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NOVA INNOVATION

Òran na Mara

EIA Scoping Report

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Nova Innovation

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Òran na Mara

EIA Scoping Report

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ABBREVIATIONS

AA
Appropriate Assessment

ABC
Argyll and Bute Council

AEZ
Archaeological Exclusion Zone

AfL
Agreement for Lease

AIS
Automatic Identification System

AoS
Area of Search

ASA
Acoustic Society of America

BGS
British Geological Survey

BTO
British Trust for Ornithology

CAA
Civil Aviation Authority

CaP
Cable Plan

CES
Crown Estate Scotland

CEMP
Construction Environmental Management Plan

CFA
Cylde Fishermen's Association

CIfA
Chartered Institute for Archaeologists

COLREGs
Convention on the International Regulations for Preventing Collision at Sea

CSAC's
Candidate Special Area's of Conservation

CTMP
Construction Traffic Management Plan

DBA
Desk Based Assessment

DSDP
Deep Sea Drilling Project

DSLP
Design Specification and Layout Plan

ECC
Export Cable Corridor

EEZ
Exclusive Economic Zone

EIA
Environmental Impact Assessment

EIAR
Environmental Impact Assessment Report

EMEC
European Marine Energy Centre

EMF
Electromagnetic fields

EPS
European Protected Species

FeAST
Feature Activity Sensitivity Tool

FMP
Flex Marine Power

FSA
Formal Safety Agreement

GEBCO
General Bathymetric chart of the Oceans

GLVIA
Guidelines for Landscape and Visual Impact Assessment

GPP
Guidance for Pollution Prevention

HERs
Historic Environment Records

HRA
Habitats Regulation Assessment

IALA
International Association of Marine Aids to Navigation and Lighthouse Authorities

ICES
International Council for the Exploration of the Sea

IEMP
Integrated Environmental Monitoring Plan

IH&M
Inner Hebrides and the Minches

iMarDIS
The Integrated Marine Data and Information System

IMO
International Maritime Organization

Km
Kilometres

kW
Kilowatt

LAQM
Local Air Quality Management

LAT
Lowest Astronomical Tide

LCOE
Levelised Cost of Energy

LCT's
Landscape character types

LMP
Lighting and Marking Plan

LVIA
Landscape and Visual Impact

M
Metre(s)

MAIB
Marine Accident Investigation Branch

MCA
Maritime and Coastguard Agency

MGN
Marine Guidance Note

MHWS
Mean High Water Springs

MLWS
Mean Low Water Springs

MoD
Ministry of Defence

MPA
Marine Protected Area

MS-LOT
Marine Scotland Licence and Operations Team

MU
Management Units

MW
Megawatt(s)

NLB
Northern Lighthouse Board

NM
Nautical mile(s)

NMFS
National Marine Fisheries Service

NRA
Navigational Risk Assessment

NRHE
National Record of the Historic Environment

NtMs
Notice to Mariners

ODPM
Office of the Deputy Prime Minister

ÒnM
Òran na Mara

OREI's
Offshore Renewable Energy Installations

PAD
Protocol for Archaeological Discoveries

PAN
Planning Advice Note

PDE
Project Design Envelope

PSA
Particle Size Analysis

PSPA's
Proposed Specially Protected Area's

RMS
Root Mean Square

RSPB
Royal Society for the Protection of Birds

SAC
Special Area of Conservation

SEPA
Scotland Environment Protection Agency

SPA
Specially Protected Area

SPR
Scottish Power Renewables

TAN
Technical Advice Note

TTS
Temporary Threshold Shift

UKHO
United Kingdom Hydrographic Office

UXO
Unexploded Ordnance

VP
Vantage Point

WEBS
Wetland Bird Survey data

WLA
Wild Land Area

WOSAS
West of Scotland Archaeology Service

ZoI
Zone of Influence

ZTV
Zone of Theoretical Visibility

Conservation
The process of maintaining and managing change to a heritage receptor in a way that sustains and, where appropriate, enhances its significance.

Designated heritage assets
World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Inventory Gardens and Designed Landscapes, Inventory Battlefields and Conservation Areas designated under the relevant legislation.

Heritage receptor
A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest.

Historic environment
Physical evidence for human activity that connects people with place, linked with the associations we can see, feel and understand.

Historic environment record
A public, map-based data set, primarily intended to inform the management of the historic environment.

Setting
More than the immediate surroundings of a site or building, and may be related to the function or use of a place, or how it was intended to fit into the landscape of townscape, the view from it or how it is seen from areas round about, or areas that are important to the protection of the place, site or building.

Significance
The value of a heritage receptor to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage receptor's physical presence, but also from its setting.

Value
An aspect of worth or importance.

NON-TECHNICAL SUMMARY

Nova Innovation (Nova) is a leading tidal technology company that designs, builds and operates tidal energy devices and develops sites for arrays of tidal turbines. Drawing on past lessons from the wind power sector, Nova strongly believes that the way to achieve this is to demonstrate commercial devices at a small (sub-megawatt) scale, then scale up in size as the technology and environmental effects are proven: start small, think big.

Nova is passionate about contributing to a cleaner environment and reducing the need for fossil fuels and working with local communities and supply chains. It believes that the resources and expertise of coastal communities will make a major contribution to the success of tidal energy.

In 2016 Nova deployed the world's first offshore tidal array in Bluemull Sound, Shetland, expanding the project to six turbines in January 2023. Nova's latest direct-drive (gearbox-less) technology, outlined in Chapter 5 (The Project)

Nova plans to develop a tidal energy Project known as Òran na Mara (Gaelic for "Song of the Sea"), in the Sound of Islay, Scotland. The Òran na Mara (ÒnM) Project will have a capacity of up to 10MW and comprise up to 30 tidal stream turbines installed on the seabed between Islay and Jura. The turbines are likely to be a combination of Nova's existing M100-D turbine (100-200kW capacity) currently operating in Shetland and its upscaled 'next-generation' turbine (up to 500kW capacity). When installed, the turbines will be fully submerged with nothing visible on the surface.

The power generated by the turbines will be brought to shore via cable, with four different 'landfall' options on Islay (Bunnahabhain, Ardnahoe, Caol Ila and Port Askaig) and one on Jura (Whitefarland Bay) currently being explored. A small onshore substation close to the landfall point will export the power to the National Grid network, or via a 'private wire' to a local end-user or users.

The Project will be developed incrementally, with turbines and associated offshore and onshore infrastructure installed gradually in phases. Each Project phase will be carefully monitored to gather environmental evidence to ensure sustainable progression through sequential phases.

A seabed Agreement for Lease for the Project has been awarded to Nova by Crown Estate Scotland. Nova intends to apply to Marine Scotland Licencing Operations Team (MS-LOT) and Argyll and Bute Council for the offshore and onshore consents to construct and operate the ÒnM Project.

An Environmental Impact Assessment (EIA) will be required to support Nova's consent applications to MS-LOT and Argyll and Bute Council. This EIA Scoping Report documents the first stage of the EIA by identifying the potential positive and negative environmental effects of the ÒnM Project and setting out how they will be assessed, and the results documented in an EIA Report.

This EIA Scoping Report, which is being submitted to MS-LOT in support of a request for an EIA 'scoping opinion', supports two key purposes:

- To seek the views and opinions of stakeholders, consultees and the local community on the potential environmental effects of the Òran na Mara Project. These views will help determine the scope of the EIA, the approach to assessing the identified potential effects and any measures needed to reduce or remove the potential for adverse effects.
- To enable Nova to gather information to gain a better understanding for key local issues or constraints and information on environmental factors that will inform and influence the final design of the Project. This will help Nova 'design out' any potential adverse environmental effects and enhance the Project's sustainability at the project design stage. Areas of project design where Nova thinks local knowledge and information will play a critical role include decisions on the landfall options, turbine layout and Project phasing.

Some of the key design features of the ÒnM Project cannot be finalised until local knowledge and evidence have been obtained and further site investigations and surveys carried out. A relatively broad 'design envelope' has been defined in this Scoping Report which in some cases includes a range of options (such as landfall points). As a consequence, the scope of the EIA also remains broad at this stage, with few potential effects having been fully 'scoped out' of the need for further assessment. Many of the effects have been 'scoped in' to the EIA on a precautionary basis but are very unlikely to be significant or result in adverse impacts.

When all Project details are confirmed it is expected that many of the identified potential effects will not require a detailed assessment and can be addressed proportionately in the EIA, for example through a desk-based assessment with no need for site surveys. Other potential effects will require a more in-depth assessment, supported by detailed site data and surveys. This approach is key in taking practical steps towards a proportionate EIA, while making sure that Nova provides the local community, regulatory bodies and their advisors, and other stakeholders with a comprehensive understanding for the likely significant effects of the Project, so that any measures to avoid or reduce such effects can be agreed.

This Scoping Report has identified some potential effects of the ÒnM Project which are not expected to be significant and, therefore, which are proposed to be 'scoped out' of the EIA. It is proposed that these effects, detailed in the table below, will not be assessed in any further detail in the EIA Report. A brief supporting rationale for scoping out these effects is provided, with further details provided in the corresponding topic chapters.

Potential effects to be 'Scoped out' of EIA for Òran na Mara

EIA Topic	Potential effects	Rationale for scoping out of the EIA
Marine Water and Sediment Quality Benthic Ecology Marine Mammals Marine Ornithology Fish and Shellfish Ecology Commercial and Local Fisheries	Toxic contamination through accidental chemical release from turbines.	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. NB: Corresponding potential effects of accidental releases on all other receptors have also been scoped out of the EIA.
Marine Water and Sediment Quality Benthic Ecology Marine Mammals Marine Ornithology Fish and Shellfish Ecology Commercial and Local Fisheries	Toxic contamination through accidental hydrocarbon or chemical release from vessels engaged in works.	Embedded mitigation measures including use of responsible vessels operators only, compliance with statutory requirements and application of best practice standards will avoid accidental release from vessels engaged in works. The tidal conditions at the site mean small spills will quickly disperse. NB: Corresponding potential effects of accidental releases on all other receptors have also been scoped out of the EIA.
Marine Mammals	Disturbance from electromagnetic field (EMF) from export cables.	Low-power Alternating Currents (AC) will be used which produce much lower EMF than high-power subsea Direct Current (DC) systems. Nova's systems are balanced so no external electrical field should be present. The EMF in the sea around the cable(s) will be negligible.
Marine Mammals Marine Ornithology	Increased suspended sediment	Potential risk of temporary increase in suspended sediment concentrations and associated sediment

EIA Topic	Potential effects	Rationale for scoping out of the EIA
Commercial and Local Fisheries	concentrations and associated sediment deposition	deposition during construction and decommissioning. However, the lack of seabed drilling and tidal conditions at the site mean any sediment will quickly disperse so the risk of effects on Marine Mammals is negligible.
Archaeology and Cultural Heritage	Changes to the setting of the historic environment and cultural assets due to presence of offshore Project infrastructure	All offshore infrastructure will be fully submerged, with no requirement for surface markers or lighting.
Archaeology and Cultural Heritage	Changes to the setting of the historic environment and cultural assets due to the presence of vessels engaged in works.	The modular nature of Nova's turbines means that these and other offshore infrastructure can be installed and retrieved quickly and easily, limiting the need for vessels to be present on site. Any visual effects will be limited in scale and duration.
Archaeology and Cultural Heritage	Direct physical disturbance from seabed contact by anchors on vessels.	Construction and maintenance activities will be undertaken using a small 'multicat' work vessel using dynamic positioning. Any impacts on known or unknown features of marine archaeological and cultural heritage will be avoided
Terrestrial Ecology	Direct effects on terrestrial avian species	The small-scale of the onshore infrastructure for the Project and very limited land-take minimise the potential for any disturbance, dispersal or mortality to birds.
Terrestrial Ecology	Direct and indirect effects on Jura, Scarba and the Garvellachs SPA	The small-scale of the onshore infrastructure for the Project and very limited land-take minimise the potential for any direct or indirect effects on the SPA.
Landscape and Seascape	Impact on visual amenity experienced at night	All offshore structures are fully submerged with no requirement for lights or other marking. Onshore lighting of onshore infrastructure is not anticipated to be necessary. Neither offshore nor onshore works will be carried out during hours of darkness.
Onshore Geology and Physical Processes	Effects on Caol Ila Geological Conservation Review site	No landfalls or routings are planned to cross this area or enter into the designated area or immediately adjacent to it.
Onshore Noise and Vibration	All effects	Onshore Project infrastructure is limited in scale. Construction and decommissioning works will be temporary and short-term.
Traffic and Transport	All effects	Onshore Project infrastructure is limited in scale. Any increase in traffic and transport will be temporary, short-term and very minimal compared to background levels.
Air Quality	All effects	Onshore Project infrastructure is limited in scale. Any increase in dust or traffic emissions will be temporary, short-term and very minimal compared to background levels. Any emission from offshore vessels will be minimal.

EIA Topic	Potential effects	Rationale for scoping out of the EIA
Major accidents, Disasters and Human Health	All effects	Project design, including small size, fully submerged offshore infrastructure and avoidance of the use of any hazardous materials minimise the risk of any major accidents. Project location makes the risk of any major natural disasters extremely low. The potential for significant adverse effects on the environment or human health are highly unlikely.
Climate Change	Greenhouse gas emissions from onshore and offshore traffic	Any increase in traffic will be temporary, short-term and minimal compared to background levels. Resulting increases in GHG and other emissions are expected to be negligible in comparison with existing traffic emissions in the area.

The remaining potential effects of the ÒnM Project identified in this Scoping Report cannot at this stage be 'scoped out'. It is proposed that these 'scoped in' effects, detailed in the table below, will be assessed in further detail in the EIA Report. A brief supporting rationale for scoping in these effects is provided, with further details provided in the corresponding topic chapters.

Potential effects to be 'scoped in' to the EIA for Òran na Mara

Topic	Potential Effects
Marine Physical Processes	▪ Changes in suspended sediment (all Project Phases). ▪ Changes to tidal regime (turbulence, scour, mixing) during turbine operations (Operational Phase). ▪ Changes in coastal erosion (Operational Phase). ▪ Changes in offshore sediment pathways and effects on morphological features (Operational Phase). ▪ Changes in shoreline sediment pathways and effects on coastline (Construction and Decommissioning Phases).
Marine Water and Sediment Quality	▪ Deterioration in Marine Water Quality due to re-suspension of sediments (all Project Phases).
Benthic Ecology	▪ Physical disturbance or change (substratum type) to habitats and species and habitat loss (all Project Phases). ▪ Abrasion/disturbance at the surface of the substratum causing habitat loss and disturbance (all Project Phases). ▪ Smothering of benthos and siltation rate changes (Construction and Decommissioning Phases). ▪ Introduction of Invasive Non-Native Species (all Project Phases). ▪ Turbine presence causing changes to the hydrodynamic regime, in the area potentially affecting the mechanisms within the local benthic ecology (Operational Phase).
Marine Mammals	▪ Mortality, injury and/or disturbance from unexploded ordnance (UXO) clearance (Construction Phase). ▪ Disturbance (noise and visual presence) from vessel traffic (all Project Phases). ▪ Disturbance from operational noise generated by the devices (Operational Phase). ▪ Indirect effects of underwater noise or barrier effects on marine mammal prey species (Operational Phase).

Topic	Potential Effects
	▪ Disturbance and/or injury from pin-piling (Construction Phase). ▪ Disturbance from noise above the sea surface (all Project Phases). ▪ Barrier to movement or displacement due to presence of turbines (Operational Phase). ▪ Risk of collision with vessels (all Project Phases). ▪ Risk of collision with tidal turbines (Operational Phase).
Marine Ornithology	▪ Disturbance and displacement by vessel activity (all Project Phases). ▪ Disturbance and displacement from vicinity of turbines (Operational Phase). ▪ Effects on foraging from changes in turbulence (Operational Phase). ▪ Seabed feeding habitat loss/change, due to presence of devices and offshore infrastructure (Operational Phase). ▪ Risk of collision with tidal turbines (Operational Phase).
Fish and Shellfish	▪ Changes to or loss of fish or shellfish habitat (all Project Phases). ▪ Effects of Electromagnetic Fields (Operational Phase). ▪ Effects of underwater noise to hearing and pressure sensitive species (all Project Phases). ▪ Effects of siltation and smothering (Construction and Decommissioning Phases). ▪ Risk of fish collision with tidal turbines (Operational Phase). ▪ Introduction of Invasive Non-Native Species (all Project Phases).
Commercial and Local Fisheries	▪ Disturbance of fishing grounds (all Project Phases). ▪ Displacement of fishing vessels (Operational Phase). ▪ Effects on vessel safety (all Project Phases).
Shipping and Navigation	▪ Displacement of vessels leading to increased voyage distance or time (all Project Phases). ▪ Restricted access to local ports/harbours (all Project Phases). ▪ Increased vessel to vessel collision risk (all Project Phases). ▪ Increased vessel grounding risk due to vessel displacement (all Project Phases). ▪ Vessel hull interaction risk with turbines (Operational Phase). ▪ Anchor and/or fishing gear interaction with offshore Project infrastructure (Operational Phase). ▪ Navigational hazard caused by loss of station of offshore Project infrastructure (all Phases).
Archaeology and Cultural Heritage	▪ Direct physical disturbance during invasive seabed or intertidal surveys (all Phases). ▪ Direct physical disturbance during installation or decommissioning of offshore and intertidal infrastructure (Construction and Decommissioning Phases). ▪ Direct physical disturbance during installation or decommissioning of onshore infrastructure (Construction and Decommissioning Phases). ▪ Turbine presence causing changes to the hydrodynamic regime in the area potentially affecting local features (Operational Phase). ▪ Changes to the setting of the historic environment and cultural assets due to presence of onshore Project infrastructure (Operational Phase).
Underwater Noise	▪ Generation of underwater noise from vessel movements and effects on marine life (all Phases).

Topic	Potential Effects
	▪ Generation of underwater noise from cable laying and effects on marine life (Construction). ▪ Generation of underwater noise from acoustic site surveys and effects on marine life (all Phases). ▪ Generation of underwater noise from operational turbines and effects on marine life (all Phases).
Terrestrial Ecology	▪ Direct and indirect effects on habitats of conservation concern (Construction and Decommissioning). ▪ Direct effects on non-avian protected species (Construction and Decommissioning).
Landscape and Seascape	▪ Changes to landscape character (all Phases). ▪ Changes to seascape character (all Phases). ▪ Changes to the Jura NSA (all Phases). ▪ Changes to the Jura, Scarba Lunga and Garvellachs WLA (all Phases) ▪ Changes to visual amenity (all Phases). ▪ Cumulative effects arising in combination with other similar unbuilt onshore developments (all Phases).
Onshore Geology and Physical Processes	▪ Effects on surface and groundwater quality from sediment/silt run-off (Construction and Decommissioning). ▪ Contamination of surface and groundwater quality from chemical or fuel spills (Construction and Decommissioning). ▪ Effects on drainage and flood risk (all Phases). ▪ Effects on surface and groundwater quantity (Construction and Decommissioning). ▪ Direct and indirect impacts on soils (Construction and Decommissioning).
Socioeconomics, Tourism and Recreation	▪ Direct, indirect and induced employment and economic opportunities (all Phases). ▪ Potential effects on local tourism or recreational amenities (all Phases).
Climate Change	▪ Generation of low carbon electricity (Operational Phase). ▪ Contribution to the commercialisation of tidal power (all Phases). ▪ Emissions of embodied greenhouse gases present in Project materials or resulting manufacturing (Construction). ▪ Project resilience to climate change effects (Construction).

The final scope of the EIA for ÒnM will be confirmed following the receipt of a Scoping Opinion from the Scottish Ministers. Nova Innovation invites consultees to comment on the EIA Scoping Report and the questions outlined in each topic chapter. Responses to this Scoping Report should be directed to MS-LOT of the Scottish Government to ensure all responses are collated and included within the Scoping Opinion responses.

1. INTRODUCTION

1.1 Purpose of EIA Scoping Report

This Environmental Impact Assessment (EIA) Scoping Report (the 'EIA Scoping Report') has been prepared for the Òran na Mara[1] tidal energy project (hereafter referred to as 'ÒnM' or 'the Project'), in the Sound of Islay between the islands of Jura and Islay in the Inner Hebrides, Scotland.

The ÒnM Project will have a capacity of up to 10MW and comprise up to 30 non-surface piercing tidal turbines installed on the seabed between Islay and Jura. The developer, Nova Innovation Ltd. (hereafter referred to Nova) intends to apply to Marine Scotland Licencing Operations Team (MS-LOT) and the local authority (Argyll and Bute Council) for the onshore and offshore consents required to construct and operate the Project.

An EIA will be required to support Nova's consent applications to MS-LOT and Argyll and Bute Council. This Scoping Report provides information to support Nova's request for a formal opinion ('Scoping Opinion') from the Scottish Ministers[2] on the scope of the EIA required to support these consent applications. The Scoping Report documents the first stage of the EIA by identifying the potential positive and negative environmental effects of the ÒnM Project and setting out how they will be assessed, and the results documented in an EIA Report.

The Project was originally intended to be 3MW, with a view to possible future expansion. However, following discussions with MS-LOT and NatureScot, Nova determined that consents should be sought for a larger array from the outset. The total potential capacity has increased from 3MW to up to 10MW. An Agreement for Lease (AfL) for the Project development area was secured by Nova from Crown Estate Scotland in December 2020. This AfL enabled Nova to explore the potential to develop a tidal stream energy project at the site.

This EIA Scoping Report will be issued for a period of consultation with stakeholders by MS-LOT, after which a Scoping Opinion will be provided. The Scoping Opinion may identify gaps in the approach proposed and additional sources of information. The subsequent EIA Report (EIAR) will benefit from, and take account of, these comments.

The scoping process allows statutory and non-statutory consultees to comment on the Project, the scope of the future EIA and the proposed assessment methodologies. It also provides an opportunity for consultees to raise any issues which they consider may be important to the EIA process and provide direction on the topics on which it should focus. The EIA will be carried out in accordance with the Scoping Opinion and the findings of the EIA will be documented in an EIA Report.

1.1 Structure of the Scoping Report

This EIA Scoping report provides the following information:

- A description of the characteristics of the Project (including construction, operation and decommissioning phases);
- The location of the Project, including a description of the characteristics (physical, biological and human) and the environmental sensitivity of the area;
- The types and characteristics of the potential effects of the Project (positive and negative) on the environment;

[1] Òran na Mara means 'song of the sea' in Gaelic.
[2] Under Regulation 5 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and Regulation 7 of the Marine Works (Environmental Impact Assessment) Regulations.

- An explanation of the likely effects of the Project on the environment;
- The proposed approach to identifying and assessing the magnitude of any significant effects of the Project, including assessment methodologies and associated evidence and data requirements; and
- Potential mitigation measures to reduce or remove significant negative or adverse effects of the Project on the environment.

Table 1-1 provides an overview of the structure and content of this EIA Scoping Report.

Table 1-1 Structure of EIA Scoping Report

Chapter	Title	Summary of Content
1	Introduction	▪ Provides an overview of Nova Innovation, the ÒnM Project and the Scoping Report.
2	Approach to EIA	▪ Summarises the approach to identifying and assessing the potential effects of the Project in this Scoping Report. ▪ Sets out how the potential likely significant effects of the Project identified in this Scoping Report will be assessed and documented in the EIA. ▪ Provides details of the proposed proportionate approach to the EIA according to the risk of significant effects.
3	Legislation, Policy and Consenting	▪ Provides an overview of international and national legislation and policy relevant to the Project, tidal energy and consenting and an overview of the consenting process for the Project.
4	Stakeholder Engagement	▪ Summarises stakeholder engagement for the Project to date. ▪ Presents the forward plan for seeking the views of the local community and other stakeholders to ensure these are incorporated to the final project design and the EIA.
5	The Project	▪ Describes the characteristics of the Project (including construction, operation and decommissioning phases). ▪ Provides details of the Project location and onshore and offshore components. ▪ Presents details of the flexible project design envelope on which this Scoping Report has been based.
6-24	Technical chapters (various)	▪ Describes the characteristics (physical, biological and human) of the project location and the environmental sensitivity of the area to impacts. ▪ For each technical topic, describes the types and characteristics of the potential effects of

Chapter	Title	Summary of Content
		the Project (positive and negative) on the environment and provides an explanation of the likely significant effects. ▪ Presents the proposed approach to identifying and assessing the magnitude of any significant effects of the Project in the EIA, including assessment methodologies and associated evidence and data requirements. ▪ Provides an initial overview of potential mitigation measures to reduce or remove significant negative or adverse effects of the Project on the environment.
25	Information to Support Habitats Regulations Assessment	▪ Provides an overview of the requirements of the Habitats and Birds Directives (as transcribed into Scottish Law) in relation to the Project. ▪ Details how information to support a Habitats Regulations Assessment for the Project will be provided in the EIA.
26	Cumulative Impact Assessment	▪ Provides an overview of the approach that will be taken in the EIA to assess the cumulative effects of the Project in combination with other plans, projects and activities that may affect the same environmental and human receptors as ÒnM.
27	Summary of EIA Scoping and Next Steps	▪ Provides an overview of the potential environmental effects of the Project which will be further assessed and documented in the EIA Report. ▪ Provides an overview of the likely Survey and Evidence Strategy for the Project, to ensure that the final project design and the EIA are based on appropriate evidence. ▪ Summaries the mitigation measures identified to reduce or remove significant negative or adverse effects of the Project on the environment. ▪ Details Project next steps including the formal request for a Scoping Opinion and how this information will be used to progress the EIA and inform the final project design.

1.2 Scoping Report Terminology

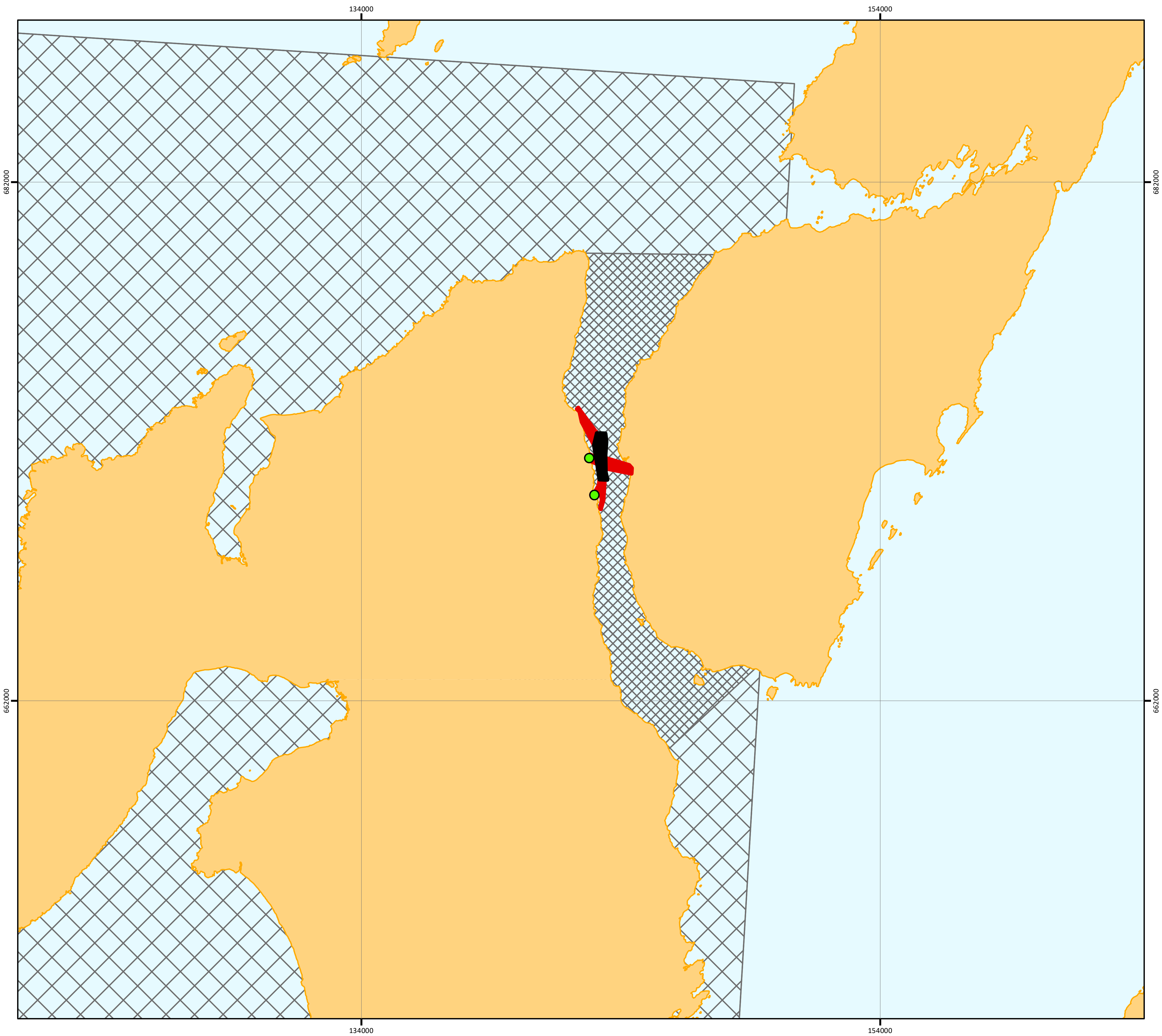
It is appropriate to define the terms that are used in the EIA Scoping Report.

- The “study area” refers to the Sound of Islay (46.8km²); and

- The "Project area" refers to the area defined by an AfL issued to Nova by Crown Estate Scotland for the ÒnM area for lease Project (0.64km²).

Chapters 11 (fish and shellfish) and 12 (commercial and local fisheries) use the term the "wider region" which refers to the sea area around Islay (International Council for the Exploration of the Sea (ICES) statistical rectangle 40E3, covering 2,792km².

The extent of these areas is shown in Figure 1-1 (Drawing no. P2585-LOC-004-A), while Figure 1-3 (Drawing no. P2585-LOC-003-D), shows the Project area.



ÒRAN NA MARA EIA SCOPING REPORT

LOCATION OVERVIEW
Wider Study Area

Drawing No: P2585-LOC-004	A

Legend

- Vantage Point Surveys
- AfL Area
- Exploratory Cable Routes & Cable Corridor
- Study Area - Sound of Islay
- Wider Study Area - ICES Statistical Rectangle (40E3)

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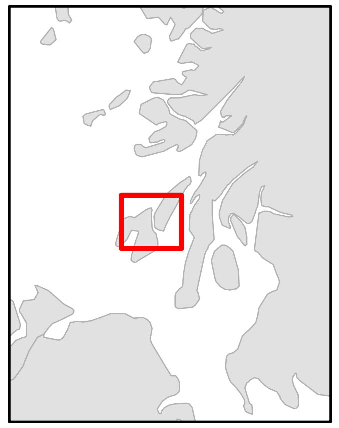

NOTE: Not to be used for Navigation

Date	02 February 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; Nova Innovation; ICES; OSOD
File Reference	J:\P2585\Mxd_QGZ\01_LOC\ P2585-LOC-004.mxd
Created By	Lewis Castle
Reviewed By	Oliver Bula
Approved By	Lesley Harris

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0 2 4 6

1.3 The Project Developer

Nova is an award-winning tidal energy company headquartered in Leith, Edinburgh. Nova designs, builds and operates tidal energy devices that generate electricity from the natural ebb and flood of the tide, and develops sites for tidal turbine arrays.

Nova was founded in 2010 and now employs over 40 staff, including engineering, project management, site development and environmental specialists. The strength of this team and Nova's capability is demonstrated by the successful deployment and operation of the world's first offshore tidal array in Bluemull Sound, Shetland and a growing global portfolio of tidal energy projects.

Drawing on lessons from the wind sector, Nova believes that the best way to sustainably develop tidal stream energy is to demonstrate commercial devices at a small scale and scale up in size as the technology is proven; start small, think big. Nova has successfully demonstrated the success of this approach at its tidal energy projects in Bluemull Sound, Shetland (the "Shetland Tidal Array") and most recently at the "Nova Tidal Array" in Petit Passage in the Bay of Fundy, Canada.

Nova is committed to engaging with the local communities in which its projects are located and sourcing from local supply chains. Nova believes that the resources and expertise of coastal communities can make a major contribution to the success of tidal energy.

In 2016 Nova deployed the world's first offshore tidal array in Bluemull Sound, Shetland, expanding the project to six turbines in January 2023. Nova's latest direct-drive (gearbox-less) technology is shown in Figure 1-2.

Figure 1-2 Nova's M100-D direct drive tidal stream turbine on the quayside in Shetland

1.4 Project Overview

Full Project details are provided in Chapter 5 of this report, with a brief overview provided here. Offshore elements are defined as those located below Mean High Water Springs (MHWS) and onshore elements as those located above Mean Low Water Springs (MLWS). There is, therefore, an area of overlap between offshore and onshore boundaries within the 'inter-tidal' area.

Figure 1-3 (Drawing no. P2585-LOC-003-D shows the different Project elements including turbine deployment area, cable corridor and exploratory cable corridors. All turbines will be located in the area delineated by the black polygons shown, which is the Crown Estate Scotland AfL area.

The ÒnM Project will be located in the Sound of Islay, north of Port Askaig between the islands of Islay and Jura in the Inner Hebrides. It will have a capacity of up to 10MW and comprise up to 30 tidal stream turbines installed on the seabed between Islay and Jura. The turbines are likely to be a combination of Nova's existing M100-D turbine (100-200kW capacity) currently operating in Shetland and its upscaled 'next-generation' turbine (up to 500kW capacity). When installed, the turbines will be fully submerged with nothing visible on the surface.

The Project will be developed incrementally, with turbines and associated offshore and onshore infrastructure installed gradually in phases. Each Project phase will be carefully monitored to gather environmental evidence to ensure sustainable progression through sequential phases. The EIA will assess the benefits of incorporating specified and defined phases as a core feature of the Project design. This approach will be a core feature of the ÒnM project, to carefully manage and reduce environmental risk, while improving the evidence base on effects around which there is uncertainty.

Nova is exploring a number of potential options for the subsea cable route to export the power generated by the turbines to shore at various landfall points on Islay and Jura. These are delineated by the red polygons in Figure 1-3, referred to as areas of search (AoS) for cable routes, as follows:

- An export cable running from the Project area to a landfall point on the east of the Sound in the Whitefarland Bay area on Jura.
- An export cable running from the Project area to various other locations west of the Project area on Islay, at Port Askaig, Caol Ila, Ardnahoe and Bunnahabhain.

Figure 1-3 (Drawing no. P2585-LOC-003-D) shows the AfL area, and AoS for the potential cable corridors and corresponding landfall currently being explored. A small onshore substation close to the chosen landfall point will export the power to the National Grid network, or via a 'private wire' to a local end-user or users.

Nova is exploring the possibility of providing power from the tidal array to local whisky distilleries, as there is a great potential and appetite for decarbonisation within the whisky industry in Islay. 'Islay has a constrained electricity supply network' (Local Energy Scotland, 2022) so providing tidal power direct to local distilleries would enable them to meet their energy needs using local, predictable, renewable energy. Nova is also in discussion with other potential local end users of the power generated by the turbines. The landfall and end-user options for power from the ÒnM Project will be narrowed as part of the EIA and advanced engineering design process, taking account of supply and demand of electricity in the local area.

1.5 The Need for The Project

Nova is passionate about having a cleaner environment and reducing the need for fossil fuels, for current and future generations. Nova is committed to engaging with, and sourcing from, local supply chains: Nova believe that the resources and expertise of coastal communities will make a major contribution to the success of tidal energy.

The need for the Project can be considered from two perspectives: (i) the policy-based need; and (ii) the practical need, each being considered in turn below.

i *The need for the Project is supported strongly by national planning policy (see **Chapter 3: Relevant Legislation and Policy** below). In the context of wider Scottish and UK energy policy, the role of tidal energy as part of a sustainable long-term mix of generating sources across Scotland and the UK, is also clearly established. The Project will contribute towards Scotland's Climate Change targets, specifically 2045 net-zero targets.*

ii *the Project is needed to connect an offshore tidal generating facility to the national electricity transmission grid. Without such a connection, the electricity generated offshore could not connect to the grid and in turn, could not be used to power properties across Argyll and Bute, Scotland and the UK.*

There are four key drivers for the shift in energy production toward low carbon sources, including renewable energy, in the UK and Scotland:

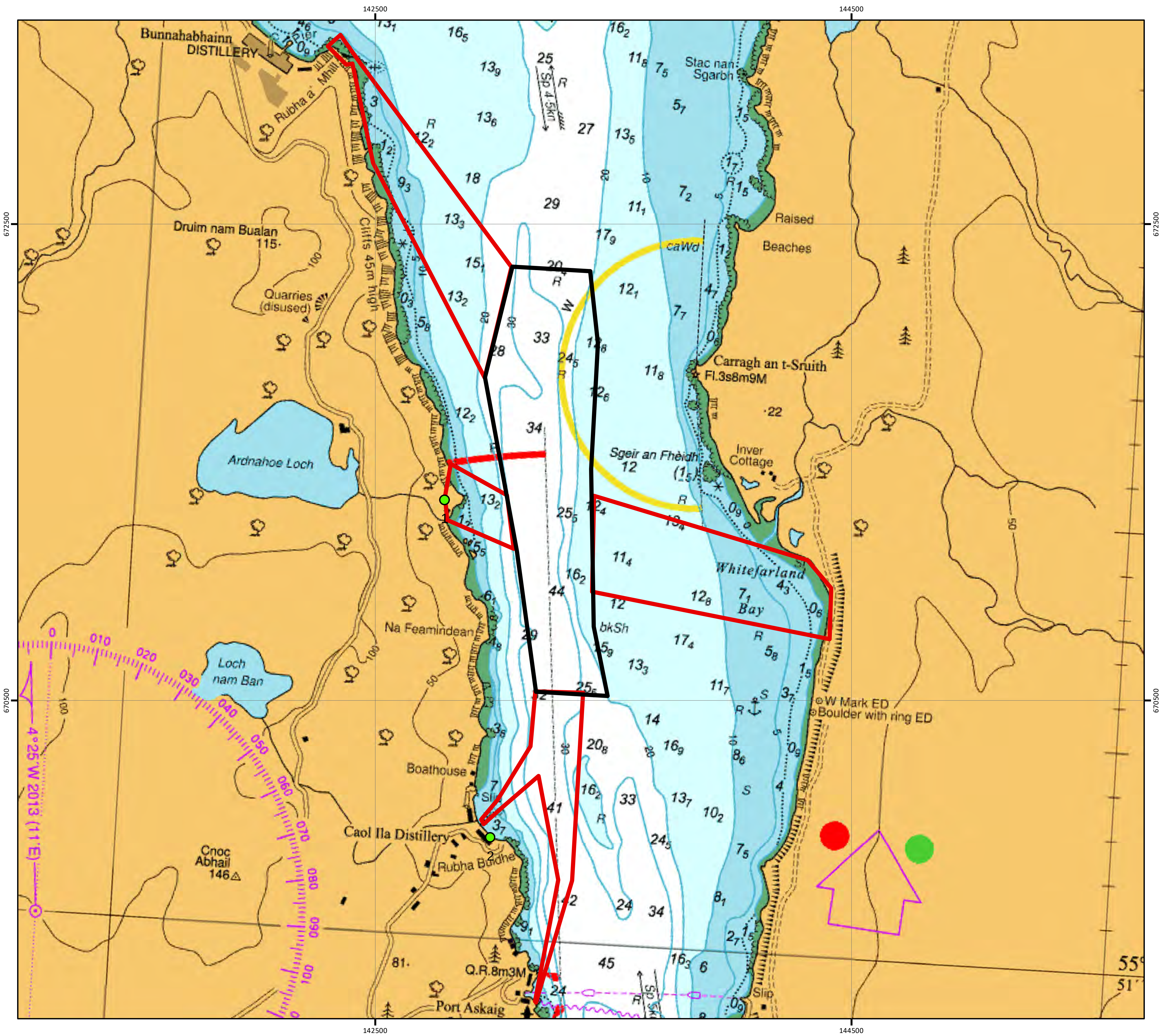
1. The need to address Climate Change;
2. The need to secure energy supply;
3. The need for new energy infrastructure; and
4. The need to maximise economic opportunities.

Tidal energy is well-placed to contribute to helping meet the UK's target of achieving Net Zero by 2050[3] and the Scottish Government's target 20GW of additional low-cost renewable energy generation by 2030[4]. The completely predictable nature of tidal resource makes tidal stream energy unique among renewables. This uniqueness could give it a key place in the UK's energy system as a highly predictable form of energy, improving energy security.

Following Russia's war in Ukraine the UK Government has ambitions for a major acceleration in 'home-grown' power, set out in its British Energy Security strategy which aims for 95% of the UK's electricity to come from low carbon, renewable energy sources by 2035 (DBEIS 2021).

To help achieve these Scottish and UK Government targets and ambitions, tidal Projects need to scale up from single devices and small arrays to achieve commercialisation of tidal energy and bring down the Levelised Cost of Energy (LCOE). It is this need that underpins Nova's current application.

[3] UK's path to net zero set out in landmark strategy - GOV.UK (www.gov.uk)
[4] Renewable and low carbon energy - gov.scot (www.gov.scot)



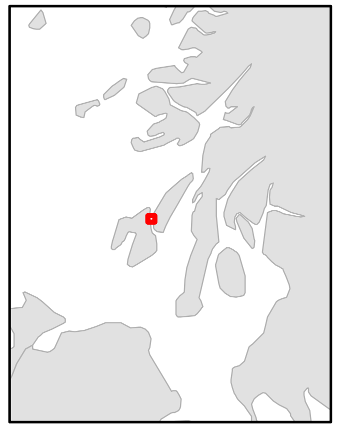
ÒRAN NA MARA EIA SCOPING REPORT

LOCATION OVERVIEW
Immediate Project Area

Drawing No: P2585-LOC-003	D

Legend

- AfL Area
- Areas of Search for Exploratory Cable Corridors



NOTE: Not to be used for Navigation

Date	13 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; Nova Innovation; The Crown Estate
File Reference	J:\P2585\Mxd_QGZ\01_LOC\ P2585-LOC-003.mxd
Created By	Aodhfin Coyle
Reviewed By	Lewis Castle
Approved By	Lesley Harris

NOVA INNOVATION   intertek

0 0.25 0.5 0.75 1 Km

1.5.2 Offshore Site

The Crown Estate Scotland AfL enabled Nova to explore the potential to develop a tidal stream energy project at the site in the Sound of Islay. The sound is orientated north – south, so is protected from prevailing westerly winds and has limited fetch, minimising wave action. An assessment by Nova has confirmed that tidal conditions at the site are suitable for its tidal turbine technology.

The AfL area is effectively an area where turbines might be deployed. Details and locations of turbines and offshore project infrastructure will be refined as further site data are gathered and following discussion with regulatory bodies and their advisors and other key stakeholders, during and following scoping.

Further details on the offshore site and onshore Project components are provided in Chapter 5 (The Project).

1.1.2 Onshore Site

Nova is exploring a number of potential options for the subsea cable route to export the power generated by the turbines to shore at various landfall points on Islay and Jura (Figure 1-1 -Drawing no. P2585-LOC-003), including:

- An export cable running from the offshore Project area to a landfall point on the east of the Sound of Islay in the Whitefarland Bay area on Jura, from where a connection would be made to either the National Grid network and/or local end user(s) via a 'private wire' agreement.
- An export cable running from the offshore Project area to various other locations west of the Project area on Islay, at Port Askaig, Caol Ila, Ardnahoe and Bunnahabhain. These options may involve the negotiation of a 'private wire' agreement rather than a direct connection to the National grid network.

Details and locations of the export cable(s) and onshore project infrastructure will be refined as further site data are gathered and following discussion with regulatory bodies and their advisors, and other key stakeholders, during and following scoping. The options presented within the EIA Scoping report will be narrowed down as part of the EIA and advanced engineering design process. Further details on the onshore site and onshore Project components are provided in Section 5.6.

1.6 Contributors to the EIA Scoping Report

This EIA Scoping Report for the ÒnM project has been prepared by Intertek Energy and Water (Intertek), on behalf of Nova. A number of other technical specialists have contributed as follows:

- APEM Ltd – Marine Mammal and Offshore Ornithology;
- Anatec Ltd – Shipping and Navigation;
- Wessex Archaeology – Offshore and onshore Archaeology;
- Seiche Ltd – Underwater Noise;
- Land Use Consultants (LUC) – Seascape, Landscape Visually Impact and onshore Elements;
- Kaya Consulting Ltd. – Onshore Hydrology and Hydrogeology;
- AWJ Marine – Commercial Fisheries; and
- Dragon Fly Project Delivery – Stakeholder Engagement.

Nova's internal Project planning, engineering and environmental specialists have also contributed to the EIA Scoping Report.

2. APPROACH TO EIA

2.1 Introduction

This Chapter provides an overview of the approach to the EIA and Scoping exercise for the Project. The Chapter sets out the approach to identifying the activities or effects that require further assessment within the EIA, and the depth of evidence required, based on the latest Project Design Envelope at the time the assessments are undertaken.

2.2 The EIA Process

The Environmental Impact Assessment Directive ("the EIA Directive") aims to ensure that the competent authority granting consent for a particular project makes its decision in full knowledge of any likely significant effects (LSE) on the environment. The EIA process is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects, and the scope for reducing any adverse effects, are properly understood by the public and competent authority before a decision is made. The EIA Directive is transcribed to Scottish Law through various EIA regulations, of which the following apply to the ÒnM project:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended by The Environmental Impact Assessment (Miscellaneous Amendments) (Scotland) Regulations 2017
- The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended by The Environmental Impact Assessment (Miscellaneous Amendments) (Scotland) Regulations 2017

Each of the EIA regulations outline a similar process to determine the nature and scale of effects that a potential development may have. These stages are summarised as:

- Screening (pre-application): determines whether an EIA is required.
- Scoping (pre-application): identifies the issues which must be addressed in the EIA Report.
- EIA Report (application): assesses the likely significant effects of a project.
- Consultation/public participation by the competent authority (application): gathers views from stakeholders on the likely effects of the project.
- Determination by the competent authority: having considered the environmental information, mitigation and consultation responses.

The identification and assessment of likely significant effects of the ÒnM Project in the EIA process will be conducted having regard to the guidance set out in the following:

- Marine Scotland Consenting and Licensing Guidance: For Offshore Wind, Wave and Tidal Energy Applications (Marine Scotland, 2018b);
- Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2022);
- Environmental impact assessment for offshore renewable energy projects (British Standards Institute (BSI), 2015);
- Guidelines for data acquisition to support marine Environmental assessments of offshore renewable energy projects (Centre for Environment, Fisheries and Aquaculture Science (Cefas), 2012);

- IEMA Environmental Impact Assessment Guide to Shaping Quality Development (IEMA, 2016a);
- Planning Advice Note (PAN) 1/2017 Environmental Impact Assessment (Scottish Government, 2017);
- A Handbook on Environmental Impact Assessment (SNH, 2018); and
- Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2019).

2.3 Approach to Assessing Potential Effects

The EIA regulations require that the EIA should consider the LSE of the Project on the environment. The EIA topic-specialists that have contributed to the production of this EIA Scoping Report have identified will predict how the receiving environment might interact with the ÒnM Project. The full extent of the potential effects of ÒnM on its receiving environment, before proposed mitigation measures are introduced, will be outlined. Potential effects from the construction, operations and maintenance and decommissioning phases of ÒnM will be set out.

The significance of an impact can be subjective and may be primarily based on professional judgement. Although this process is subjective, the assessment will be transparent, evidence base, consistent and quantitative as possible or necessary.

Definitions for the sensitivity of receptors and magnitude of change will be developed on a topic-by-topic basis and are described and presented in each topic chapter. The sensitivity of the receptor to the Project considers the specific nature of the receptor or group of receptors and their capacity to adapt to change.

Sensitivity is also a subjective judgement, defined by a receptor's tolerance to an impact, its ability to recover from an impact or ability to adapt to the changes in the environment resulting from the Project. Sensitivity may also consider a receptor's environmental designation, rarity, and whether it provides an important ecosystem service or function.

In some instances, professional judgement for the topic will be used to develop the sensitivity category used in accordance with the technical assessment guidance for each technical area. Where no specific technical guidance is available the following sensitivity of receptor categories will be used:

- Very high;
- High;
- Medium;
- Low; and
- Negligible

Magnitude of an impact can also be subjective but is influenced by its duration, timing, scale size, and frequency / probability. Where no specific wording is present for the technical assessment area via guidance etc, the following magnitude categories are applied in this Scoping Report.

Table 2-1 Definition of Significance

Magnitude	Description	Significance
Major	Highly Significant and requires immediate action	Significant under EIA Regulations

Magnitude	Description	Significance
Moderate	Significant requires additional control measures and/or management	
Minor	Not significant, however may need some management to ensure remains within acceptable levels	Insignificant impact under EIA Regulations
Negligible	Not significant	

Consequence the sensitivity of a receptor and the magnitude of impact are combined to define the severity of the effect as outlined in Table 2-2.

Table 2-2 Consequence of Impact

Magnitude	Sensitivity				
	Very high	High	Medium	Low	Negligible
Major	Major	Major	Major	Moderate	Minor
Moderate	Major	Major	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible
Positive	Positive	Positive	Positive	Positive	Positive

For the ÒnM Project EIA process LSE will be those that are likely to cause a moderate or major effect to the environment, based on sensitivity of the receptor and magnitude of impact. It is proposed to divide the possible LSE of the Project into one of three categories, detailed below:

- Potential likely significant effects (positive and negative). These will be comprehensively assessed in the EIA with a corresponding detailed depth of evidence;
- Potential effect positive or negative, but unlikely to be significant; and
- No likely significant effect.

For the onshore elements of the Project the assessment will be undertaken in accordance with NatureScot guidance[5] and based on CIEEM guidance[6].

The approach to assessment will take account of existing guidance and published scientific literature, together with professional judgement and relevant experience.

The EIAR will provide a detailed description of the existing baseline for onshore elements within the Study Area, along with the assessment of the potential effects of the Project on the identified important onshore features, taking account of mitigating measures to avoid and reduce significant effects where appropriate.

[5] NatureScot. Planning and Development: Standing Advice and Guidance Documents. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents (Accessed 23/01/23)
[6] CIEEM (May 2021). Good Practice Guidance for Habitats and Species. Available at: https://cieem.net/resource/good-practice-guidance-for-habitats-and-species/ (Accessed 23/01/23)

2.4 Proportionate EIA

The European Commission's 2009 review of the EIA Directive identified the need for action to streamline the increasingly complex array of environmental assessments required for projects. In 2014 amendments to the Directive included actions to make EIA more efficient, focusing on the 'likely significant effects' of the project, especially where they act in combination with the Habitats and Birds Directives (IEMA 2017).

Nova intends to carry out a proportionate EIA for the ÒnM Project that provides a robust assessment of the Project's likely significant effects and accessible reporting which add value to the consenting process. The EIA for ÒnM will ensure that regulatory bodies and their advisors, and other key stakeholders have a focused and full understanding for the likely significant effects of the Project, which the consultation and decision-making process can take into account.

This scoping report identifies the potential impact pathways for the ÒnM Project and the corresponding possible effects on biological and human receptors. Some of the key design features of the ÒnM Project cannot be finalised until local knowledge and evidence have been obtained and further site investigations and surveys carried out. A relatively broad 'design envelope' has been defined in this Scoping Report which in some cases includes a range of options (such as landfall points). As a consequence, the scope of the EIA also remains broad at this stage, with few potential effects having been fully 'scoped out' of the need for further assessment. Many of the effects have been 'scoped in' to the EIA on a precautionary basis but are very unlikely to be significant or result in adverse impacts.

When all Project details are confirmed it is expected that many of the identified potential effects will not require a detailed assessment and can be addressed proportionately in the EIA, for example through a desk-based assessment with no need for site surveys. Other potential effects will require a more in-depth assessment, supported by detailed site data and surveys. This approach is key in taking practical steps towards a proportionate EIA, while making sure that Nova provides the local community, regulatory bodies and their advisors, and other stakeholders with a comprehensive understanding for the likely significant effects of the Project, so that any measures to avoid or reduce such effects can be agreed.

A key factor in delivering proportionate EIA for the ÒnM Project will be the appropriate use of existing evidence and data to minimise uncertainty about the potential effects of the Project. This includes environmental monitoring data from Nova's other tidal energy projects in Shetland and Canada, and evidence presented in the EIA for a previously consented 10MW tidal energy project south of Nova's site in the Sound of Islay[7].

2.5 Use of Flexible Project Design Envelope

Nova will take a flexible Project Design Envelope (PDE) approach to defining the ÒnM Project which will be assessed in the EIA. Nova will demonstrate that the LSE of the proposal have been properly assessed. The use of a flexible PDE at scoping stage enables Nova to retain flexibility in the project parameters at this early stage and will allow feedback during scoping to inform refinement of the Project design.

Realistic worst-case scenarios will look at sensitive receptors and impact pathways as identified by the EIA Scoping Report and the assessments carried out within the EIA Scoping process. For those design aspects for which the retention of flexibility is required for technical reasons, a series of parameters will be defined within which the final Project will fall. The EIA and supporting EIAR will clearly set out the maximum environmental impact based on the realistic worst-case scenario derived from the PDE. Many of the technical aspects of the Project are likely to be closely aligned with the Nova tidal array

[7] Volume 1 2010 Sound of Islay Environmental Statement.pdf (marine.gov.scot).

in Bluemull Sound, Shetland. However, Nova recognises, the nature of the ÒnM Project and evolving technology mean that some aspects of the final project are yet to be determined in precise detail at the time the EIA Scoping application is submitted (such as the precise location of certain types of infrastructure, the foundation type, the size of certain structures or the turbine model).

This ensures that final decisions on some technical elements of the Project can be based on the best available evidence nearer project delivery. Where possible, Project details will be refined as further site data are gathered and following discussion with regulatory bodies and their advisors, and other key stakeholders, during and following scoping.

Nova will consider the key principles which have been set out by Marine Scotland following judgments in cases in the Queen's Bench Division of the High Court[8]. MS consider the key principles[9] for Nova to consider when using the PDE approach:

- The application should explain the need for and the timescales associated with the flexibility sought for the Project;
- The parameters established for the Project must be sufficiently defined to enable a proper assessment of the likely significant environmental effects and to allow for the identification of mitigation, if necessary, within a range of possibilities;
- The assessments in the EIAR should be consistent with the clearly defined parameters and ensure a robust assessment of the likely significant effects;
- The EIAR assessment may include a "cautious worst case" approach, but that must then feed through into the mitigation measures which should be adequate to deal with the worst case; and
- Any consent given by Scottish Ministers must not permit the Project to extend beyond the clearly defined parameters which have been requested and assessed. Scottish Ministers may choose to impose conditions to ensure that the Project is constrained in this way.

2.6 The Evidence Base for Scoping

2.6.1 Marine Scotland and NatureScot Advice

Nova has been in discussion with Marine Scotland and NatureScot about the ÒnM Project since 2020. This previous advice, as well as published guidance and reports have been taken into account in this EIA Scoping Report. The scoping report has also taken account of relevant advice and decisions provided by Marine Scotland and NatureScot for SPR's 10MW Sound of Islay Tidal Demonstrator Project. Marine Scotland and NatureScot's advice to date on ÒnM is summarised below.

2.6.1.1 Marine Scotland

Marine Fish Ecology data sources

MSS have commissioned a project to develop 'Essential Fish Habitat Maps for Fish and Shellfish Species in Scotland'. An initial study was undertaken, based on a literature review and consultation with key stakeholders to establish current knowledge for evidence gaps. This report, published in June 2022 includes research recommendations to help fill remaining strategic priority gaps[10]. The Project was due to be completed by 30th September 2022, however, the Project has been extended to allow more

[8] *R v Rochdale MBC ex parte Tew and Others (No. 1)* [2000] Env L.R. 1; and *R v Rochdale MBC ex parte Milne (No. 2)* [2001] Env. L.R. 22.
[9] https://www.gov.scot/publications/guidance-applicants-using-design-envelope-applications-under-section-36-electricity-act-1989/pages/3/
[10] S. Xoubanova and Z. Lawrence (2022). Review of fish and fisheries research to inform ScotMER evidence gaps and future strategic research in the UK. Report commissioned by Marine Scotland. Available at https://www.gov.scot/publications/review-fish-fisheries-research-inform-scotmer-evidence-gaps-future-strategic-research-uk/documents/

time for additional case study maps to be created. The new contract end date is 15th January 2023 and publication of the final outputs were published in May 2023. MSS advise consideration of the Project outputs in the Scoping Report if timelines align between the expected report publication date and writing the Scoping Report, however at the time the time of writing the maps were not published. The Essential Fish Habitat Maps for Fish and Shellfish Species in Scotland will be utilised during the EIA process and included in the final EIAR.

Cumulative Impact Assessment

MS-LOT advised that any project within the vicinity that is scheduled to reach or progress past scoping three months or more prior to the submission of Nova's EIA Report must be included in Nova's Scoping Report.

Socio Economic Impact Assessment

Provided General Advice for SEIA, from their Marine Analytical Unit (MAU), in December 2022. This advice included key best practice tips for undertaking a SEIA, along with key components of a SEIA, Examples of different types of socio-economic effects and key data sources.

Decommissioning

Marine Scotland has provided Nova with a guidance document on the decommissioning Offshore Renewable Energy Installations in Scottish waters [11].

2.6.1.2 NatureScot

Nova and Intertek asked NatureScot to provide written advice on how to assess the harbour porpoise SAC near the Project area. The following response was provided:

It is difficult to provide a strong steer on assessing effects on the Inner Hebrides and the Minches SAC before detailed monitoring results are available, however at this stage we can offer the following comments:

- *The location of the development in the Sound of Islay means that it is not only immediately adjacent to the IH&M SAC but also provides a transit route between parts of the SAC. Therefore, any porpoise seen in the development area are highly likely to be part of the protected population.*
- *However, we know from previous developments and survey work, that detecting porpoise within narrow tidal channels can be problematic and therefore they may need to include data from either side of the sound to give a better indication of the numbers (density) likely to be transiting. (See work done previously on Kyle Rhea) https://apps.snh.gov.uk/sitelink-api/v1/sites/10508/documents/64*
- *In terms of assessment this will need to be done against the conservation objectives for the SAC and should include information on likely collision risk/encounter rates and implications of displacement from a transiting route. https://apps.snh.gov.uk/sitelink-api/v1/sites/10508/documents/59 [eur03.safelinks.protection.outlook.com] [eur03.safelinks.protection.outlook.com]*
- *Although there isn't a 'true' reference population for the SAC there is a population figure that was used at site designation, which should be used alongside the West Coast Management Unit figures, for contextual information about the likely scale of any impact (along with any more local information for that area). https://apps.snh.gov.uk/sitelink-api/v1/sites/10508/documents/63*

[11] Decommissioning of Offshore Renewable Energy Installations in Scottish waters or in the Scottish part of the Renewable Energy Zone under The Energy Act 2004 : Guidance notes for industry (in Scotland) (www.gov.scot)

2.6.1.3 Current Data Gathering

Nova is currently undertaking vantage point Marine Mammal and Marine Ornithology surveys within the Sound of Islay, the vantage point locations are outlined in the Figure 1-2 (Drawing no.: P2578-LOC-003-A). More information on these surveys is outlined in Chapter 9 (Marine Mammals), Chapter 10 (Marine Ornithology), and Appendix B.

These surveys will continue until at least July 2023, after which the need for their continuation will be reviewed and discussed with MS-LOT and NatureScot. As part of this discussion, Nova proposes analysing the data gathered to date to determine consistency with the extensive surveys undertaken by SPR. Where no discrepancies are observed the appropriateness of using SPR's data in place of continuing surveys in the ÒnM site beyond July 2023 will be discussed with Marine Scotland and NatureScot. More information on the survey methods and analysis is provided in Appendix B.

2.6.2 Evidence from Other Tidal Projects in the Sound of Islay

2.6.2.1 SPR Sound of Islay Demonstration Tidal Array

MS-LOT awarded consents to SPR in 2011 for their 10MW Sound of Islay Tidal Demonstration Array[12] at a location south of the ÒnM Project Figure 2-1 (Drawing no. P2585-LOC-006-A). A considerable body of evidence was gathered to inform the EIA and consent applications for SPR's project. Such evidence includes including baseline surveys and studies, Environmental Statement chapters, Impact Assessments, Consultation responses, Consent decisions and conditions.

Nova has had initial discussions[13] with Marine Scotland and NatureScot to seek their views on the relevance of this evidence to the ÒnM Project. This topic was also discussed during the EIA Scoping Workshop for the Project in November 2022[14].

Nova proposes taking an approach based on a modified version of that applied to offshore wind farms (OWF) in the Firth and Tay, where there was a similar change and evolution in projects and developers over time. Marine Scotland advised Nova that for the Firth and Tay OWF a 5-year limit 'rule of thumb' was applied for onshore EIA data, but the situation offshore is less clear, with decisions made on a case by case basis framed around the following key stages and guiding principles:

1. Were significant residual impacts identified in the original EIA?
2. Does the [new project] involve an increase in relevant worst case design parameters?
3. Are the technical studies and baseline data in the [original project] application and EIA still valid?
4. Have there been any changes to relevant policy, guidance or legislation since consent for the [original SPR was issued] that may now invalidate the approach to the assessment?

Marine Scotland and NatureScot have advised Nova that some of the evidence in the SPR, including baseline surveys and information might be sufficient for ÒnM, with some supplementation by Nova and a commitment to post-consent monitoring. Any information from the SPR EIA and how it has been utilised in the ÒnM EIA will be detailed in the relevant technical chapters of the EIA Report.

The approach will recognise that while some of the SPR data are greater than ten years old, it may still be relevant to the ÒnM Project. The approach to use this SPR data will be further discussed and agreed with MS-LOT and NatureScot and other stakeholders throughout the EIA. Scoping will work to the principle that SPR data and existing data are sufficient for ÒnM unless stated otherwise in the EIA Scoping Report. The overall aim is to ensure the evidence required for and presented in the EIA is fit for purpose and proportionate to the risk of significant effects.

[12] Consents were varied in 2015 following some changes to the project design.
[13] Meetings took place between Nova and NatureScot (then Scottish Natural Heritage) on 27 August 2020 and between Nova, NatureScot and MS-LOT 22 September 2020.
[14] See Section 4.5 and Appendix A for further details.

Flex Marine Power Ltd

In October 2021, a marine licence application was submitted to MS-LOT by Flex Marine Power Ltd (FMP) to install a single 50kW SwimmerTurbine™ at a location in the Sound of Islay approximately 4km to the south of the ÒnM Project. On the 24 June 2022 a Marine Licence was granted by The Scottish Ministers, which will be valid from 1 September 2022 until 31 December 2027. While a full EIA was not required for the Project various environmental information and assessments were provided in support of the marine licence application.

2.6.3 EIA and Consenting for Other Tidal Energy Schemes

Information and learning from other tidal energy schemes form an important part of the evidence base for the ÒnM Project EIA, including to inform this EIA Scoping Report. This information has been accessed through a wide variety of means, including publicly available consent documentation, as well as through websites and portals such as the Offshore Renewable Energy Joint Industry Programme for Ocean Energy and Tethys.

Nova's Shetland Tidal Array was the world's first grid-connected offshore tidal array. The first 100kW Nova turbine was installed in Bluemull Sound between the islands of Yell and Unst in March 2016. Since then the array has been expanded to six 100 kW turbines, the most recent three of which are direct drive machines with no gearbox. A comprehensive programme of environmental monitoring has been carried out throughout the operation of the Shetland Tidal Array which has provided unique data on interactions between marine wildlife and the turbines.

Nova has applied evidence and experience gained from the Shetland Tidal Array to EIA scoping and project design for the ÒnM Project. This includes evidence from the environmental monitoring, technical elements of project design and experience gained in installation and decommissioning methodologies, these reports can be found here: https://marine.gov.scot/ml/shetland-tidal-array. In particular, Nova has gained expertise in delivering tidal projects in incremental phases, where environmental monitoring is an embedded project design component used to de-risk deployment of subsequent phases. This approach will be a core feature of the ÒnM Project to carefully manage and reduce environmental risk, while improving the evidence base on effects around which there is uncertainty.

Other key tidal energy schemes from which relevant evidence can be drawn for the ÒnM Project include (but are not limited to):

- Tidal Energy Limited's 400kW Delta Stream tidal energy project in Ramsey Sound, Pembrokeshire;
- Marine Current Turbines' 10MW Anglesey Skerries Array;
- Minesto's Deep Green project, Anglesey;
- Various devices deployed at the European Marine Energy Centre (EMEC), Orkney;
- SSE Renewables and Open Hydro Group Ltd's 200MW Brims Tidal project Orkney, Scotland;
- The Morlais Tidal Demonstration Array, Anglesey; and
- Nova's other tidal projects including the Nova Tidal Array in Petit Passage, Nova Scotia.

2.6.4 Online Databases and Other Tools

Energy Initiatives such as the Offshore Renewable Energy Joint Industry Programme for Ocean Energy[15] and the US Ocean Energy Systems Initiative Tethys database [16] and State of the Science

[15] http://www.orjip.org.uk/oceanenergy/about
[16] https://tethys.pnnl.gov/

report 2020[17] will form a crucial part of the evidence base on which Nova will draw. Marine energy data bases that have been developed within Wales include: The Integrated Marine Data and Information System (iMarDIS)[18] ; the Marine Energy Wales (MEW)[19] database; and the most recent 'State of the Sector' report issued by MEW. Renewable UK have also developed 'EnergyPulse'[20], which Renewable UK has labelled as "the industry's go-to market intelligence service, providing comprehensive and accurate energy data, insights, and focussed dashboards for the wind, marine, storage and green hydrogen sectors in the UK and offshore wind globally".

The Scottish Government has developed an online assessment tool known as 'FeAST'. FeAST[21] is a starting point for determining potential management requirements for Nature Conservation Marine Protected Area (MPAs) and highlights where further discussion with users of the marine environment may be required. An example of how FeAST can provide evidence to demonstrate how infrastructure changes to tidal flow could impact on native oyster beds. The aim is that information on the sensitivity of all Scottish marine features of conservation importance will be incorporated into FeAST.

2.7 Approach to Consultation During Scoping

Some stakeholder engagement was undertaken prior to and during the production of this EIA Scoping Report. This includes ongoing engagement by Nova with local stakeholders, to ensure that the PDE takes into account early feedback. Some consenting and EIA-focused engagement by the Intertek/Nova team was undertaken to inform ongoing consenting and the production of this report. A particular focus of this engagement and consultation was an EIA Scoping Workshop hosted by MS-LOT. Further details on this workshop and other consultation that has taken place during scoping are provided in Chapter 4 For topics which were informed by consultation during the scoping phase of the Project, the early responses are outlined in the topic chapters. If no consultation is mentioned, no consultation took place on the technical topic.

2.8 Approach to Characterisation of the Existing Environment

An accurate description of the existing environment is necessary to predict the potential effects of the Project on the environment. Existing baseline Environmental monitoring data can also be used as a valuable reference for the assessment of actual effects from a development once it is operational. To describe the receiving environment, desktop reviews of existing data sources will be undertaken for each topic, relying on published reference reports and datasets to ensure the objectivity of the assessment.

To appropriately scope the EIA, each technical discipline has identified their likely study area for each landfall option, or how that study area would be defined once one or more landfall option(s) is / are chosen. Each section has also briefly described the existing environmental baseline of the surrounding area near each proposed landfall option and identified potentially sensitive receptors of the wider surrounds where landfall is anticipated. This information has been gathered from desk-studies and the review of publicly available information.

Desktop studies will also be supplemented by specialised field walkovers, surveys, or studies in order to confirm the accuracy of the desktop study and to gather more baseline Environmental information for incorporation into the future EIAR. The receiving environment will be evaluated to highlight the character of the existing environment that is distinctive and what the significance of this is. The significance of a specific environment will be derived from legislation, national policies, local plans and

[17]https://www.ocean-energy-systems.org/news/oes-environmental-2020-state-of-the-science-report/
[18] https://www.imardis.org/
[19] https://www.marineenergywales.co.uk/
[20] https://www.renewableuk.com/page/EnergyPulse
[21] https://www.marine.scotland.gov.uk/feast/

policies, guidelines, or professional judgements. The sensitivity of the environment will also be described.

2.9 'Do nothing' Scenario

In this section of each chapter of the future EIAR, the EIA topic-specialists will predict the situation or environment which would exist if Òran na Mara Tidal Array was not developed. This scenario will take into account the continuation or change of current management regimes, as well as the continuation or change of trends currently evident in the environment

2.10 Approach to Cumulative Impact Assessment (CIA)

Cumulative Impact Assessment (CIA) is a legally required component of EIA. The CIA must examine the impacts arising from the Project alone and cumulatively with other relevant plans, projects, and activities. The EIA Report will examine potential cumulative impacts of the ÒnM Project with other plans and projects, including other tidal projects in the Sound of Islay region, as well as other marine and coastal developments. The interactions between environmental topics, for example the interaction of the offshore infrastructure with the onshore infrastructure which may share the same Zone of Interest will also be considered.

The Marine Scotland (2018) Consenting and Licensing Guidance: For Offshore Wind, Wave and Tidal energy Applications states that 'Engagement with MS-LOT is required to identify which plans/projects/ongoing activities should be included in the in-combination element of the CIA. It will consider all other relevant plans, projects and activities that are publicly available and which are:

- Already constructed;
- Under construction;
- Permitted application(s) not yet determined; and
- Plans and projects which are "reasonably foreseeable" (i.e. developments that are being planned, including, for example, offshore renewable energy projects which have a Crown Estate Scotland AfL, and offshore renewable energy project that have been scoped).

Marine Scotland is currently working with partners including the Centre for the Environment and Hydrology (CEH), RSPB, the Sea Mammal Research Unit and the Sea Watch Foundation to develop a Cumulative Effects Framework (CEF) for offshore renewable developments. The key outputs of this initiative will be a tool for the assessment of cumulative effects for key ecological receptors. This tool is currently expected to be released in May 2023. While the focus of the CEF is on the application to assess the cumulative effects of large scale offshore wind in Scottish waters, elements of the CEF may be of relevance to ÒnM. This will be reviewed during the EIA and once the CEF has been released.

2.11 Approach to Assessing Risk of Major Accidents and Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of ÒnM on the receiving environment deriving from the vulnerability of the Project to risks of major accidents and/or disasters which are relevant to ÒnM will be assessed in the future EIAR.

Two key areas need to be considered namely:

- the Project's potential to cause accidents and/or disasters; and
- The vulnerability of the Project to potential disaster/accident, both natural and manmade.

In the Population and Human Health chapter of the EIAR, the Project's vulnerability to major accidents and natural disasters and the potential adverse effects on human health and the environment will be assessed. That chapter of the EIAR will examine potential disaster situations including:

- Flooding;
- Fire;
- Extreme weather;
- Coastal erosion and sea level rise;
- Major incidents involving dangerous substances;
- Catastrophic events;
- Landslides; and
- Shipping and Navigation.

Specifically, this assessment in the Population and Human Health chapter of the EIAR will draw on other chapters of the EIAR to identify, describe and evaluate, in an appropriate manner, the worst case potential direct and indirect effects of major accidents and natural disasters.

The Construction and Environmental Management Plan (CEMP) that will be submitted as part of the EIAR will include an emergency response plan which will be implemented for the Project in the event of emergency or disaster situations.

The CEMP will also outline the statutory obligations of the Developer, Designer and Contractor pursuant to the Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992. The Construction (Design and Management) Regulations 2015.

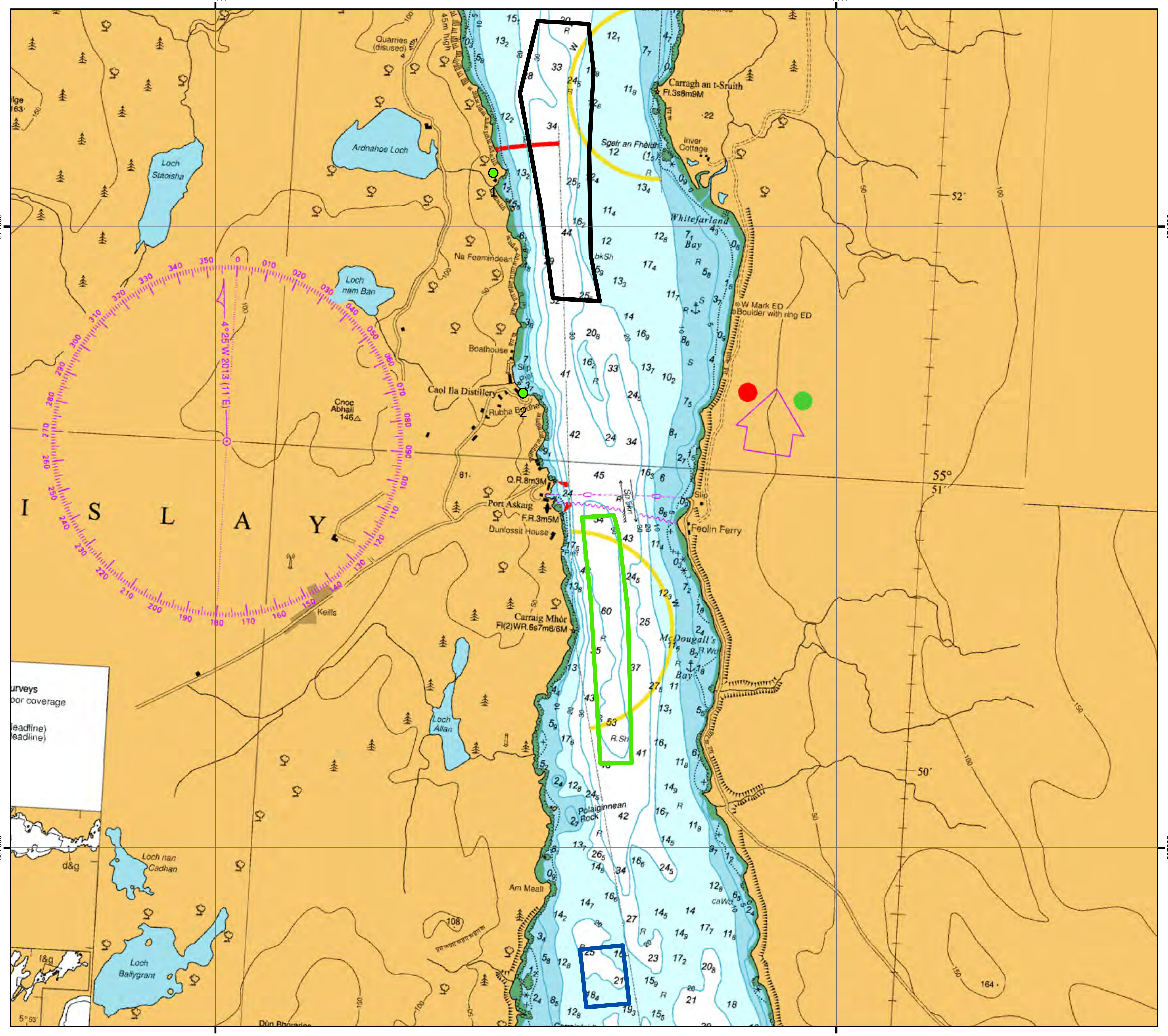
The CEMP also sets out mitigation in the event of a catastrophic event associated with operational wave turbines.

2.12 Approach to Mitigation

The identification and adoption of embedded mitigation measures to avoid or minimise adverse effects upon onshore and offshore features will form part of the iterative design process.

Full details of the Project's evolution and embedded mitigation measures in relation to the relevant technical topics will be detailed within the EIAR. Where LSE are identified, within the context of the EIA regulations, mitigation measures will be identified and agreed in consultation with relevant stakeholders. All mitigation measures will be developed on the basis of robust science, drawing on current and emerging good practice and its likely efficacy and success will be considered. For completeness, mitigation to safeguard legal compliance will also be included in this section.

To ensure that a proportionate approach is taken to the EIA process, it has been assumed within this Scoping Report that a range of mitigation measures will be 'embedded' within the design and construction of the Project. These are typically 'standard' practices and procedures, such as implementing a CEMP and use of 'best practicable means' construction techniques, but also appropriate siting and design of the Project to minimise environmental effects and, as far as practicable, the need for additional mitigation measures or environmental controls. Therefore, only potentially LSE that could arise with these measures in place require further consideration within the EIA.



ÒRAN NA MARA EIA SCOPING REPORT

LOCATION OVERVIEW

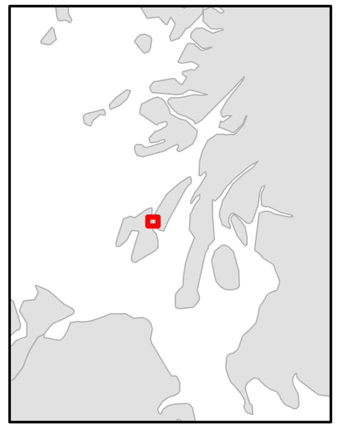
Tidal Energy Project's in the Wider Study Area

Drawing No: P2585-LOC-006 | **A**

Legend

- Nova Innovation AfL Area
- Flex Marine Tidal Energy Site
- SPR Tidal Desmonstration Site

N S E W



NOTE: Not to be used for Navigation

Date	08 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	Nova Innovation; The Crown Estate; UKHO; ESRI
File Reference	J:\P2585\Mxd_QGZ\01_LOC\ P2585-LOC-006.mxd
Created By	Aodhfin Coyle
Reviewed By	Lewis Castle
Approved By	Lesley Harris

NOVA INNOVATION intertek

0 0.25 0.5 0.75 1 Km

3. LEGISLATION, POLICY AND CONSENTING

3.1 Introduction

Renewable energy development is at the forefront of international, national and local policy due to the challenges associated with climate change, energy demand and energy security particularly following the Russian war in Ukraine. There is an ever-growing number of international and national policies which relate to climate change and the development of renewable energy resources in Europe, the UK and Scotland. Various pieces of legislation and policies are relevant to the Project. This chapter describes the key relevant policy, legislation and guidance which relates to the development of renewable energy projects, and the consents required for the Project.

3.2 International and EU Legislation and Policy

The "level playing field" requirements in the UK/EU Trade and Cooperation Agreement (TCA) contains environment aspects such as the marine and onshore environment, biodiversity, waste management, chemicals, industrial emissions, air, nature and the management of effects on the environment from agricultural or food production.

The TCA requires "non regression" in the level of environmental protection by the UK from the end of the transition period of Brexit[22] on environmental protection that were in place at 31 December 2020 (the end of the transition period of Brexit). Furthermore, environmental targets through EU environment law will remain to be bound to the UK even where the attainment of the target is envisaged for a later date. On this basis, the existing EU renewable energy targets for the UK, including the EU Renewable Energy Directive 2009/28/EC will remain applicable. It is, however, considered unlikely that any new EU legislation or updates to existing directives will be transposed into UK law.

3.2.1 Renewable Energy Directive 2018/2001

The UK's decision to leave the EU has no impact on the application of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, as the EU Directives on EIA was transposed into UK domestic law when the UK was a full member state of the EU. The purpose of the EIA Regulations is to ensure that the potential effects of the Project on the environment are taken in consideration before consent is granted. A key part of the EU's renewable energy policy is the Revised Renewable Energy Directive (RRED), this directive entered into force in December 2018, as part of the Clean Energy for all Europeans package, aimed at keeping the EU a global leader in renewables and, more broadly, helping it to meet its emissions reduction commitments under the Paris Agreement. The targets set by RRED included:

- at least a 32% share of renewable energy consumption within the EU; and
- member States to establish their contribution 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.

3.2.2 The Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU)

The Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU) has been in law in the EU since 1985. This directive has undergone four amendments to bring it alongside

[22] the UK formally leaving the European Union (EU) after triggering article 50 of the Lisbon Treaty.

EU's international commitments and other legal developments. The directive requires any major building or development projects in the EU must first be assessed for their impact on the environment. This directive provides assurances to Environmental protection and transparency with regard to the decision-making process for several public and private projects. This directive splits projects into Annex 1 and Annex 2 projects. All projects listed in Annex I are considered as having significant effects on the environment and require an EIA. For projects listed in Annex II, national authorities have the authority to decide whether an EIA is necessary.

The directive has undergone four amendments in 1997, in 2003, in 2009 and in 2014:

- Directive 97/11/EC brought the Directive in line with the UN ECE Espoo Convention on EIA in a Transboundary Context. The Directive of 1997 widened the scope of the EIA Directive by increasing the types of projects covered, and the number of projects requiring mandatory Environmental impact assessment (Annex I).
- Directive 2003/35/EC was seeking to align the provisions on public participation with the Aarhus Convention on public participation in decision-making and access to justice in Environmental matters.
- Directive 2009/31/EC amended the Annexes I and II of the EIA Directive, by adding projects related to the transport, capture and storage of carbon dioxide (CO2).
- In 2011, Directive 85/337/EEC and its subsequent amendments was codified into a single new act (Directive 2011/92/EU) that is currently in force.

3.2.3 2030 Targets including European Union Renewables Energy Directive

The 2030 Energy Strategy framework delivered by the European Commission (EC) in October 2014, builds on the 2020 climate and energy framework. The EC has proposed new climate and energy targets to be achieved by 2030 (European Commission, 2020a), including:

- at least 40% cuts in GHG emissions compared to 1990 levels;
- at least 27% of energy used in EC countries to be from renewable sources; and
- at least 27% improvement in energy efficiency.

3.2.4 2050 Low Carbon Economy

The EU aims to be climate-neutral by 2050 – an economy with net-zero GHG emissions. This objective is at the centre of the European Green Deal and in line with the EU's obligation to global climate action under the Paris Agreement (European Commission, 2020b). In March 2011, the EC presented "The roadmap for transforming the EU into a competitive, low-carbon economy by 2050" (European Commission, 2011). This report sets the goals for domestic EU action to keep global warming below 2°C:

- reducing GHG emissions by 40% in 2030 when compared to 1990 levels.
- by 60% in 2040; and
- by 80% in 2050.

These targets will be achieved by following the roadmap with the need for all economic sectors to contribute to reducing GHG emissions and the need for increased investment in low-carbon energies (European Commission, 2011).

3.3 UK Policy and Legislation

3.3.1 Climate Change Act 2008

The Climate Change Act 2008 is a legal requirement for the UK to reduce its greenhouse gas emissions from 1990 levels by at least 80% by 2050. This target is supported by a system of legally binding five-year 'carbon budgets' and an independent body to monitor progress, the Climate Change Committee (CCC). The UK carbon budgets limit the amount of GHG emissions the UK can legally release in a five-year period. The UK Parliament announced a climate emergency in May 2019, publicly declaring concern over the findings around climate change and its consequences. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 revised the 80% reduction target and introduced a legally binding commitment that the net UK carbon account for the year 2050 must be at least 100% lower than the 1990 baseline i.e. 'net zero'.

3.3.2 The Energy Act 2013

The Energy Act 2013 makes requirements to incentivise investment in low carbon electricity generation, ensure security of supply and help the UK meet its emission reduction and renewables targets. The Energy Act contains provisions for Electricity Market Reform (EMR), which sets out the framework for replacing Renewables Obligation Certificates (ROCs) with Contracts for Difference (CfD) to provide stable financial incentives to encourage investment in low carbon electricity generation. CfDs are private contracts between a low carbon electricity generator and the UK Government owned Low Carbon Contracts Company (LCCC). The aim of the CfDs is to give greater certainty and stability of revenues to electricity generators by reducing exposure to volatile wholesale prices, whilst protecting the consumer from paying for higher generation support costs when electricity prices are high (BEIS, 2020). CfDs aim to support development of renewable energy in the UK by incentivising development.

3.3.3 UK Marine Policy Statement

Published in 2011, under Chapter 4 of the Marine and Coastal Access Act (MCAA) 2009, the UK-wide MPS, provided a framework for marine spatial planning, in terms of the preparation of Marine Plans, and to guarantee that marine resources are used sustainably (HM Government, 2021). The Scottish Ministers also adopted the MPS, along with Wales and Northern Ireland. Under the MPS public authorities in all jurisdictions, must follow the marine spatial planning framework when considering applications for energy infrastructure, particularly:

- the national level of need for energy infrastructure;
- the positive wider environmental, societal and economic benefits of low carbon electricity generation;
- that renewable energy resources can only be exploited where the resource exists and where economically feasible; and
- the potential for inward investment on energy related manufacturing and deployment activity and employment opportunities and regeneration of local national economies, supporting the objective of developing the UK's low carbon manufacturing capability.

The MCAA 2009, has a requirement that all public authorities taking authorisation or enforcement decisions that affect or might affect the UK marine area, do so in accordance with the MPS and the relevant Marine Plans. Decisions on activities in the UK marine area will be plan-led once Marine Plans are in place (HM Government, 2011b).

3.4 Scottish Policy and Legislation

3.4.1 Scotland's Energy Strategy

Scotland's Energy Strategy: The Future of Energy in Scotland sets out a vision for the energy system in Scotland until 2050. The strategy sets a 2030 target for the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied by renewable sources.

3.4.2 National Marine Plan

In March 2015, the Scottish Government published 'Scotland's National Marine Plan (NMP). The NMP 2015 is a single framework which sets out strategic policies for the sustainable development of Scottish marine resources out to 200nuatical miles (nm). It is required to be compatible with the UK Marine Policy Statement and existing marine plans across the UK.

3.4.1 The National Spatial Strategy – Delivery of Sustainable Places

Part 1 of NPF4 sets out six spatial principles which form part of the 'National Spatial Strategy for Scotland to 2045':

- Just transition to net zero;
- Conserving and recycling assets, including making productive use of existing budlings, places, infrastructure and services;
- Local living, including ensuring people can easily access services, including work, locally;
- Compact urban growth, including optimising use of land to provide services and resources;
- Rebalanced development, including targeting development to create investment in areas of past decline; and
- Rural revitalisation.

The principles summarised above are considered to play a key role in delivering the United Nations Sustainable Development Goals and the Scottish Government's National Performance Framework[23.]

The Spatial Strategy is aimed at supporting the delivery of:

- 'Sustainable Places': "where we reduce emissions, restore and better connect biodiversity";
- 'Liveable Places': "where we can all live better, healthier lives"; and
- 'Productive Places': "where we have a greener, fairer and more inclusive wellbeing economy".

Page 6 of NPF4 addresses the delivery of sustainable places, noting the consequences of Scotland's changing climate:

"Scotland's Climate Change Plan, backed by legislation, has set our approach to achieving net zero emissions by 2045, and we must make significant progress towards this by 2030…..Scotland's Energy Strategy will set a new agenda for the energy sector in anticipation of continuing innovation and investment."

The National Spatial Strategy in relation to 'sustainable places' is described (page 7) as follows:

"Scotland's future places will be net zero, nature-positive places that are designed to reduce emissions and adapt to the effects of climate change, whilst protecting, recovering and restoring our environment.

[23] The Scottish Government National Performance Framework sets out 'National Outcomes' and measures progress against a range of economic, social and environmental 'National Indicators'.

Meeting our climate ambition will require a rapid transformation across all sectors of our economy and society. This means ensuring the right development happens in the right place.

Every decision on our future development must contribute to making Scotland a more sustainable place. We will encourage low and zero carbon design and energy efficiency, development that is accessible by sustainable travel, and expansion of renewable energy generation."

3.4.2 Regional Marine Plan

The Marine (Scotland) Act in 2010 set out a new management framework of Scottish seas and the resulting NMP (2015) sets the wider context for planning within Scotland, including what should be considered when creating local, regional marine plans. Scottish Waters have been split up into eleven regions and covers sea area out to 12nm. The ÒnM project is in the Argyll marine region. Regional Marine Plans will be developed by Marine Planning Partnerships, allowing more local ownership and decision making about specific issues within their area.

3.4.3 National Planning Framework 4 (2023)

NPF4 came into force on 13 February 2023. NPF4 forms part of the statutory Development Plan and should, therefore, be afforded substantial weight in the overall decision-making process.

3.4.4 The Renewables Action Plan and 2020 Routemap for Renewable Energy in Scotland

The Scottish Government's renewable energy division published The Renewables Action Plan (RAP) in June 2009. The overall aim of the RAP is to support and accelerate the implementation of renewable energy in line with EU targets, and it sets out short-term targets towards the delivery of 2020 targets for renewable energy (Scottish Government, 2009). In 2011 an updated extension to the RAP was published by the Scottish Government, the '2020 Routemap for Renewable Energy in Scotland'. This publication commits Scotland to generating the equivalent of 100% electricity demand from renewable's, along with a minimum of 11% renewable heat, by 2020 (Scottish Government, 2011). The Routemap presents the potential opportunities and challenges facing the renewable energy sector and reflects these in four key actions:

- Market initiatives;
- Support innovation;
- Investment in infrastructure; and
- Grid regulation and charging.

3.4.5 Argyll and Bute LDP 2015 (and Supplementary Guidance 2016)

The Argyll and Bute Local Development Plan provides the local planning framework for the surrounding ABC area. The Plan is divided into the written statement and proposals maps. The written statement provides a context for the policy against which planning applications for new development proposals should be assessed. This is supported by the proposals maps which show the range of development opportunities and constraints within the area. These maps include key development areas, potential area for development, areas requiring environmental improvement or regeneration and environmental designations. Depending on the final application boundary/boundaries, relevant LDP Policies are outlined below:

- LDP STRAT 1 – Sustainable Development
- LDP 3 – Supporting the Protection, Conservation and Enhancement of our Environment
- LDP 4 – Supporting the Sustainable Development of our Coastal Zone
- LDP 6 – Supporting the Sustainable Growth of Renewables

- LDP 5 – Supporting the Sustainable Growth of Our Economy
- LDP 6 – Supporting the Sustainable Growth of Renewables
- LDP 9 – Development Setting, Layout and Design
- LDP 10 – Maximising our Resources and Reducing Our Consumption
- LDP DM1 – Development within Development Management Zones
- SG LDP ENV 1 – Development Impact on Habitats, Species and our Biodiversity
- SG LDP ENV 6 – Development Impact on Trees / Woodland
- SG LDP ENV 12- Development Impact on National Scenic Areas (NSAs)

3.4.6 Argyll and Bute Proposed LDP2

ABC is presently preparing a new Local Development Plan (LDP2) which will replace the current LDP in due course. ABC has submitted the Proposed LDP2 and all unresolved representations to the Scottish Government. The Scottish Government appointed a Reporter to conduct the independent Examination which started in May 2022, and which has now concluded.

If it is adopted before the application submission, then the adopted LDP2 policies will be appropriately referenced within the EIAR and any supporting documentation, and relevant weight will be applied to its content.

3.4.7 Other Policy Based Material Considerations

Other material considerations will include Scottish climate change and energy policy, for example Scotland's Emission Reduction Targets – the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 and the Scottish Energy Strategy and Just Transition Plan (draft for consultation published in January 2023).

The technical assessment of those environmental topics which are 'scoped-in' to the EIAR will also include consideration of the relevant parts of Planning Advice Notes (PANs).

3.5 Scotland's Consenting Legislation

3.5.1 EIA

The Project will require Environmental Impact Assessment (EIA) Consent under the Marine Works (Environmental Impact Assessment) Regulations 2017 or the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 or under Section 36 of the Electricity Act 1989, both consents are issued by MS-LOT on behalf of Scottish Ministers. Both sets of Regulations set out the statutory process and minimum requirements for EIA. The key steps of an EIA are set out in Figure 4-1.

The purpose of the EIA is to ensure that the potential effects of a project on the environment are taken in consideration before development consent is granted. If a development is deemed to have potential to cause a significant effect on the environment by virtue of its scale, size and location, then an EIA is required, the results of which must be provided by the developer to the decision maker in the form of an EIA Repo. The competent authority cannot grant consent for an EIA development without considering the EIAR in due course. The EIA will fully account for the changes to made to the Marine Works (Environmental Impact Assessment) Regulations 2017 and the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. The changes to the Marine Works (Environmental Impact Assessment) Regulations 2017 are wide ranging and can be viewed here: The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 (legislation.gov.uk). Under Regulation 15 (2) of the EIA Regulations (The Marine Works (Environmental

Impact Assessment (Scotland) Regulations 2017) the information provided must include that which is necessary to “identify the location, nature and purpose of the works, and must indicate the main environmental consequences to which the applicant proposed to refer in the EIAR”. This is supplemented by Schedule 4 of the (The Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017) which specify the requirements of the information for inclusion in environmental impact assessment reports.

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 are very minor and include the amendments to regulation 2(4)(b) clarify the meaning of “development” in relation to applications for multi-stage consent. Amendments to regulations 4(5) and 21(2)(f) clarify that references to “consent” are to “Electricity Act consent”, which is defined in regulation 2 of the 2017 Regulations.

Section 36 Consent is required for an electricity generating station which has a capacity greater than 1MW in Scottish Territorial Waters under Section 36 of the Electricity Act 1989 (as amended). Section 36 consent will allow for the installation, operation and maintenance of tidal turbines and export cables as described within Chapter 7. An application for consent for the 10MW ÒnM tidal array under Section 36 in Scottish Territorial Waters may be made to the MS-LOT on behalf of the Scottish Ministers.

3.5.2 HRA

The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) and The Conservation of Habitats and Species Regulations 2017 are often referred to as the ‘Habitats Regs’. The purpose of these regulations is to preserve or restore natural habitats and wild species listed on the Annexes at a favorable conservation status. This protection is granted through the designation of European Sites and European Protected Species (EPS). The ‘Habitats Regulations’ also provide a framework for the conservation and management of wild birds. They afford rare and vulnerable species, and regularly occurring migratory species, protection through the identification and designation of Special Protection Areas (SPAs).

The Habitat Regulations require that wherever a plan or project that is not directly connected with, or necessary to the management of a national site network site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives.

Marine Scotland must consider whether the Project is likely to have significant effects on the conservation objectives of the sites considered in the HRA, and, where LSE cannot be excluded at the screening stage, and in the absence of mitigation measures, an ‘Appropriate Assessment’ of the implication of the plan or project must be undertaken by Marine Scotland before consent may be given for the Project.

This EIA Scoping report will be accompanied by a statement on information to inform HRA Screening (Chapter 19), a shadow HRA will submitted along with the EIAR. The outcome of any Appropriate Assessment would be determined by the Competent Authority and would be produced prior to determination of the application.

The Habitats Regulations represent a different legal test to the EIA Regulations. As a result, the HRA will be screened separately from this Scoping Report, however the European sites which at this point are considered likely to require further assessment are discussed throughout the assessment chapters, and feedback is sought on whether or not this covers all sites that stakeholders would expect to see assessed.

3.6 Overview of Project Consents

The following key consents and approvals for which the Scottish Ministers are the competent or regulatory authority will be required for the Project:

- Marine Licence under Part 4 of the Marine (Scotland) Act 2010 and Part 4 of the Marine and Coastal Access Act 2009;
- Consent under Section 36 of the Electricity Act 1989;
- Decommissioning programme (Energy Act 2004, as amended by the Scotland Act 2016); and
- Environmental Impact Assessment Consent under the Marine Works (Environmental Impact Assessment) Regulations 2007 and the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

  The following licences for which the Scottish Ministers are the competent or regulatory authority may also be required, depending on the potential likely effects of the Project:

- European Protected Species (EPS) license under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended); and
- Basking Shark Licence under the Wildlife and Countryside Act 1981 (as amended) and the Wildlife and Natural Environment (Scotland) Act 2011.

Marine Scotland Licensing Operations Team (MS-LOT) operates a "one-stop-shop" approach to consenting and licensing, meaning that applications for the above consents and approvals are handled simultaneously on behalf of Scottish Ministers, where requested. Onshore aspects may be consented separately under the Town and Country Planning (Scotland) Act 1997 (as amended). Nova is keen to hear comments from ABC regarding consent for the onshore elements of the Project

In addition, a statutory provision in the *Growth and Infrastructure Act 2013*, amending s57 of the *Town and Country Planning (Scotland) Act 1997* allows Scottish Ministers to direct that planning permission is deemed to be granted for the ancillary onshore components and related onshore infrastructure for a marine based electricity generating station consented under Section 36 of the *Electricity Act 1989*. ABC is statutory consultee for Section 36 applications, so would be consulted on any deemed planning components of a Section 36 application for the Project. Alternatively, Nova could choose to apply for planning consent for onshore components from ABC. Nova will agree the approach to securing onshore planning permission with ABC and MS-LOT.

4. STAKEHOLDER ENGAGEMENT

4.1 Introduction

Nova has undertaken initial stakeholder engagement with ABC and local communities and individuals. In November 2022 an online EIA Scoping workshop was held with MS-LOT, NatureScot and other key stakeholders, and a separate Navigational Risk Assessment (NRA) scoping workshop with the Maritime and Coastguard Agency (MCA) and Northern Lighthouse Board (NLB). All views and input to date have been incorporated into this EIA Scoping Report. This section outlines the stakeholder engagement to date and the forward plan for ongoing engagement for the ÒnM Project.

4.2 Stakeholder Engagement to Date

Nova is committed to open and transparent dialogue and engagement with all stakeholders, regulators, and communities that may be affected by or indeed may affect the ÒnM project. Some stakeholder engagement has been carried out prior to the EIA scoping process, including with local stakeholders, to ensure that the PDE takes into account early feedback.

Discussions and consultation with stakeholders, local authorities, local and wider communities (including the fishing industry) and those with an interest in any aspect of ÒnM project and its related infrastructure will continue throughout all stages of the Project lifecycle. Nova believes that the resources and expertise of stakeholders and coastal communities can make a major contribution to the success of tidal energy, and recognises that involvement, advice and feedback of others from an early stage can bring about significant benefits for all parties.

Table 4-1 Summary of stakeholder engagement to date for ÒnM

Stakeholder	Communication form	Date	Comments received
MS-LOT	Meeting (NatureScot also in at endance)	September 2020	Initial advice on consenting and EIA.
	Meeting (NatureScot also in at endance)	March 2022	Discussion on consenting, EIA and project timelines.
	Email	June 2022	Provided completed MS-LOT Project Details Form.
	Meeting (NatureScot and Marine Scotland Science also in at endance)	July 2022	Further advice on key issues to inform scoping, bird and mammal surveys and EIA scoping workshop.
	EIA scoping workshop (online)	November 2022	Advice on technical issues to inform Nova's scoping report.
NatureScot	Meeting	August 2020	Initial advice on key consenting issues Advice on relevance of SPR EIA to ÒnM.

Stakeholder	Communication form	Date	Comments received
	Meeting and follow up emails	September 2020	Detailed above (MS-LOT).
	Meeting and follow up emails	March 2022	Detailed above (MS-LOT).
	Meeting and follow up emails	July 2022	Detailed above (MS-LOT).
	EIA scoping workshop (online)	November 2022	Detailed above (MS-LOT).
Crown Estate Scotland	Meeting	November 2022	Quarterly meetings to discuss progress on tidal projects (Yell and Islay).
	Meeting	March 2023	As above.
Argyll and Bute Council	Meeting	June 2019	Initial meeting to introduce Nova and discuss project.
	Meeting	May 2021	Meeting to discuss key project details, progress and next steps.
	Meetings	August 2022	Meeting and follow up to discuss key project details, progress and next steps.
	Email	March 2023	Notification to planning department asking for preferred route for onshore consenting – instructed to fill in online pre-application form.
	Online pre-planning application enquiry form	March 2023	As above, online form completed – planning adviser will be in touch via email.
Scottish Power Renewables	Phone and Teams call (various)	2019-present	Discussions about status of Sound of Islay demonstration tidal array project consents and information and data presented in the EIA Report.

Stakeholder	Communication form	Date	Comments received
Islay Energy Trust (IET)	IET Board Meeting	April 2019	Information about Nova shared during board meeting.
	Meeting	June 2019	Project introduced to George Dean.
	Meeting	August 2022	Project update.
Jura Climate Action	Meeting	September 2022	Meeting with Neil Gow to share information on project.
Jura Community Council / Jura Development Trust	Meeting	December 2022	In person meeting with Jura Community members to share information on project. Interest in ensuring community benefit; highlighting issues of importance to the community (availability of ferry / under-resourced in technical personnel – waiting lists for electricians/plumbers etc, perhaps increased by large project?).
Whisky distilleries (Various)			
Diageo (Caol Ila)	Meeting	August 2019	Initial project information shared with distillery
	Meeting	September 2022	Information on project plans shared with Head of Carbon Sustainability and team, 40energy load info requested. Strong interest in decarbonisation / electrification of distillery using tidal energy
Whyte and MacKay (Jura)	Meeting	March 2021	Initial project information shared with distillery
Rémy Cointreau (Bruichladdich)	Meeting	August 2021	Initial project information shared with distillery

Stakeholder	Communication form	Date	Comments received
Distell (Bunnahabhain)	Meeting	August 2021	Initial project information shared with distillery
Ian Macloed Distillers	Meeting	August 2022	Initial project information shared with distillery
Ardnahoe	Meeting	August 2021	Initial project information shared with distillery
AMP Biomass Heat Experts	Meeting	August 2022	Initial project information shared with shared contact on opportunities for collaboration
Inver Estate Management	Meeting	December 2022	Project update and discussion on potential site options for onshore component. Specification that onshore component must be discreet and fitting with surrounding area/not an eyesore
	In person site visit	December 2022	Visit to Estate to view potential onshore site options
Ardfin Estate	Meeting	January 2023	Ardfin contacted us showing interest in the project and opportunities to decarbonise their operations, info on project shared
	Email	January 2023	NDA signed
Commercial Fishers	In person	December 2022	Shared information about the project with local fishers during Nova site visit.
	Email	January 2023	Contacted various local fishermen as par of EIA scoping report preparation.
	Email	January 2023	Contacted Clyde Fishermen's Association to

Stakeholder	Communication form	Date	Comments received
			introduce project and arrange meeting.
RNLI	Email	June 2019	Initial email to introduce Nova and discuss project.
Maritime and Coastguard Agency	Meeting	June 2019	Initial email to introduce Nova and discuss project.
RSPB	EIA scoping workshop (online)	November 2022	Detailed above (MS-LOT)
Whale and Dolphin Conservation	EIA scoping workshop (online)	November 2022	Detailed above (MS-LOT)
Hebridean Whale and Dolphin Trust	EIA scoping workshop (online)	November 2022	Detailed above (MS-LOT)

Extensive Public Consultation events are planned throughout the design and EIA processes. These will include hybrid community events attended in person and online illustrating the progress of the Project and will seek feedback from the local communities and general public for consideration in the design and EIA processes where possible. Nova is committed to consulting and communicating with the community throughout the lifecycle of ÒnM project.

4.3 Fisheries Consultation

The Nova project team began speaking with the local fishing community in 2019. Further engagement is planned with the local fishers, the Clyde Fishermen's Association and local angling associations. This consultation will continue throughout the development of the Project. More information on fisheries consultation is outlined in Chapter 12.

4.4 Technical Consultation

Consultation is a key element of the EIA process and is an important factor in developing the topic specific methodologies for the EIA. Ongoing technical consultation will be carried out with Statutory Bodies, Prescribed Bodies and non-government bodies (NGOs). As additional data and project information becomes available, further technical consultation will take place to reach agreement on scope of assessment and appropriate mitigation measures where possible.

Consultation relating to the onshore infrastructure will be undertaken in conjunction with that for the overall Project to ensure that the onshore and offshore Project components are considered holistically. Regular consultation will be undertaken throughout the pre-application stage with relevant stakeholders, following receipt of consultee comments to inform the EIA Scoping Opinion. In addition, the EIA team will contact consultees directly on technical issues, as required, throughout the EIA process (e.g., for agreement of survey locations/methodologies or proposed mitigation measures), with all consultation reported within the EIAR.

4.5 EIA Scoping Workshop

To support the development of this EIA Scoping Report, an online workshop took place in November 2022 to access technical advice on environmental receptors of the Nova' choice before submitting a formal request for a scoping opinion. The workshop format and content were led by Nova and followed MS-LOT's 'Scoping Workshop Guidance for Developers'. In advance of the workshop, specific questions and topic for discussion were identified and provided to all attendees in advance. The workshop was held online and focused on the following four topics:

1. Use of evidence and data from SPR 10MW Sound of Islay Tidal Array in the ÒnM EIA;
2. Marine mammal impact assessment;
3. Marine bird impact assessment; and
4. Benthic ecology impact assessment.

The workshop was attended by representatives from MS-LOT, Marine Scotland Science (MSS) NatureScot, Hebridean Whale and Dolphin Trust, Whale and Dolphin Conservation and RSPB Scotland. After the workshop, further clarifications on data methodology and assessment were requested in writing to Marine Scotland and NatureScot (November 2022).

Discussions in the ÒnM scoping workshop identified possible additional environmental datasets (for example marine mammal data) that may be of relevance to the project. These data will be further investigated and incorporated into the EIA where relevant, subject to the necessary data use agreements.

A paper providing background information on the Project and the key topics for discussion, along with key questions to steer discussions was provided in advance of the workshop. This workshop backing paper is provided in Appendix A of this EIA Scoping Report. Feedback and advice provided during and following the workshop has been incorporated into this EIA Scoping Report.

4.6 NRA Workshop

To support the development of this EIA Scoping Report, an online workshop took place in December 2022 to access technical advice on the Navigational Risk Assessment for the ÒnM Project. The workshop was led by Anatec Consultants and Nova and was attended by the NLB and MCA. Discussions and feedback in the workshop have informed this EIA Scoping Report and will continue to inform refinement of the PDE to minimise any navigational issues.

4.7 SPR Stakeholder Review

As part of the stakeholder engagement process for the ÒnM project, a review of the stakeholder engagement and consultation for the SPR EIA in the public domain was carried out. This data informed the Nova's stakeholder mapping for the ÒnM project and development of a Project Stakeholder Engagement Plan.

A review of stakeholder responses to the SPR 10MW project EIAR consultation identified the following consultees which may also be of relevance to Nova's ÒnM project:

1. Caledonian MacBrayne Ferries (CalMac);
2. Islay Energy Trust (IET) Joint Nature Conservation Committee (JNCC);
3. Royal National Lifeboat Institution (RNLI) – Islay;
4. Scottish Federation of Sea Anglers Scottish Fisheries Protection Agency (SFPA) (now known as Marine Scotland: Compliance);
5. Serco Denholm (operates Port Askaig to Feolin ferry);
6. Scottish Surfing Federation;
7. Scottish Canoe Association;
8. Scottish Fisheries Committee;

9. Scottish Water Scottish Creelers and Divers;
10. Scotways;
11. Scottish Coastal Forum Sea Mammal Research Unit (SMRU);
12. Sea Fish Industry Authority;
13. Scottish Southern Energy;
14. Transco West Highlands and Islands Sailing Club;
15. Islay Community Council;
16. Jura Community Council Robin Currie (Islay Councillor)
17. Anne Horn (Islay Councillor);
18. John Mcalpine (Islay Councillor); and
19. Landowner (c/o Malcolm Younger).

4.8 Forward Plan

In November 2022, Nova and Dragonfly Project Delivery developed a forward plan for stakeholder engagement for the Project. Stakeholders were identified, building on Nova's work to date. These stakeholders will be the subject of a stakeholder mapping exercise to identify critical stakeholders and those with less importance to the Project.

Stakeholders and contact details will be recorded on a stakeholder spreadsheet, with the importance of each stakeholder to the Project identified, along with notes of contacts made and the themes raised by the individuals or groups. Nova will ensure that stakeholders give consent to have their data stored on the stakeholder spreadsheet, in accordance with General Data Protection Regulations (GDPR) requirements. Identified stakeholders will be contacted and engaged with via the following methods:

- Email
- Calls
- Online meetings
- In person meetings

When making contact with stakeholders, even though not members, Nova will adhere to the principles of the Market Research Society (MRS):

1. Ensure that their professional activities can be understood in a transparent manner;
2. Be straightforward and honest in all professional and business relationships;
3. Be transparent as to the subject and purpose of data collection;
4. Ensure that their professional activities are not used to unfairly influence views and opinions of participants;
5. Respect the confidentiality of information collected in their professional activities;
6. Respect the rights and well-being of all individuals;
7. Ensure that individuals are not harmed or adversely affected by their professional Activities;
8. Balance the needs of individuals, clients, and their professional activities;
9. Exercise independent professional judgement in the design, conduct and reporting of their professional activities;

10. Ensure that their professional activities are conducted by persons with appropriate training, qualifications and experience;
11. Protect the reputation and integrity of the profession; and
12. Take responsibility for promoting and reinforcing the principles and rules of the MRS Code of Conduct.

5. THE PROJECT

5.1 Boundary of Development Area

The ÒnM project will be located in the Sound of Islay, north of Port Askaig between the islands of Islay and Jura, in the Inner Hebrides. The sound is orientated north – south, so is protected from prevailing westerly winds and has limited fetch, minimising wave action. An assessment by Nova confirmed that tidal conditions at the site are suitable for its tidal turbine technology.

An AfL for the ÒnM project, covering an area of 0.64km² in the Sound of Islay was awarded to Nova by Crown Estate Scotland (CES) in December 2020, the boundary of which is shown in Figure 1-2 and the coordinates provided in Table 5-1. The majority of the AfL area is circa 30m below sea level, with a trench running north to south which is circa 30m to 40m in below sea level.

Table 5-1 Coordinates of the Agreement for Lease area

Point	Latitude	Longitude
1	55.87533	-6.10382
2	55.87263	-6.10301
3	55.8679	-6.10297
4	55.86198	-6.10217
5	55. 85939	-6.10098
6	55.85939	-6.10579
7	55.86463	-6.10761
8	55.87111	-6.11044
9	55.87533	-6.10905

Nova's current AfL for ÒnM is for 3MW. However, to assure the long term viability of the project and optimise its benefits, Nova is exploring increasing the lease agreement to 10MW, since initial site investigations indicate that the same area could support a larger project. Based on advice from MS-LOT, Nova determined that consents should be sought for the larger array from the outset, rather than seeking consent for 3MW initially with a view to future expansion. The total Project capacity of ÒnM as defined in this EIA Scoping Report has been increased from 3MW to 10MW. Nova is requesting to increase the AfL capacity to 10MW, while retaining the original AfL boundary and footprint (0.64km²), as shown in Figure 1-3 and detailed in Table 5-1.

A number of potential options are being explored for the subsea cable route to export the power generated by the turbines to shore at various landfall points on Islay and Jura, as follows:

- An export cable running from the offshore Project area to a landfall point on the east of the Sound of Islay in the Whitefarland Bay area on Jura, from where a connection would be made to the National Grid network.
- An export cable running from the offshore Project area to various other locations west of the Project area on Islay, at Port Askaig, Caol Ila, Ardnahoe and Bunnahabhain. These options would most likely involve the negotiation of a 'private wire' agreement rather than a direct connection to the National Grid network.

Figure 1-3 (Drawing no. P2585-LOC-003) shows the AfL area, and Areas of Search (AoS) for the various potential cable corridors, and corresponding landfall and onshore infrastructure currently being explored.

The AoS for cable corridors and corresponding landfall and onshore infrastructure shown in Figure 1-2 delineate the areas currently under consideration. They are not specific locations at this stage. At this time all of the AoS have been retained within the EIA Scoping Report to ensure that the Project Design Envelope (PDE) includes all possible options, in line with MS-LOT advice and guidance.

Details and locations of all project infrastructure, including the export cable route and landfall location will be refined as further site data are gathered and following discussion with regulatory bodies and their advisors, and other key stakeholders, during and following scoping. This will result in the exclusion of some options or AoS from the final PDE, reducing the final scope of the EIA. Where any of the options for landfall and export cable route detailed in this scoping report are subsequently excluded, this will be made clear in the EIA.

The majority of the seabed in the Project area, including the AfL and AoS has been identified as high energy circalittoral seabed with numerous rock exposures, classified as high and low energy circalittoral and infralittoral rock. Further details of seabed habitat types are provided in Chapter 8.

5.2 Consideration of Alternative Sites

Nova uses a two-stage process to identify potential sites for tidal stream energy development. The process is carried out across multiple jurisdictions and countries, with the aim of identifying sites of maximum opportunity and minimum constraint, to drive down the cost of energy production and develop new markets.

Stage 1 involves prospecting across a range of possible sites, in the first instance based on market opportunities and sector intelligence. Stage 2 generates a shortlist of sites, based on an overview of project technical and economic feasibility, taking account of key factors. Sites selected from the shortlist become the focus of targeted effort, including detailed site investigations, seabed lease applications, early consenting discussions and project funding activity. This process is summarised in Figure 5-1, with an overview provided in Table 5-2.

Figure 5-1 Overview of Nova's site selection process for tidal projects

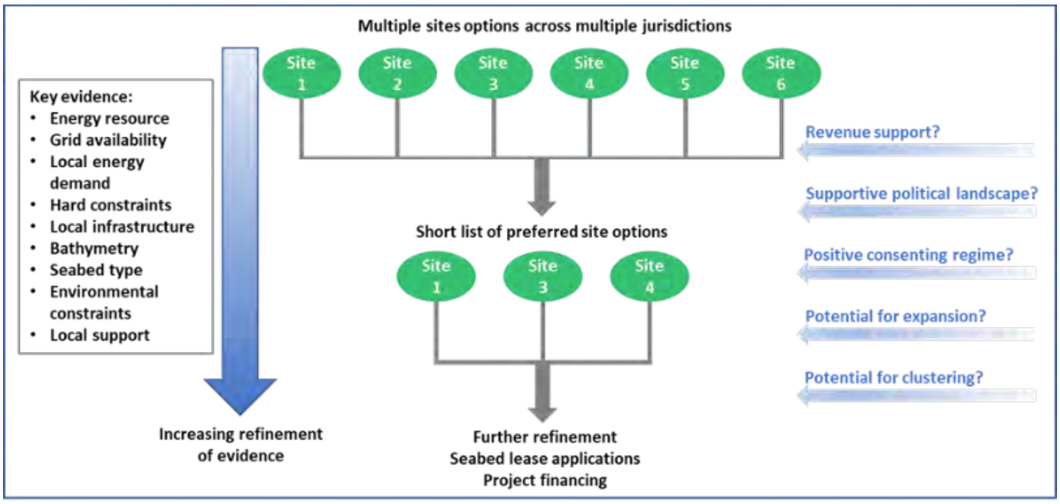


Table 5-2 Nova's two-stage site selection process for tidal stream development

Stage	Overview
1	▪ Initial investigations across range of sites, usually across multiple countries and jurisdictions ▪ Desk-based, high level investigations, based on information and data already available (and quality of information) ▪ Key considerations include energy resource, grid connection, hard constraints (including Environmental) and local infrastructure Other influencing factors include availability of revenue support, supportive political landscape, positive consenting regime and potential for development clustering (shared infrastructure)
Stage 1 results in a shortlist of preferred options for more detailed consideration in Stage 2	

1	▪ More detailed investigation of sites on the shortlist
	▪ Evidence and data needs largely driven by seabed leasing processes, key technical site parameters and technology specific factors
	▪ Large elements of evidence gathering and collation will still be desk-based and rely on existing information, where available (and quality of information)
	▪ Some data may be gathered by the developer for example on energy resource and bathymetry and through early stakeholder engagement
	▪ Key site characteristics and parameters, in approximate order of priority:
	  ▪ Location of energy resource
	  ▪ Water depth and seabed type
	  ▪ Proximity to grid connection or sources of demand (including possible cable routes, grid upgrade costs, sources of current and future local demand)
	  ▪ Practical constraints (other activities, conflicting seabed rights, navigational concerns, MOD, Environmental)
	  ▪ Proximity to shore and local infrastructure
	  ▪ Detailed hydrodynamic characteristics (flow type, turbulence, wave regime)
	  ▪ Potential for future expansion
	Level of local support (political, local communities)

Stage 2 results in sites that become the focus of more intense activity, including detailed project design, applications for seabed lease applications, project funding activity	

Key factors influencing site shortlisting generally relate to the physical characteristics of the location(s) and their associated energy resource and access to a grid connection (or a local source of energy demand). Understanding any hard constraints, such as conflicting seabed rights, or Environmental constraints[24] is also key. Other key considerations include:

1. Availability of revenue support for tidal energy;
2. Presence of a positive and supportive political landscape;
3. Presence of a positive and streamlined consenting landscape and delivery mechanisms;

[24] In the absence of clear policy or advice on Environmental constraints that could result in failure, delay, or complications within consenting processes, overlap with or proximity to protected areas is normally used to inform site selection.

4. Availability of local infrastructure and supply chain;
5. Degree of local support for possible projects;
6. Potential for future project expansion at the site; and
7. Potential for development clustering, shared infrastructure and supply chain development.

Access to relevant information and availability of open dialogue with regulatory and advisory bodies, seabed and land owners and other stakeholders are critical to informing and facilitating site selection.

Considering the above information, Nova decided on the Sound of Islay site for multiple reasons. The Sound of Islay is the stretch of water, with "where peak spring tidal currents above 2.5 m/s" (Neil et al., 2017) and a depth which reaches 62m, making the sound a good tidal energy resource. Having the tidal turbines located between two islands, allows for multiple landfall options and the Sound provides various routes to the market via the abundance of Whisky Distilleries in Islay and the Hydro Station located on Jura Island. Not only this, but there have also been two projects (SPR and Flex Marine) that have achieved consent in this area, and the availability of the EIA and data used to inform the EIA is another factor in selecting the Sound of Islay for this Project

5.3 Overview of Key Project Components

The PDE for the ÒnM project encompasses a number of engineering and infrastructure components, as follows:

- An array of tidal turbines of up to 10MW capacity;
- Offshore electrical infrastructure, including inter-array cabling potentially utilising hubs/rings to minimize export cables
- An export cable or cables to shore, with onshore landfall; and
- Onshore electrical infrastructure including infrastructure at the point of export cable landfall, an onshore substation, grid connection infrastructure and other infrastructure potentially including battery storage.

The 10MW Project is likely to be developed incrementally, with turbines and associated offshore and onshore infrastructure installed in phases. The EIA will assess the benefits of incorporating specified and defined phases as a core feature of the Project design. If this were the case, phases would be defined by MW or by number of turbines and would be accompanied by an integrated environmental monitoring programme to gather evidence to enable progression through Project phases.

Project design will develop and evolve in parallel with the EIA process and will be influenced by a range of factors, including commercial, engineering and environmental as well as community and stakeholder consultation and feedback. This will ensure that the final PDE on which consent applications will be based is realistic, feasible and sustainable.

As the precise details of all Project components cannot be fully defined at this stage, a flexible PDE will be used to describe the realistic worst-case scenarios and provide a scope for the assessment of the effects of the Project in the EIA. The following sections provide information on the infrastructure and activities included in the PDE which will be used for appraising potential effects and their importance in the EIA. The principles of the approach to using a flexible PDE in the EIA and the compliance with MS-LOT guidance is described in Section 2.6 of this EIA Scoping Report.

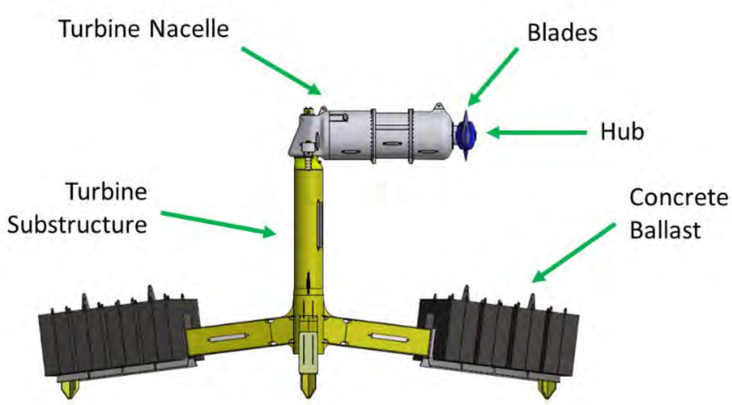
5.4 Tidal Turbines

Turbines in the ÒnM project will be similar to Nova's proven 2-bladed, horizontal axis turbines supported on a gravity-based substructure or foundation. There are currently six of these 100kW turbines operating in the Shetland Tidal Array in Bluemull Sound between the islands of Yell and Unst.

Nova's turbines comprise the following key components, illustrated in Figure 5-2:

- Nacelle: a cylindrical steel unit containing the drivetrain and power conditioning;
- Blades and Hub: connected to the nacelle; and
- Substructure: gravity-base steel frame and pre-cast concrete ballast (pin-piling may be considered to replace concrete ballast depending on site conditions and turbine size).

Figure 5-2 Nova's M100-D turbine and components



The substructure of the M100-D turbine is a steel, gravity-based structure, which means seabed drilling is not required during installation. Three rock feet on the underside of the substructure provide a stable base and minimise the seabed footprint of turbines. The substructure base measures 13.5m by 12.2m, but the direct footprint is limited to the three rock feet each measuring 1m by 1m. Custom-made blocks of reinforced concrete are securely placed over the substructure base. Once the substructure has been installed on the seabed, the turbine nacelle including rotor are lowered into position on the substructure. The weight in air of the entire structure (steel foundation, concrete ballast, nacelle, and turbine) is approximately 200 tonnes in air. The mass of ballast required depends on the detailed tidal flow and wave conditions on the site.

Once installed on the seabed the entire turbine structure is non-surface piercing, with no requirement for surface markers. Turbines in Bluemull Sound have minimum surface clearance of 15m at Lowest Astronomical Tide (LAT), so no navigational restrictions are required and even large vessels can travel directly over the array. The minimum clearance of turbines in the ÒnM project will depend on the array layout and turbine size, which are to be determined, more information on clearance can be found in Chapter 13. However, in defining the PDE Nova will work to the principle that clearance will be at the clearance of turbines can be so least the minimum required to avoid any navigational issues, taking into consideration local vessel traffic and bathymetry.

The modular nature of Nova's turbines mean that they can be installed and decommissioned quickly and easily. Sites where turbines are installed can quickly be returned to their original state on decommissioning.

The Nova M100-D is shown in Figure 5-3 prior to deployment in Bluemull Sound in 2020. This is the direct drive version of Nova's tried and tested geared 100kW tidal turbine (the Nova M100). Three Nova M100 tidal turbines have been operating in the Shetland Tidal Array since 2016/17. The first Nova M100-D tidal turbine, 'Eunice', was successfully deployed in Shetland in August 2020 following extensive onshore and offshore testing, and a further two Nova M100-D turbines were deployed in

Shetland in January 2023. The key difference between Nova's M100-D and M100 turbine is the removal of the gearbox. This removes gearbox lubricating oil, extends the device service interval (and therefore the number and frequency of maintenance operations), and will reduce turbine noise, whilst improving efficiency and reliability.

Figure 5-3 The Nova M100-D turbine prior to deployment in Bluemull Sound

Table 5-3 Key features of the M100-D and Nova's next-generation upscaled turbines

Turbine feature	M100-D	Upscaled turbine
Total capacity	100 - 200 kW	20 - 500kW
Rotor diameter	7m – 9m	10m - 14.5m
Rotor speed[25]	10 – 33 RPM	6 - 28 RPM
Max. tip speed	15m/s	17m/s
Max. height above seabed	12m - 14m	14m – 18.5m
Draft clearance	To be confirmed dependent on array layout and turbine dimensions. Nova will work to the principle that clearance will be at least the minimum required to avoid any navigational issues, taking into consideration local traffic and bathymetry.	
Output voltage	3.3kV	3.3 – 11kV
Cut in tidal speed	~ 0.8 m/s	~ 0.8 m/s
Substructure	Gravity-based	Gravity-based or pin-piled
Design life	20 years	20 years

[25] Note that a larger turbine blade will result in decreased RPM on rotation.

Up to a maximum of 30 turbines will be included in the ÒnM PDE and will provide a scope for the assessment of the effects of the Project in the EIA. Turbines are likely to be a combination of the existing M100-D turbine (100-200kW capacity) and the upscaled 'next-generation' turbine (up to 500kW capacity). While turbine capacity will be within this envelope, care should be taken when combining parameters of the different turbines in Table 5-3. For example, larger blades will result in decreased RPM on rotation. This will be fully considered and details provided within the EIA. All turbines within the array will be deployed within the CES AfL area. The layout of turbines will be determined following site investigations, as well as feedback during EIA scoping and throughout the EIA.

Key features of the turbine design and array layout for the ÒnM Project, based on current understanding are outlined in Table 5-4. The EIA will identify realistic 'worst case scenarios' for each parameter so that the assessment of the effects can be based on maximum extents, as per MS-LOT guidance (Section 2.6.1). The worst-case scenario for different parameters may vary for different receptors and impact pathways, which will be considered in detail in the EIA.

Table 5-4 Key features of turbine design and array layout for ÒnM project

Feature	Detail for PDE
Total number of turbines	Maximum 30 turbines
Turbine capacity	Minimum 100 kW; Maximum 500 kW
Technology type	Two-bladed horizontal axis direct-drive turbine
Rotor diameter	Minimum 7m; Maximum 14.5m
Rotor swept area	Minimum 38m²; Maximum 165m² per device
Max height from seabed	Minimum 14m; Maximum 17m
Depth of rotor tip in vertical position at LAT	To be confirmed dependent on array layout and turbine dimensions. Nova will work to the principle that clearance will be at least the minimum required to avoid any navigational issues, taking into consideration local traffic and bathymetry.
Surface-piercing components	None
Rotor speed	Minimum 6 RPM; Maximum 33 RPM
Max. tip speed	17m/s
Substructure type	Gravity-based foundation, upscaled turbines may require some pin-piling (TBC)
Substructure footprint	Three rock feet each measuring 1m² (footprint will be the same for the M100-D and upscaled turbines)
Array layout including turbine spacing	All turbines will be deployed within the CES AfL area, but the layout of turbines has not yet been determined. This will be informed by site investigations, as well as feedback during EIA scoping and throughout the EIA

5.5 Offshore Electrical Infrastructure

Turbines in the ÒnM array will be connected using inter-array cabling potentially utilising hubs/rings to minimise export cables. The turbines themselves, or offshore hubs, will convert and condition the energy to a grid-exportable format. An export cable or cables will take the power generated by the turbines to one or more of the identified landfall point/points detailed in Section 5.6**.** The inter-array cables are expected to be 3.3 to 11Kilovolt (kV), with the voltage dependent on the capacity of the turbines. The voltage of the export cable(s) will also be 3.3-11kV.

Subsea cables will be double-armoured with integral fibre optics, similar to those used on the Shetland Tidal Array in Bluemull Sound and Nova Tidal Array in Petit Passage (Bay of Fundy, Canada). The two armour layers with a hard outer high-density polyethylene (HDPE) shell, provide stability, robustness and electromagnetic shielding compared to alternative cable designs. The outer diameter of the export cable(s) will be up to 50mm, while the diameter of inter-array cables will be ~10mm.

Figure 5-4 and Figure 5-5 show a turbine export cable and cross-section at the Shetland Tidal Array, to illustrate the design of cables for the ÒnM project.

Figure 5-4 Typical subsea cable

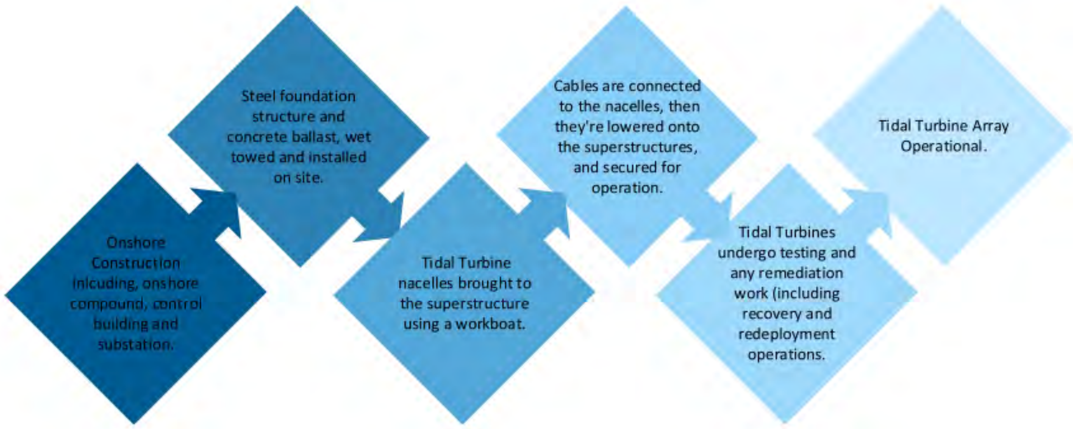
Figure 5-5 Typical subsea cable cross-section

The total length of inter-array and export cabling will be determined once further design and engineering studies have been completed. Inter-array cables and the export cable will be laid on the seabed, rather than buried, due to the hard rock nature of the seabed within the AfL area and export cable corridor AoS. Careful micro-siting will be used to orientate the cables in relation to tidal flow to avoid bridging. The surface-laid cables in the Shetland Tidal Array (Figure 5-4 and Figure 5-5) have remained stable on the seabed in Bluemull Sound for over 5 years, with no additional protection required. Some trenching may be used in the nearshore area as the export cable approaches the foreshore. This will be determined during site investigation and the EIA.

Offshore cables in the ÒnM project will use low-power Alternating Currents (AC), which produce much lower electromagnetic fields (EMF) than the common high-power subsea Direct Current (DC) transmission systems. Nova's systems are also delta-connected which means the three electrical phases are always balanced and no external electrical field should be present. The magnetic fields and resultant induced EMF in the sea around the cable will therefore be negligible.

Offshore hubs may be used in the ÒnM project to minimise export cables. Nova has recently installed on offshore hub in the Shetland Tidal Array connecting the fifth and sixth installed turbines, which utilise a single export cable. The performance of the hub in the Shetland Tidal Array will be monitored and assessed and will inform the use and design of offshore hubs in the ÒnM project. For the purposes of EIA scoping, the use of offshore hubs is included in the PDE. Full details including any corresponding implications for offshore cabling will be provided in the EIA.

Figure 5-6 Process of construction and installation through to tidal array operation



The modular nature of Nova's turbines means that the components can be installed in separate operations. It also means that relatively small work vessels can be utilised for all Project installation and maintenance activities. Figure 5-7 provides an illustration of the smaller 'multicat' vessels used for installation and maintenance at the Shetland Tidal Array, likely to be similar to those used in the Sound of Islay for the ÒnM Project.

Figure 5-7 Representative vessel used by Nova Innovation for construction and maintenance activities. Source: Delta Marine.

The modular nature of Nova's turbines also means that any maintenance can be carried out quickly and easily. Rather than removing the entire turbine and substructure from the water, the nacelle can be retrieved, leaving the substructure and cable in place on the seabed. Once the maintenance has been completed, the nacelle can be quickly and easily re-deployed onto the substructure. Based on experience in Shetland, Nova anticipates that once the array is fully up and running, each turbine will need to be removed approximately once every 24 months for maintenance.

5.6 Onshore Infrastructure

5.6.1 Landfall Options

A number of potential options are being explored for the subsea cable route to export the power generated by the turbines to shore at various landfall points on Islay and Jura, as follows:

- An export cable running from the offshore Project area to a landfall point on the east of the Sound of Islay in the Whitefarland Bay area on Jura, from where a connection would be made to the National Grid network.
- An export cable running from the offshore Project area to various other locations west of the Project area on Islay, at Port Askaig, Caol Ila, Ardnahoe and Bunnahabhain. These options would most likely involve the negotiation of a 'private wire' agreement rather than a direct connection to the National grid network.

The landfall location for the option on Jura is likely to be near Whitefarland Bay beach, with a connection point to the electricity transmission network (the 'grid') in the Coille na h-Uanaire woodland area (Option 1 on Figure 5-8). The exact location of the substation would be confirmed following confirmation of a grid connection agreement. At this stage, the anticipated route to this connection point follows a track upwards from the shore along the edge of the woodlands.

Four additional landfall options on Islay are also being considered. These would most likely provide direct 'private-wire connections' to local consumers. Areas currently under consideration for the Islay landfall options and associated cable corridors are shown on Figure 5-8 (as Options 2 to 5). As with the Jura landfall option, these are not specific locations at this stage and indicate Areas of Search.

A summary of the four Islay options is provided in Table 5-5.

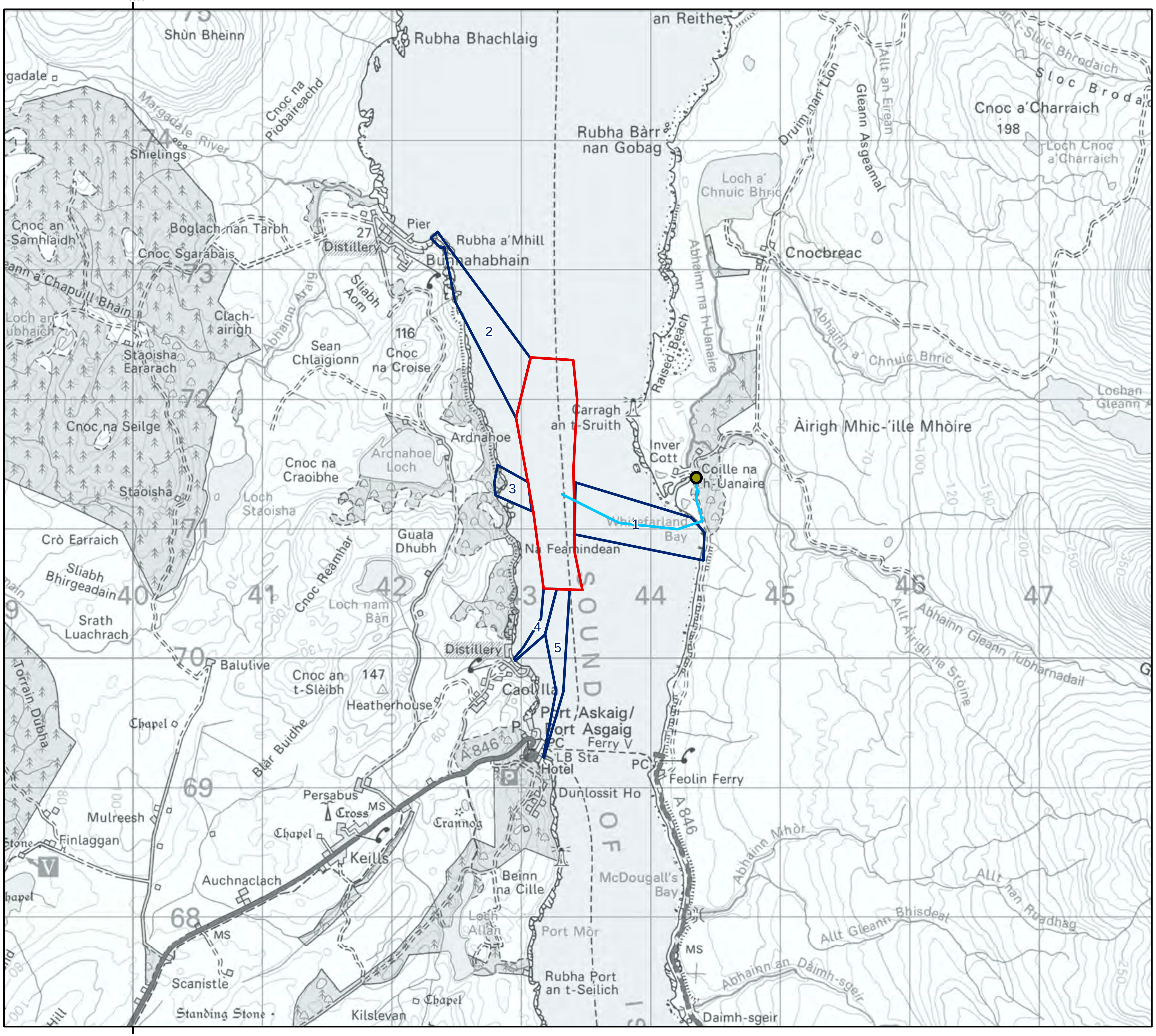
Table 5-5 Landfall and substation options on Islay

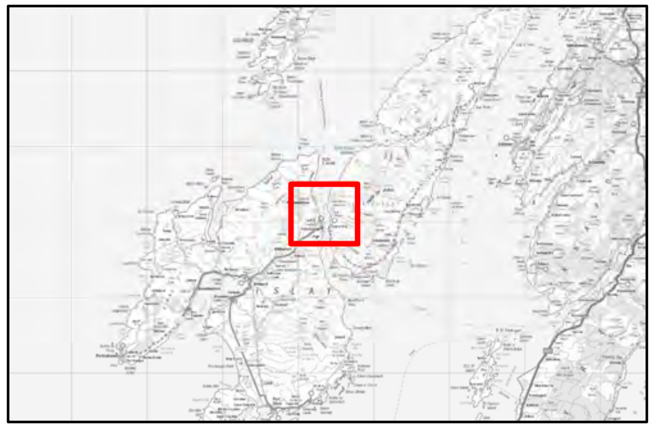
Option	Description
Option 2: Bunnahabhain	Export cable landfall and onshore substation expected to be in area to the north-west of the Sound of Jura, in the area of Bunnahabhain Bay.
Option 3: Ardnahoe	Export cable landfall and onshore substation expected to be in area to the west of the Sound of Jura, in the vicinity of the boathouse at Ardnahoe.
Option 4: Caol Ila	Export cable landfall and onshore substation expected to be in area to the south-west of the Sound of Jura, near the Caol Ila Distillery.
Option 5: Port Askaig Ferry Terminal	Export cable landfall and onshore substation expected to be to the south of the Sound of Jura, in the area of Port Askaig.

ÒRAN NA MARA EIA SCOPING REPORT

Indicative Landfall Cable Route Options

4-1	A





NOTE: Not to be used for Navigation

Date	21 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; OSOD, LUC
File Reference	Fig_3-1_12237_r0_IndicativeCableRouteOptions.mxd
Created By	Henry Wingfield, LUC
Reviewed By	Lewis Castle, Intertek
Approved By	Aodhfin Coyle, Intertek

NOVA INNOVATION LUC intertek

0 0.5 1 km

Details and locations of all project infrastructure, including the export cable route and landfall location will be refined as further site data are gathered and following discussion with regulatory bodies and their advisors, and other key stakeholders, during and following scoping. This will result in the exclusion of some options or AoS from the final PDE, reducing the final scope of the EIA. Where any of the options for landfall and export cable route detailed in this scoping report are subsequently excluded, this will be made clear in the EIA.

5.6.2 Onshore Project Components

The main onshore components which are considered within this Scoping Report are: the cable landfall; the onshore cable, the onshore substation; and the connection to the electricity grid or private wire connection to a local consumer or consumers.

5.6.2.1 Cable Landfall(s)

For all landfall options detailed in the preceding section, the subsea offshore cable will be brought a short distance onshore and will then be connected to an onshore cable within a shallow 'transition pit'.

There are two main methods typically used for cable installation at land fall:

- Cable burial up an existing beach in a temporary open trench which is then covered over; or
- Horizontal Directional Drilling (HDD).

The transition pit is typically backfilled with sand and protected by a suitable cover. Trenching will be the preferred method for cable installation at landfall where possible. If geology/substrate or other factors exclude the use of trenching, HDD will be included and assessed within the EIA.

5.6.2.2 Onshore Cable to Substation

Onshore cable installation from the landfall is typically undertaken by either plough or a trench with backfill depending on the soil type. Ploughing requires suitable (softer soils) and causes minimal disturbance. Harder soils may require the excavation of a trench along the cable route which is backfilled once the cable has been laid at a depth of no less than 1m below ground.

In areas where the cable route crosses obstacles such as roads, excavation of a trench may not be possible. In these areas, HDD may be undertaken to install the cable without disturbing surface infrastructure.

5.6.2.3 Onshore Substation (s)

An Onshore Power and Control Station (OPCS), or onshore substation, will need to be installed in close proximity to any cable landfall point for ÒnM. Nova has a standard design modular OPCS which is 'plug and play' to set up and operate fully autonomously. The OPCS provides the following functions:

- Termination point for offshore submarine cabling coming onshore.
- Housing of power system protection and control equipment to ensure system operates safely.
- Interconnection Grid Transformer.

The location and design of the onshore substation(s) for ÒnM has not been determined at this stage and locations described in this scoping report are AoS for these Project components. Based on Nova's existing tidal projects in Shetland and Canada, the onshore substation would likely comprise the following key components for any of the landfall options on Jura and Islay:

- A substation compound with hardstanding which would house a number of small, modular shipping containers. These would house a grid transformer and connection terminations, transformers, energy storage, and switch gear.

- A welfare area which would likely consist of a site office and welfare facilities including a modest area of hardstanding for parking.

Depending on the location and total onshore substation size, these would likely be pre-commissioned transportable containers, or a permanent building. Stone or other cladding along with suitable landscaping can be used to ensure the architectural character is sympathetic with the local area. In the case of the Jura landfall, which would be connecting into the national Grid network, access would also be provided for the distribution network operator (DNO).

The size of onshore substation(s) will vary with the design chosen and method of cable entry. Factors that will influence the final design and footprint include:

- Whether an air or gas insulated substation is chosen as the final design. An air insulation-based substation would be likely to increase the final footprint.
- The direction in which the cables enter the substation (vertically or horizontally).
- The internal layout of the substation. Whilst electrical equipment can be stacked to reduce the overall footprint of the substation this would increase the overall height of the substation.

The overall appearance of the substation/s will depend on which of the following two options is selected:

- A fully enclosed substation where the electrical components are contained within an external structure; or
- An outdoor substation where the electrical components are not contained within a structure.

5.6.2.4 Grid or Private Wire Connection(s)

As the substation location(s) and grid or private wire connection points have not been finalised, details of the connections between the substation and the grid or local consumer have not been included within this Scoping Report. Discussions are ongoing and will result in the exclusion of some options or AoS from the final PDE, reducing the final scope of the EIA. Where any of the options for landfall and export cable route detailed in this scoping report are subsequently excluded, this will be made clear in the EIA.

5.6.2.5 Battery Storage

No battery storage is currently included in the onshore project design or footprint, but there is an ideal opportunity to link tidal energy with energy storage. Coupling a battery to the tidal array before the point of grid or private wire connection would allow excess energy to be captured at times of higher generation and released at times to meet the local demand from the grid or a private wire connection.

Tidal energy is the perfect partner for energy storage. The predictability of the tide, repeating every six hours, means that the energy storage system can be optimised efficiently and the short cycle time, compared to solar, means that a smaller battery can be used.

If a decision is made to include battery storage within the final PDE, the footprint of the onshore infrastructure will take this into account, and this will be assessed in the EIA.

5.7 Decommissioning

A detailed decommissioning plan will be developed and agreed with MS-LOT prior to the end of the ÒnM project lifetime. It is anticipated that a draft plan will be required prior to commencement of construction, as a condition of licence conditions.

The decommissioning plan will reflect Marine Scotland guidance[26], the available technology, techniques, and statutory requirements at the time, as well as best practice and any conditions of Project consents. The decommissioning plan will likely include the following options and components:

- The removal of infrastructure;
- The partial removal of infrastructure;
- The re-use of infrastructure for the same or another purpose;
- The burying or encasing of infrastructure; and
- The removal of any deposited or waste material.

The decommissioning plan will also identify:

- The proposed programme of decommissioning/rehabilitation works.;
- The proposed date on which implementation of the programme will start;
- The proposed date by which the programme will be completed;
- The estimated costs of the programme; and
- The expected timelines for applying for and obtaining any other authorisations required to enable implementation of the plan.

At the end of the operational lifetime of ÒnM project, it is likely that any onshore grid connection infrastructure adopted by the National Grid would remain part of the grid network and be left in situ. Cables and onshore infrastructure which have not been adopted by the grid operator will likely be removed and recycled, unless they can re-purposed.

Decommissioning is likely to largely entail the reverse of the activities involved in Project construction. Decommissioning will also use any relevant information gathered during the EIA process, including mitigation measures. This will ensure that potential effects on the receiving environment associated with decommissioning activities are equal to or less than those associated with the construction phase in terms of magnitude and duration.

[26] Decommissioning of Offshore Renewable Energy Installations in Scottish waters or in the Scottish part of the Renewable Energy Zone under The Energy Act 2004 : Guidance notes for industry (in Scotland) (www.gov.scot)

6. MARINE PHYSICAL PROCESSES

6.1 Introduction

This chapter considers the potential effects on Marine Physical Processes that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It examines how activities associated with the Project might have physical effects on the marine environment, which could lead to effects on specific physical features (physical receptors), which in turn could affect biological or human receptors, which is further considered in the technical chapters below.

This topic is often also referred to as "marine processes", or "coastal processes". For simplicity, the term "Physical Processes" is used in this document, to include issues pertaining to marine geology, oceanography, hydrodynamic and Physical Processes in the offshore, nearshore and coastal environment.

The baseline physical environment at the Project location has been described as follows:

- Bathymetry, geology and seabed sediments;
- Metocean conditions (wind, wave and climate);
- Coastal processes and sediment transport; and
- Climate change implications.

6.2 Receiving Environment

- This section characterises the baseline physical environment at the ÒnM Project location (which includes the inter-array and export cables). Key components or features of the physical environment that may be sensitive to effects from device installation, operation and maintenance, and decommissioning are identified.
- The description of the baseline environment considers the conditions that exist at the present time and over an equivalent period of the lifetime of the development (notionally 20 years), assuming no development was present. Accordingly, climate change influences on the present conditions are also considered over this period.
- This Scoping Report identifies the key sources of information that will be used in the EIA and provides an initial indication of the likely effects based on a preliminary review of information.

6.3 Data Sources and Baseline

6.3.1 Data Sources

- The data sources used in developing the preliminary baseline characterisation for Physical Processes includes include, but are not limited to the following:
- Marine Scotland National Marine Plan Interactive (NMPi);
- SuperGen UK Centre for Marine Energy Research (UKCMER);
- British Geological Survey (BGS);
- UK Hydrographic Office (UKHO);
- Met Office;
- Centre for Environment, Fisheries, and Aquaculture Science (Cefas);

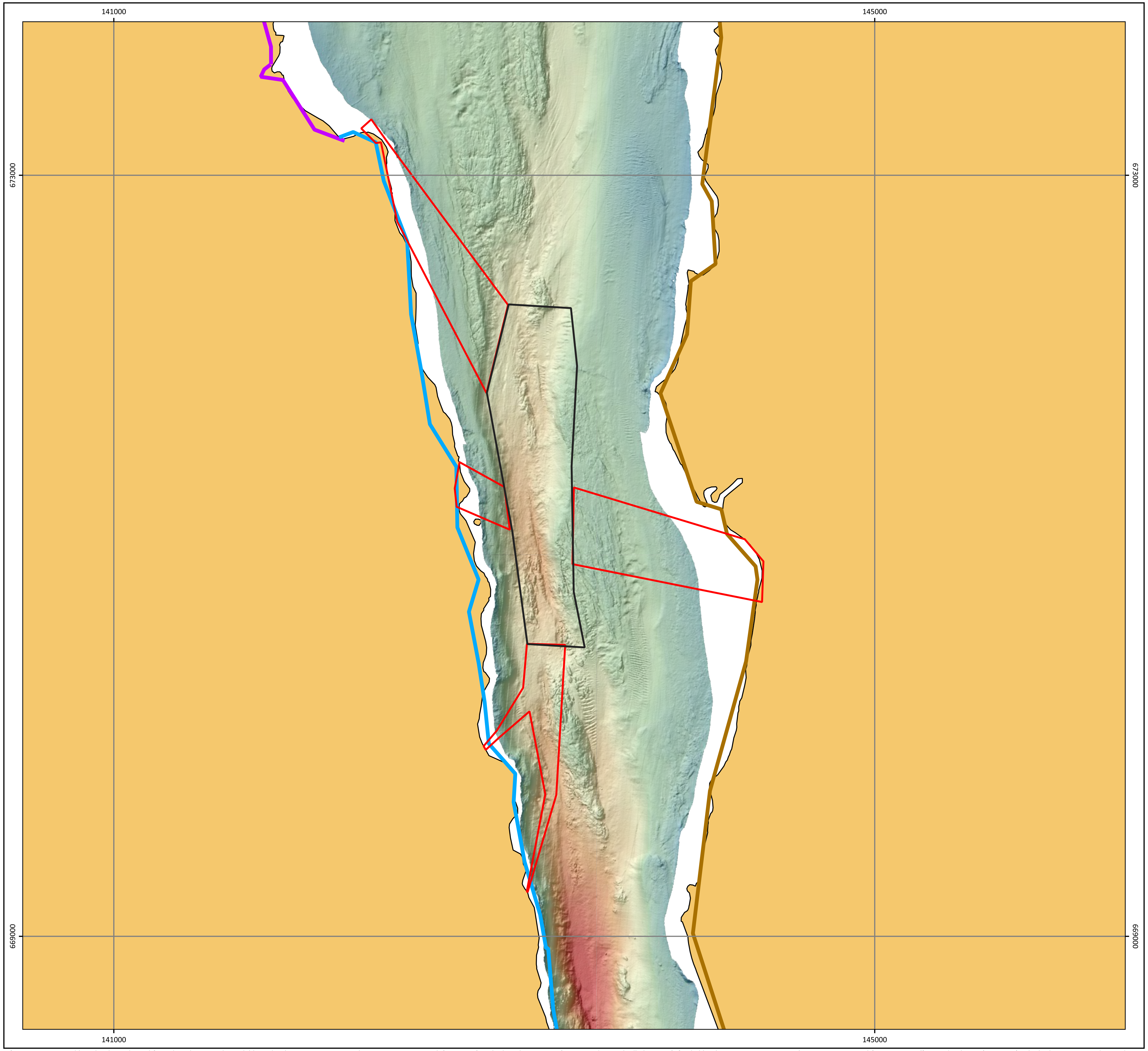
- United Kingdom Marine Monitoring & Assessment Strategy (UKMMAS);
- Previous SPR Sound of Islay Environmental Statement; and
- Other relevant literature, as outlined in the references.

6.3.2 Bathymetry, Geology and Seabed Sediments

6.3.2.1 Bathymetry

- The bathymetry within the northern and southern ends of the Sound varies between -10m Chart Datum (CD) and -25m CD. The area of maximum water depth (-60m CD) and strongest flows is associated with the narrowest part of the Sound between Port Askaig and Feolin Ferry where the width of the sound is around 750m.
- For the proposed ÒnM array area, the bathymetry in the northern portion rises from approximately -35m CD to -15m CD to the east and to -30m CD to the west, more gradually on the western side. In the southern portion of ÒnM, the seabed rises from approximately -45m CD to -35m CD on the western side and to -15m CD on the eastern side. Again, the seabed rises more steeply to the east of the central channel.
- The seabed of ÒnM is generally flatter in the northern portion with a wider flatter seabed, more suited to the deployment of turbines. At present, it is proposed that the turbine array is evenly distributed throughout the AfL area. While this will maximise the energy generation, the practicalities of deploying devices in areas with relatively steep seabed gradients should be considered prior to deployment.

An overview of bathymetry in the vicinity of ÒnM is presented in Figure 6-1 (Drawing No. P2585-PHYS-001-C).



EIA SCOPING FOR ÒRAN NA MARA ISLAY TIDAL PROJECT

PHYSICAL PROCESSES

EMODnet Bathymetry

Drawing No: P2585-PHYS-001	C

Legend

N

- AfL Area
- Areas of Search for Exploratory Cable Corridors

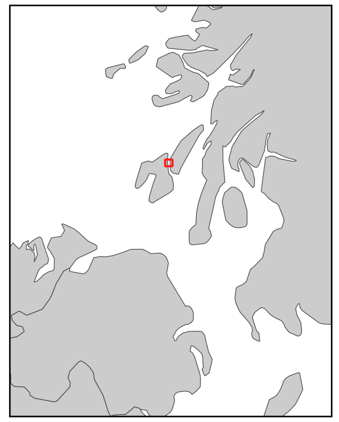
Coastal Type

- Hard Coast
- Sandy or soft beach area
- Unclassified

Bathymetry (m below LAT)

0

-60



NOT TO BE USED FOR NAVIGATION

Date	2023-03-13 12:54:41
Coordinate System	OSGB36 / British National Grid
WKID	EPSG:27700
Scale @A3	1:20,000
Data Sources	ESRI; OSOD; NOVA; EMODnet
File Reference	J:\P2585\Mxd_QGZ\02_PHYS \P2585-PHYS-001.qgz
Created By	Lewis Castle
Reviewed By	Irinios Yiannoukos
Approved By	Aodhfin Coyle

0 0.25 0.5 0.75 1 km

Information contained here has been derived from data that is made available under the European Marine Observation Data Network (EMODnet) Seabed Geology project (www.emodnet-seabedhabitats.eu), funded by the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE).; The bathymetric metadata and Digital Terrain Model data products have been derived from the EMODnet Bathymetry portal - http://www.emodnet-bathymetry.eu.; Contains Ordnance Survey data © Crown copyright and database right 2013; © Nova 2022; © Esri

6.3.2.2 Underlying geology and seabed sediments

The islands of Jura and Islay comprise a complex mixture of metamorphic Daldradian rocks, including schists and quartzites, belonging to the Argyll and Appin Groups (Barne et al., 1997). These rocks are relatively resistant to erosion by wave and tidal processes and are, therefore, likely to provide a stable platform for installation purposes, as noted in SPR (2009).

Extensive fault formation during the end of the Caledonian Orogeny has produced the geomorphology of the coastline and seabed of the Sound, which have subsequently been eroded by glacial action and weathering to form a glacial scoured valley (SPR, 2009). Charts indicate the seafloor through the Sound to be mainly rocky with some localised areas of coarse sand and shells. A side-scan sonar survey carried out for the SPR project, to the south of ÒnM, suggests that the seabed is comprised of exposed bedrock with gravel and sand, principally in depressions within the bedrock and at the base of channel with numerous boulders scattered throughout the region. The British Geological Society (BGS) seabed sediments map (1:1M) shows the Sound to be comprised of coarse sediment, however, the resolution of this map does not allow for a detailed interpretation of the seabed sediments to be made.

Both Islay and Jura generally comprise a rocky coastline with low cliffs, raised beaches and small areas of intertidal sediment comprised mainly of gravel and exposed rock platform with boulders (Barne et al., 1997).

6.3.3 Metocean Conditions

6.3.3.1 Water levels and tidal flows

The tides in Scotland are strongly semi-diurnal and can be described by the principal semi-diurnal lunar (M2) and solar (S2) constituents (Neill et al., 2017). The strong semi-diurnal tide in this region is a result of a Kelvin wave propagating northward along the shelf (Cartwright et al., 1980). To the south of Islay, between the Mull of Kintyre and Northern Ireland, the tidal range is close to zero at an amphidromic point. From this amphidromic point, the tide propagates northwards with the tidal currents propagating into the various straits in the region (including the Sound of Islay) by different routes, leading to variations in tidal phase and water level at either end (i.e. developing a tidal head), resulting in strong tidal currents (Milne at al., 2013).

Table 6-1 provides a summary of the tidal levels and ranges at Port Askaig within the Sound of Islay.

Table 6-1 Tidal levels for Port Askaig (UKHO, 2015)

Location	MHWS (m Chart Datum – CD)	MLWS (m CD)	Spring range (m)	MHWN (m CD)	MLWN (m CD)	Neap range (m)
Port Askaig	2.2	0.5	1.7	1.6	1.1	0.5

A bed-mounted acoustic Doppler current profiler (ADCP) was deployed within the Sound of Islay approximately 800m to the south-east of Port Askaig (Figure 6-2) in 2013 as part of the SPR tidal energy project. Although this ADCP was deployed to the south of ÒnM, it still provides a useful insight into the tidal currents in the area. The peak spring and neap current speeds based on these data (at 5m above the seabed) are approximately 2.5m/s and 1.2m/s, respectively (Milne et al., 2013). These data also show that the tidal streams in the Sound of Islay are generally rectilinear (i.e. over the course of a tidal cycle the current changes from approximately north-north-westerly on the flood tide to south-south-westerly on the ebb), as shown in Figure 6-3. The ebb flows appear to be slightly stronger than those during the flood.

Metoc Ltd. constructed a two-dimensional (2D) hydrodynamic for SPR in 2009, which suggested that the depth-average tidal currents during a spring tide peak between 3.5m/s to 4.0m/s in the vicinity of the proposal tidal array area.

The areas with highest flows (and more complex coastlines/bathymetry) are also associated with strong turbulence.

Figure 6-2 ADCP location from 2013 SPR survey campaign (Milne at al., 2013)

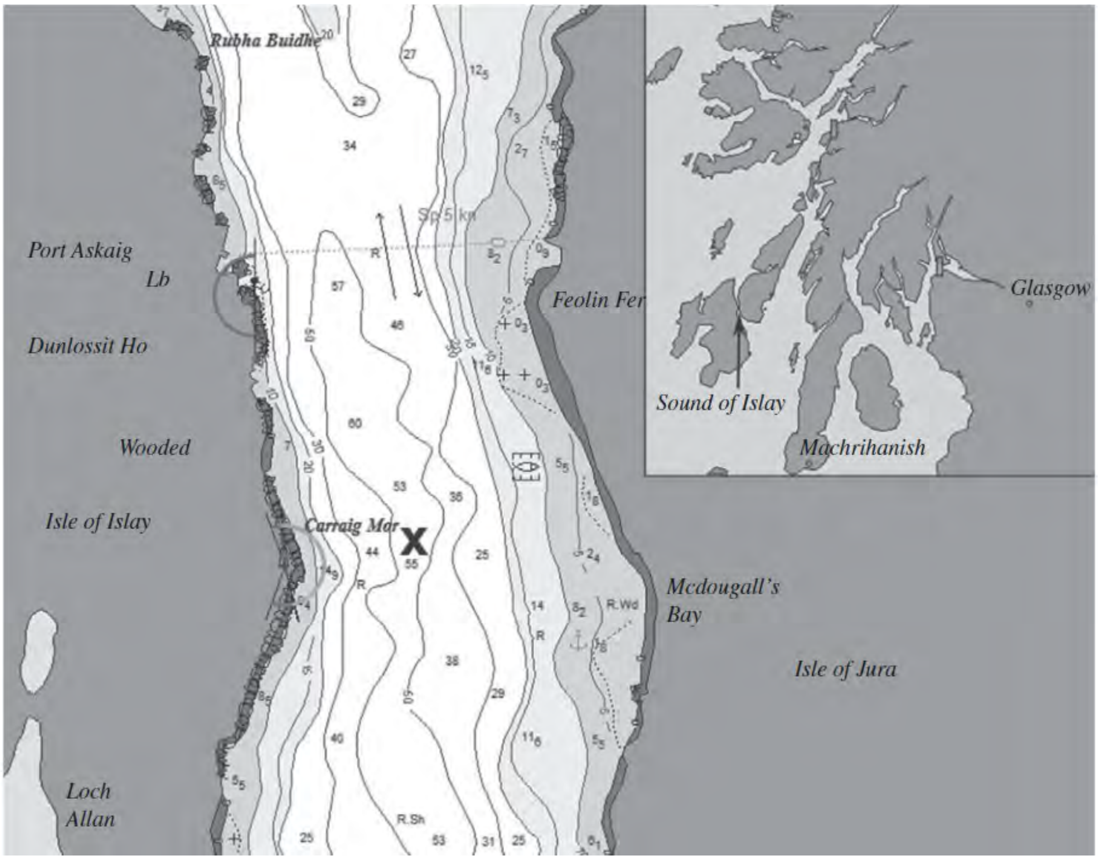
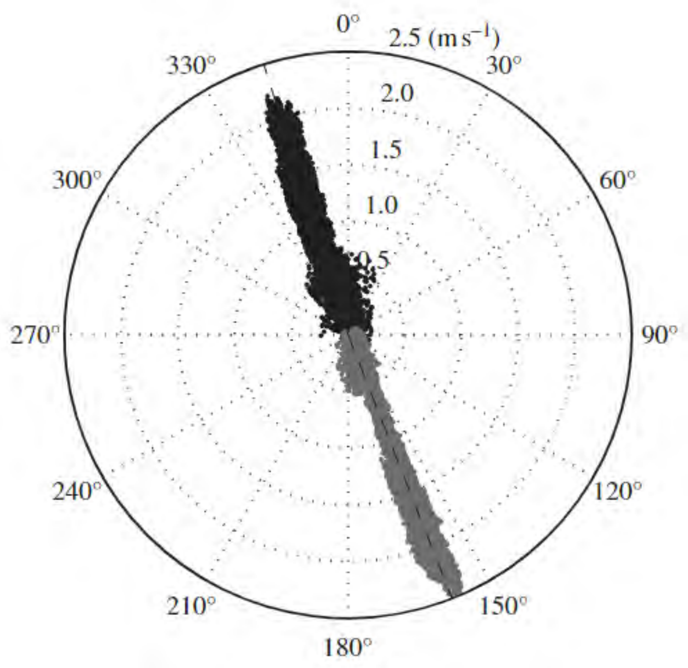


Figure 6-3 Mean flow magnitude and compass direction from bed-mounted ADCP at a distance of 5m above the seabed (Milne at al., 2013)



6.3.3.2 Waves and Wind

Waves are directly driven by winds, modified by currents and shallow sea-floor topography. In UK waters, wave climate is strongly seasonal; mean wave heights peak around January, with a high risk of high monthly-mean wave heights and extreme wave heights from October to March (UKMMAS, 2010).

The wave climate in Scotland is generally influenced by conditions in the North Atlantic given the fetch is sufficient to generate swell waves for the prevailing south-westerly winds (Neill and Hashemi, 2013). More than half of the wave conditions experienced to the west of Islay occur from a narrow wave window to the west, although waves in excess of 8m can be experienced from the majority of the western sector (Ramsay and Brampton, 2000).

Wave and wind data within the Sound itself is quite limited, however, data to the west of Islay indicates that the dominant winds are from the south-west with mean speeds exceeding 4.0m/s for 75% of the time (Barne et al., 1997). During the winter, the significant wave height exceeds 3.0m on the western side of Islay.

Table 6-2 below shows the total sea and swell extreme significant wave heights west of Islay.

Table 6-2 Offshore total sea and swell extreme significant wave heights west of Islay (Ramsay and Brampton, 2000)

Return Period (Years)	Total sea extreme significant wave height (m)	Total swell extreme significant wave height (m)
1	11.8	5.1
10	14.1	6.1
100	16.3	7.0

The Sound itself is protected from the prevailing south-westerly winds by Islay, which leads to locally generated wind waves rather than swell waves (SPR, 2009). As part of the SPR study, site surveys measured waves of up to 1.2m with wave periods of 13s (as the SPR site was located to the immediate south of ÒnM, it is likely that the wave climate will be similar. According to British Standards guidance, wave motion is greatly affected by the presence of the seabed where the water depth is < L/20, where L is the wavelength. The deep water wavelength (Lo) = (9.81/2PI) T^2, where T is equal to the wave period corresponding to the maximum wave expected (1.2m) (SPR, 2009). Therefore, based on a T of 13s, Lo = 264, Lo/20 = 13m. Therefore, as long as the water depth to the top of the turbines is not < 13m, there will be a minimal effect from waves. The maximum height of the ÒnM is 17m above the seabed. Therefore, devices deployed in water depths > 30m are unlikely to be affected by waves.

Based on the above, it is proposed that an assessment of waves is scoped out of the EIA.

6.3.4 Coastal Processes and Sediment Transport

Particulate matter in the water column is composed of organic and inorganic fractions. Organic fractions are predominantly the result of biological activity in the water column and is primarily composed of planktonic material, including bacteria. This will not be influenced by any activities associated with ÒnM and will, therefore, not be discussed further. Inorganic suspended particulate material (iSPM) is derived from fluvial inputs (derived from both erosion in the river catchments and from chemical reactions in the estuarine zone), fallout from the atmosphere and coastal erosion combined with re-suspension of existing sediments and chemical reactions in the water column. As a result, iSPM loads vary widely, generally increasing with proximity to the coastline (UKMAAS, 2010). These are also highly dependent on energy inputs (e.g. storms).

Available measurements of iSPM, whether from vessels or by satellite imagery, are largely restricted to near-surface data obtained under non-storm / cloud free conditions and are limited for the Sound of Islay. Average measured iSPM for the period 1998-2015 in the vicinity of the Sound of Islay is low (approximately 0-1mg/l) (Silva et al., 2016). However, iSPM concentrations vary widely with season, wave action, tidal conditions and freshwater discharges. As a result, water clarity and seabed and water column light intensity are also highly variable.

Sediment transport is largely driven by the hydrodynamic (tidal) conditions and the type of seabed sediment, this may lead to suspended sediment transport of finer sediment fractions and bedload transport of coarser sediments. SPR (2009) suggests that sediment transport into the Sound is from the northern and southern ends, driven predominantly by tidal currents. There are very few embayments and rivers in the area and as such, there is likely to be limited suspended sediment in the area. Sediment that resides in the Sound is likely to be coarse and patchy reducing the likelihood of it being entrained and transported (SPR, 2009).

6.3.5 Climate Change Implications

Since there are no commercial-scale tidal turbine arrays in existence, it is difficult to estimate their design life. As such, we have assumed that ÒnM will have a typical lifetime of 20 years. Over this period, climate change has the potential to (slightly) modify the present baseline, although the exact type and scale of such modifications remains uncertain. The EIAR will provide consideration to latest publications to establish potential regional changes in mean sea level.

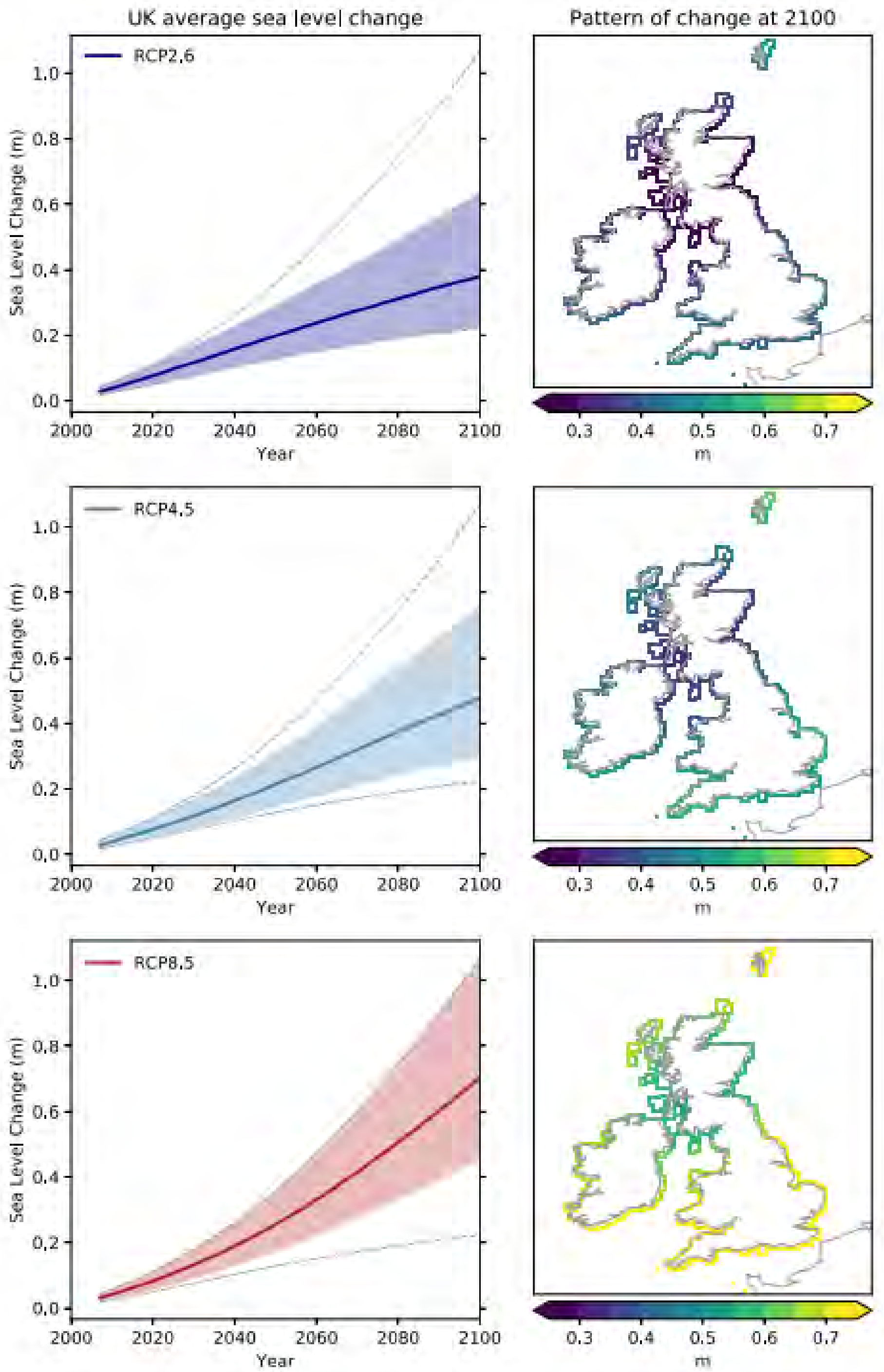
With the anticipated onset of climate change, sea levels are predicted to change around the UK, which is likely to result in coastal flooding/erosion. The UK Climate Projections (UKCP18) project presents a new set of sea level projections, rooted in the climate models and methods from the Intergovernmental Panel on Climate Change AR5, which includes projections for a range of climate phenomena (temperature, rainfall, sea levels, etc.) under different emission scenarios (Palmer et al, 2018). The study found that sea level rise will occur for all emission scenarios and at all locations around the UK, with possible changes in tidal characteristics.

Due to the uncertainty in future sea levels, a number of different scenarios exist (Palmer et al., 2018). The UKCP18 sea level projections are consistently larger than in the previous set of UK climate projections, UKCP09, for similar emissions scenarios. However, UKCP18 also includes a lower emissions scenario that assumes more mitigation. The amount of sea level rise depends on the location around the UK and increases with higher emissions scenarios. Based on exploratory results to 2300, sea levels continue to increase beyond 2100 even with large reductions in greenhouse gas emissions. Sea level rise over the coming centuries may affect tidal characteristics substantially (including tidal range). However, the atmospheric contribution to storm surges is unlikely to change. Extreme sea levels will increase due to the rise in mean sea level, but the estimates presented suggest no additional change due to the atmospheric contribution to extreme sea level.

When combined with local information on sea defences and coastline structure, the sea level and storm surge projections enable vulnerability assessments along the UK coastline to be made. The UKCP18 sea level projections of future changes in sea water level around the UK coastline are calculated on a 12km grid around the coastline – these are provided in Figure 6-4.

For a low emissions scenario (RCP 2.6), a medium emission scenario (RCP 4.5) and a high emissions scenario (RCP 8.5), sea levels in the vicinity of ÒnM are predicted to rise by up to 0.15m, 0.16m and 0.20m, respectively (UKCP, 2018), in 2053 (assuming a 20-year design life) for the central estimate (^{50}th %ile). The Mean High-Water Spring (MHWS) level at Port Askaig is 2.2m CD. In this respect, the MHWS level in the vicinity of ÒnM could increase to 2.35m CD, 2.36m CD and 2.6m CD under the low, medium, and high scenarios respectively, in 2053 for the central estimate (^{50}th %ile) a rise in sea level would reduce seabed friction thereby potentially increasing current speeds.

Figure 6-4 Three emissions scenarios against the relative sea level rise in the UK and Ireland, with further detailed (Palmer et al, 2018)



6.4 Early Consultation Responses

An online EIA scoping workshop held on 08.11.2022 (Section 4.5 for further details) raised no specific comments with regards to Marine Physical Processes.

It should be noted that NatureScot has already been consulted in relation to the need for physical process modelling for ÒnM. Further details of this can be found in Section 6.9.

6.5 Relevant Guidance and Assessment tools

The approach to undertaking the full Marine Physical Processes effect assessment at the next stage of the EIA process will be informed by relevant policy and guidance documents, as specified in Table 6-3.

Table 6-3 Relevant Legislation, Policy and Guidance Documents

Legislation / Guidance / Policy	Reference
Marine Physical Processes Guidance to inform Environmental Impact Assessment. GN041	NRW, 2020
Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2	CIEEM, 2022
Coastal Process Modelling for Offshore Wind Farm Environmental Impact Assessment: Best Practice Guide. COWRIE Coast-07-08	COWRIE, 2009
Assessment of the environmental effects of cables	OSPAR, 2009
Offshore Wind Farms: Guidance Note for Environmental Impact Assessments in Respect of FEPA and CPA Requirements	Cefas, 2004
Scoping Guidance on the Environmental Effects of Tidal Power Developments	EA, 2009

6.6 Design Parameters

6.6.1 Key Design Parameters

The Marine Physical Processes scoping assessment is based on key assumptions, which are also set out in Chapter 5 (The Project).

6.6.2 Embedded Mitigation

The embedded mitigation relevant to Marine Physical Processes is provided in Table 6-4. When undertaking the EIA, it has been assumed that these measures will be implemented; either as a matter of best practice or to ensure compliance with statute and consents.

Appropriate mitigation measures will be embedded in the proposed development design to avoid or reduce effects as much as reasonably practicable.

Table 6-4 Embedded mitigation

Embedded Mitigation
Where possible, submarine cables will be bundled together to reduce the overall seabed footprint and the electromagnetic field generated during operation, thus minimising any potential compass deviation effects as compass deviations of 22° are possible at water depths between 10m and 22m (Intertek, 2017).
Deployment of anchors/anchor chains on the seabed during installation will be kept to a minimum to reduce disturbance to the seabed.
Post-installation inspection surveys will be conducted along the length of the cables.
A cable plan will be produced outlining the proposed method statements and cable protection measures for approval by the Regulator and discussion with fisheries stakeholders.
Onshore construction vehicle movement will be minimised as far as practical to minimise effects to compacting the intertidal area; beach profile will be restored following cable installation.

6.7 Potential Project Effects

6.7.1 Potential Effects

The baseline environment is considered to be highly resilient to any potential changes in the physical environment resulting from the ÒnM Project. The EIA will assess the magnitude, extent and duration of any changes on physical process receptors to determine any potential effects, either positive or negative. These effects will be documented in the EIAR.

In some cases, predicted changes in Physical Processes may lead to a potential effects on human or biological receptors (such as other activities, Benthic Ecology or aquaculture). The Physical Processes chapter of the EIAR will describe the source of such effects and the pathways which may lead to an effect on human or biological receptors. Any potential effects will be assessed in more detail in the corresponding chapter of the EIAR.

Table 6-5 identifies the potential effects on Physical Processes from ÒnM which will be scoped into the EIA and assessed in more detail.

Table 6-5 Potential Effects of the Project on Marine Physical Processes

Potential Effect	Project Phase	Rationale and Commentary
Changes in suspended sediment.	All Phases	Depending on the nature of the seabed, sediment disturbance arising from construction activities (such as cable and foundation installation), operational activities (such as cable remedial works) and decommissioning may result in plumes increasing turbidity and settlement with potential adverse effects on other receptors (e.g. benthic communities). It is not envisaged that there would be a significant change from the baseline hydrodynamic conditions (with the exception of potential short-term increases in suspended sediment during construction) and therefore the baseline sediment transport, particularly given that the seabed within the Project location is likely to be composed of exposed bedrock with patches of coarse sand/gravel. Although there may be some short-term re-suspension of sediment during cable installation at the chosen landfall location(s), this is likely to be short-term during the construction phase only. This will be confirmed during the EIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Changes to tidal regime (turbulence, scour, mixing).	Operation	Turbines across the array will develop a series of wake effects on passing flows that will lead to increased turbulence and mixing during the operational phase. These effects may lead to local scouring around foundations and cables (depending on the nature of the seabed), changes to sediment pathways and of the tidal flow. **This potential effect will be scoped into the EIA.**
Changes in coastal erosion.	Operation	If modifications in tidal flow extend to the adjacent coastline, this may lead to associated changes in coastal erosion. It is not expected that there will be a significant change to baseline conditions, however, this will be confirmed during the EIA phase. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Changes in offshore sediment pathways (effect on morphological features).	Operation	The wake effects around the turbines may lead to local modifications in sediment pathways in areas important to the morphological behaviour of local features. It is not expected that there will be a significant change to baseline conditions, however, this will be confirmed during the EIA phase.

Potential Effect	Project Phase	Rationale and Commentary
		This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.
Changes in shoreline sediment pathways (effect on coastline).	Construction and Decommissioning	Depending on the landfall location and the construction and decommissioning methods, there may be a short-term disruption to shoreline sediment pathways or beach morphology. **This potential effect will be scoped into the EIA.**

6.7.2 Cumulative Impacts

CIA will consider other activities that might lead to changes to the local tidal flow (e.g. the proposed Flex Marine tidal energy project), which have the capacity to overlap with those expected to occur due to ÒnM, e.g. adjacent tidal energy development, cable crossings, etc.

6.7.3 Transboundary Effects

Transboundary effects will also be considered, where relevant. For example, the capacity for effects to the hydrodynamics and/or sediment plumes to extend significantly beyond ÒnM.

6.8 Mitigation Measures

Mitigation will be an integral part of the Project. In addition to the embedded mitigation discussed in Section 6.6.2, the EIA will adopt a conservative, worst-case scenario approach to assess the Marine Physical Processes. All steps during the design, installation, operational and decommissioning phases of the Project that can reasonably be taken to minimise any effects should be employed. For example, project-specific surveys are recommended (see Section 6.9) to provide a better understanding of the area, e.g. the seabed composition.

6.9 Proposed EIA Methodology

6.9.1 Assessment Methodology

As noted in Section 6.4, NatureScot was consulted about the need for Marine Physical Processes modelling for the ÒnM Project EIA ahead of the MS-LOT workshop. Their response (email dated 12 December 2022) advised that there are no marine or coastal designated areas or features in the vicinity of the ÒnM Project. Given the fast-flowing currents with the Sound of Islay, the seabed in the Sound itself is likely to be composed mainly of swept rock (with patches of coarse sand and gravel). The Marine Scotland (2022) 1:1M BGS map suggests the seabed sediments within the Sound comprises coarse sediment, however, this would need to be confirmed through site-specific geophysical surveys. It is therefore proposed that modelling is not required to assess the likely effects of the Project on Marine Physical Processes and an evidence-based approach will be appropriate and proportionate.

The assessment of potential effects of the Project on Marine Physical Processes will be established with the significance of these potential effects considered against the baseline conditions which would be expected to occur if no development took place.

The sources of potential effects have been identified in Table 6-5, based on identified project activities. Where there are multiple design options, then the realistic worst-case option will be determined and used to provide a conservative basis of assessment in the EIA. This approach assumes that all other options can be considered to lead to a lesser scale of effect (without providing further detailed assessments of other options).

In addition, far-field effects caused by changes in Marine Physical Processes, for example on the distribution and transport of sediment will be considered in the EIA. These types of effects can be difficult to predict but could include increased sedimentation if energy has been removed from the system. Importance will depend upon the sensitivity of the surrounding benthic environment, changes in sediment dynamics, local hydrodynamics, the arrangement/spacing of devices and the level of energy extraction in the context of local conditions. These factors will be considered in the EIA, using an evidence-based approach rather than modelling.

Where potential effects on Marine Physical Processes are also relevant to other biological or human receptors (e.g. 'Benthic Ecology' and 'Fish and Shellfish Ecology'), the potential effects on these receptors will be considered in the relevant EIAR chapter, informed by relevant sources and pathways established by this chapter.

The magnitude, extent and duration of effects on Marine Physical Processes will be described using an evidence-based approach based on existing information from other projects and site data gathered to inform project engineering design and the EIA, where necessary. No physical process modelling is proposed at this stage, for the reasons outlined above.

6.9.2 Data Gaps and Proposed Surveys

There is considered to be sufficient baseline data to provide a general overview and site characterisation for the area of the ÒnM development within the Sound of Islay. However, site-specific information is presently lacking in to support a full and detailed baseline description to support the EIA phase.

The following surveys are therefore proposed to address relevant data gaps if deemed the necessary and proportionate of:

- **Metocean survey** – deployment of a single bottom mounted ADCP within the ÒnM array area to obtain local flow and water level information for a period of at least 30-days (full lunar cycle). Wave data should also be obtained to verify the anticipated benign conditions. This data will be explored to help characterise the variability of local flows between ebb and flood tidal phases, as well as between spring and neap tidal ranges. The relative influence of turbulence will also be considered in terms of the measured turbulence intensity. Water sampling will be undertaken at times of ADCP deployment and recovery to determine baseline concentrations of particulate matter (if present).
- **Geophysical survey** – the array area and export cable route will be surveyed to provide information about local bathymetry (multibeam) and sedimentology (side-scan sonar and backscatter). Grab sampling of surficial sediment (to deduce particle sizes) is not considered relevant or feasible across ÒnM since the seafloor is likely to mainly rocky, the exceptions may be the shallow areas of the channel where the landfall is proposed. Similarly, sub-bottom profiling is also not considered relevant since there are no overlaying sediment layers of the rocky seabed.

7. MARINE WATER AND SEDIMENT QUALITY

7.1 Introduction

This chapter considers the potential effects on Marine Water and Sediment Quality that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It sets out the intended scope of the ÒnM EIA and the approach to be taken to the appraisal of potential effects and pressures on Marine Water and Sediment Quality associated with the Project.

7.2 Receiving Environment

The purpose of this chapter is to characterise the water and sediment quality baseline of the ÒnM Project area and to enable the identification of receptors that may be sensitive to pressures from device installation, operation and decommissioning. The baseline includes an overview of the marine and seabed quality within ÒnM.

The description of the baseline environment considers the conditions that exist at the present time and over an equivalent period of the lifetime of the development (notionally 20 years), assuming no development was present.

This chapter of the Scoping Report identifies the key sources of information that will be used and provides an initial indication of the likely effects based on a preliminary review of information.

7.3 Data Sources and Baseline

7.3.1 Data Sources

The data sources used in developing the preliminary baseline characterisation for water and sediment quality will include the following:

- Scottish Environmental Protection Agency (SEPA) – bathing water and shellfish water quality
- Marine Scotland – WFD and artificial radionuclides
- Previous SPR Sound of Islay Environmental Statement; and
- Other relevant literature, as outlined in the references.

7.3.2 Water and Sediment Quality

Water and sediment quality at any particular location on the UK continental shelf is the result of a combination of source, transport and removal mechanisms for the individual chemical species under consideration. There are many routes by which substances with the potential to affect water quality can enter the Sound of Islay, both through natural processes and as a result of anthropogenic inputs over the past few decades (UKMMAS, 2010).

7.3.2.1 Potential Sources of Pollution

Munitions
According to the OSPAR dumping at sea data, there are no dumpsites in the region. As such, pollution from this source is extremely unlikely.

Organic contaminants

The majority of organic compounds present in the environment are either readily biodegradable or of low water solubility and hence of limited significance in terms of water contamination. However, some organic compounds are the subject of concern. Prominent among the compounds that can reach toxic concentrations in the dissolved phase, and/or bioaccumulate from the dissolved phase to toxic levels are the organo-metallic compounds of lead, tin, and mercury. Use of organo-tin compounds (as marine anti-foulants) and tetraethyl lead (as a petrol additive) has been subject to stringent controls and concentrations in the marine environment are consequently decreasing.

Heavy metals

In general, dissolved metal concentrations are normally higher in coastal waters than in the open ocean (Chester, 2009), with a generally inverse relationship to salinity.

Artificial radionuclides

Artificial radionuclides form a very small component of seawater radioactivity. The natural background radioactivity of seawater, largely due to dissolved Potassium-40, is around 12 becquerels (Bq). The Scottish Environment Protection Agency (SEPA) regulates the disposal of radioactive waste from licenced nuclear sites to ensure that the amount of radiation that an individual is exposed to from the authorised disposal of radioactive waste does not exceed 1.0 millisievert per year (mSv/y) (Marine Scotland, 2020). The closest nuclear power station to the Inner Hebrides is Dounreay, which is located on the north coast of Scotland approximately 13km to the west of Thurso. Data collected between 2013 and 2017 suggest that doses from the Dounreay power station are significantly less than the legal dose limit of 1.000mSv/y. Furthermore, non-soluble nuclides, such as plutonium and americium, are quickly removed from the water column by precipitation or scavenging by suspended particulate matter.

Whisky distilleries

There are three whisky distilleries on the east coast of Islay, Caol Ila, Ardnahoe and Bunnahabhain. Discharges from these distilleries into the Sound is unlikely to adversely affect the quality of the water within the Sound.

7.3.2.2 Water Quality

The European Union (EU) Marine Strategy Framework Directive (MSFD) adopted in 2008 requires that the UK takes “the necessary measures to achieve or maintain “Good Environmental Status” in the marine environment by the year 2020 at the latest” (Department for Environment, Food and Rural Affairs (Defra, 2015)). The report concludes that good progress has been made towards this with significant contamination restricted to industrial estuaries and coastal areas.

Water Framework Directive (WFD)

The requirement for monitoring UK rivers and near-shore waters has increased as a result of the implementation of the EU Water Framework Directive (WFD), with more stringent criteria for water quality in rivers applied. River Basin Management Plans (RBMP) are being developed as a requirement of the WFD and report on the ‘ecological status’ of surface and ground water in coastal waters (out to 1nm from the baseline) and ‘chemical status’ of surface and ground waters in territorial waters (out to 12nm from the baseline). The Scottish Environment Protection Agency (SEPA) is responsible for producing RBMPs for the Scotland and the Solway Tweed River Basin Districts. The MSFD assessments are carried out at subregion level, i.e. the Greater North Sea and the Celtic Seas. The MSFD and WFD overlap in coastal waters as the WFD extends to three nm seaward from the Scottish territorial baseline. Any proposed development within these waters must have regards to the WFD and ensure that all surface water bodies achieve ‘Good Ecological Status (GES)’ and that there is no deterioration in the status. The Sound of Islay WFD waterbody has an overall waterbody status of Good in 2020 (Marine Scotland, 2022).

Bathing Waters

There are no designated bathing waters near ÒnM, the closest being Machrihanish, which is located approximately 50km to the south-east. This bathing water has a Good classification since 2019[27].

Shellfish Waters

Shellfish waters rely on good water quality to ensure safety for human consumption. Within Scotland, shellfish waters are designated for protection under the Water Environment (Shellfish Water Protected Areas: Designation) (Scotland) Order 2013.

There are no designated Shellfish Waters within the Sound of Islay, however, there is currently one on Islay at the northern end of the island (Loch Gruinart: Pacific Oysters). Since 2017, this shellfish water has been a mix of Class A and Class B depending on the time of year (SEPA, 2022A). There is also one between Colonsay and Oransay (Colonsay: Pacific Oysters), approximately 20km to the north-west of ÒnM. Since 2017, this shellfish water has been Class A (SEPA, 2022b).

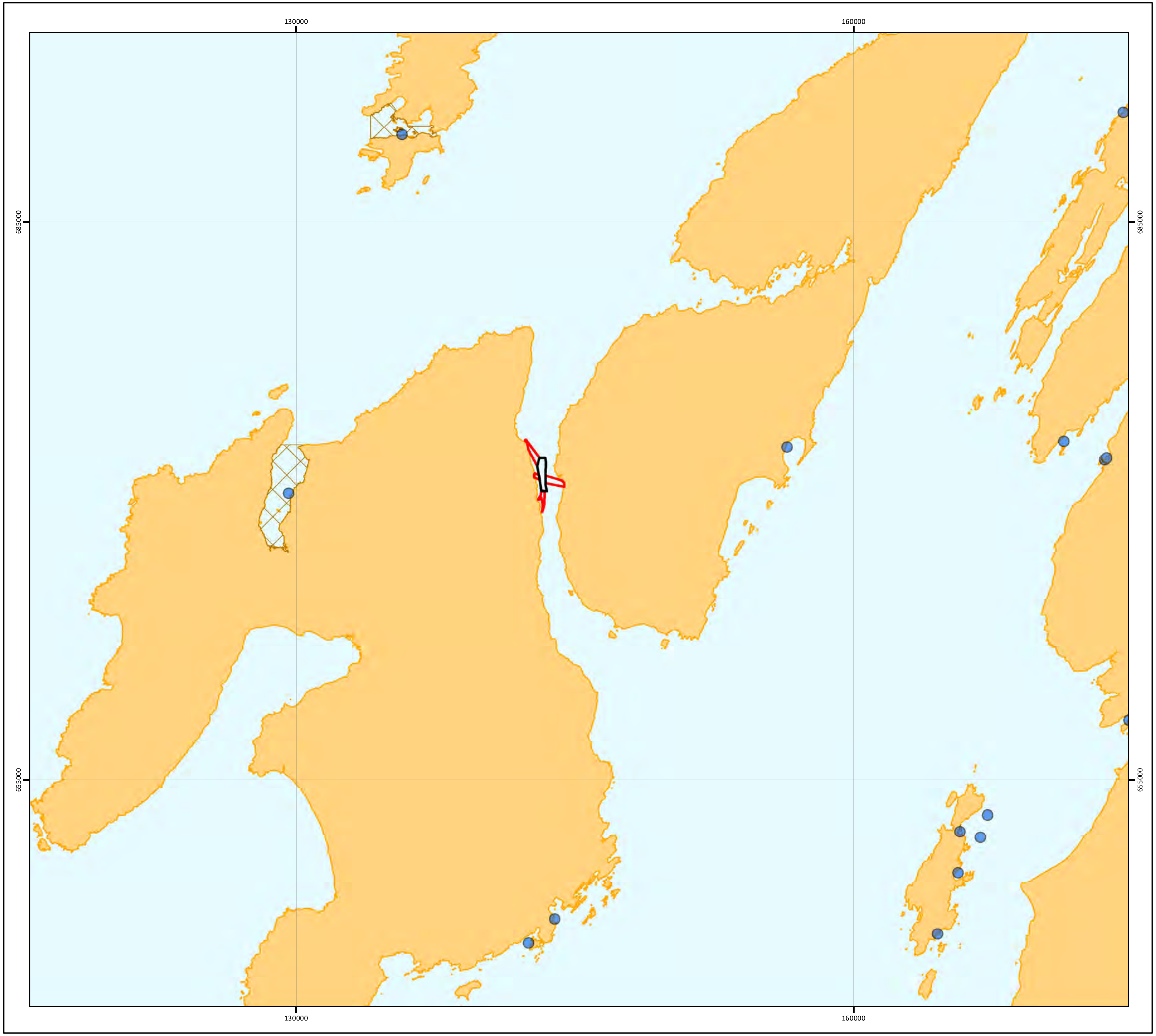
An overview of the sensitive receivers in the vicinity of ÒnM is presented in Figure 7-1 (Drawing No. P2585-PHYS-003-A).

7.3.2.3 Seabed Quality

Sediment contamination can result from natural and anthropogenic inputs and can be harmful to biota. Sediment in the near-shore sections of the proposed cable corridor corridors is likely to be affected by recent human activity. The level of both organic and inorganic contaminants in sediments is largely related to the proportion of fine material present, as a result of deposition processes. In a predominantly coarse sediment area, such as that likely to be present in the Sound of Islay, contamination levels are expected to be low. Furthermore, there are no known sources of seabed contamination within the Sound itself.

Operations at Dounreay Nuclear Power Development Establishment resulted in the discharge of radioactive (predominantly, sand sized) particles. Survey data and modelling (PRAGD, 2012) suggests that significant (i.e. potentially hazardous and persistent) contaminated particles are unlikely to be found beyond 2km from the Dounreay outfall. As a result, and given that ÒnM is a significant distance from this power station, they are not expected to be present at the Project area.

[27] No classifications were calculated in 2020/21 due to the shortened season and reduced sampling during the COVID pandemic.



EIA SCOPING FOR ÒRAN NA MARA ISLAY TIDAL PROJECT

PHYSICAL PROCESSES
Sensitive Receivers

Drawing No: P2585-PHYS-003	A

Legend

- AfL Area
- Exploratory Cable Corridor

Sensitive Receiver

- Aquaculture Site
- Shellfish Water

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NOTE: Not to be used for Navigation

Date	20 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; OSOD; EEA; MS; NOVA
File Reference	J:\P2585\Mxd_QGZ\02_PHYS\ P2585-PHYS-003.mxd
Created By	Oliver Bula
Reviewed By	Lewis Castle
Approved By	Paul Evans

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7.4 Relevant Guidance and Assessment tools

The approach to undertaking the full water and sediment quality effect assessment will be informed by relevant policy and guidance documents, as specified in Table 7-1.

Table 7-1 Relevant legislation, policy, and guidance documents

Legislation / Guidance / Policy	Reference
Bathing Water Directive (2006/7/EC) transposed into Irish Law through the Bathing Water Quality Regulations	EU, 2006
Shellfish Water Directive (2006/113/EC) transposed into Irish Law through the European Communities (Water Policy) Regulations	EU, 2006
Water Framework Directive (WFD) (2000/60/EC)	EU, 2000
Bathing Water Quality Regulations	EU, 2008a
Marine Strategy Framework Directive (MSFD) (2008/56/EC)	EU, 2008b
Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2	CIEEM, 2022
Pollution Prevention Guidelines	EA, EHHSNI, SEPA, 2007

7.5 Design Parameters

7.5.1 Key Design Parameters

The Marine Water and Sediment Quality scoping assessment is based on key assumptions, which are also set out in Chapter 5 (The Project).

7.5.2 Embedded Mitigation

A Marine Pollution Contingency Plan will be developed, outlining the procedures to protect personnel and the marine environment, and mitigation measures in the event of an accidental pollution event relating to the Project. There are a number of other standard measures that will be applied to the Project to ensure and demonstrate compliance with national and international statute and best practice guidance, as outlined in Table 7-2. These measures will help to minimise any likelihood that ÒnM will negatively water or sediment quality.

Table 7-2 Compliance and best practice measures for minimising effects on water and sediment quality.

Design Measure	Source
Ballast water discharges from Project vessels will be managed under the International Convention for the Control and Management of Ships' Ballast Water and Sediments standard.	International Maritime Organisation
Project vessels will be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards.	International Maritime Organisation
Control measures and shipboard oil pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I requirements for all project vessels.	International Maritime Organisation
Any significant chemical use in the Project will be specified in Construction Method Statement, operation site documents and COSHH register as applicable.	Project specific
Any debris or waste material during construction of the works will be removed from the Site for disposal at a location approved by SEPA.	Project specific
All substances and objects deposited during the execution of the Project works will be inert (or appropriately coated or protected so as to be rendered inert).	Project specific
The risk of transferring marine non-native species to and from the Site will be kept to a minimum by ensuring bio-fouling management practices are implemented.	Project specific
Suitable bunding and storage facilities will be used to prevent release of fuel oils and lubricating fluids associated with plant and equipment into the environment (if relevant)	Project specific

7.6 Potential Project Effects

7.6.1 Potential Effects

Modifications to baseline Marine and Sediment Quality may lead to potential effects on Marine Water Quality receptors. In some instances, the change in Marine Water Quality may lead to a potential effect on a biological receptor (e.g. Benthic Ecology or shellfish water/WFD classification). In these cases, such effects will be assessed within the EIA. Table 7-3 details the potential effects of the ÒnM Project on Water and Sediment Quality. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA.

Table 7-3 Potential Effects of the Project on Marine Water and Sediment Quality

Potential Effect	Project Phase	Rationale and Commentary
Deterioration in Marine Water Quality due to re-suspension of sediments	All Phases	Sediment disturbance arising from construction activities, such as cable laying and foundation installation, operational activities (such as cable remedial works) and decommissioning has the potential to result in a reduction in water clarity and/or re-suspension of nutrients and contaminants. See also 'Changes in suspended sediment' in Physical Processes chapter. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Toxic contamination through accidental chemical release from turbines.	All phases	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. **This potential effect has been scoped out of the EIA.**
Toxic contamination through accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels.	All Phases	Accidental spill of materials or chemicals during all phases of ÒnM has the potential to lower Water Quality in the vicinity of ÒnM. However, control measures and oil/chemical pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I requirements for all Project vessels, and where applicable, to intertidal equipment, as discussed in Chapter 9. These best practices will ensure the likelihood of an accidental oil or chemical release significantly impacting benthic communities to be very low. Chemical pollution could occur intermittently through the lifetime of a project through re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey *et al.,* 2014; Maxwell *et al.,* 2022). All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) and will follow an EMMP to reduce risk of effect. The tidal conditions at the site mean small spills will quickly disperse. **This potential effect has been scoped out of the EIA.**

7.6.2 Cumulative Impacts

Cumulative potential effects will consider other activities that may lead to additional sediment disturbance and re-suspension of nutrients and contaminants that may overlap with those which are expected to occur during the construction phase of ÒnM.

7.6.3 Transboundary Effects

Transboundary potential effects will also be considered, where relevant. For example, the capacity for any sediment plumes to extend beyond ÒnM.

7.7 Proposed Approach to EIA

7.7.1 Assessment Methodology

A literature review of the baseline data and information will be undertaken to characterise the Marine Water and sediment Quality within the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone. This will include the naturally occurring levels of contamination in marine water and concentrations of suspended sediment (Marine Water Quality), and physical properties and contamination (sediment quality).

The data and information collected during the desk-based literature review will be supplemented by results from any relevant site surveys. For example, if deemed appropriate and proportionate to risk, the sampling of contaminants collected during benthic grab sampling may be considered. An assessment of the potential effects on Marine Water and Sediment Quality will be carried out against the baseline conditions.

The main type of effects can be categorised as either:

- Seabed disturbance events – short-term activities during construction (e.g. cable laying, etc.) and decommissioning phases which can lead to sediment plumes with increased turbidity of the water column and settlement which may smother benthic receptors.
- Accidental spillage of materials – potential for pollution from spills or leaks (fuel, oil, lubricants) during construction, operation and decommissioning.

7.7.2 Data Gaps and Proposed Surveys

There is considered to be sufficient baseline data to provide a general overview and site characterisation for the area of the ÒnM development within the Sound of Islay. It is not currently envisaged that any further site surveys specifically focused on assessing the potential effects of the Project on water or sediment quality will be required.

8. BENTHIC ECOLOGY

8.1 Introduction

This chapter considers the potential effects on Benthic Ecology that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It examines how the ÒnM Project could potentially result in direct or indirect effects on the intertidal and subtidal benthic environment in the Sound of Islay. It describes the intertidal and subtidal Benthic Ecology baseline of relevance to the Project and outlines the proposed approach to assessing the effects of the Project in the EIA.

The baseline summary provides an overview of the biotopes, environmentally sensitive species and habitats, and the oceanographic conditions which support these environmental features within the ÒnM AfL and AoS. This description is based on existing sources and which are considered to remain broadly valid and relevant for the Project. There are expected to be variations within the species present and habitat distribution within the ÒnM Project area due to temporal and spatial microhabitat variations within such a dynamic environment.

The key sources of information that will be used to assess the effects of the Project on Benthic Ecology in the EIA are identified and a preliminary assessment of the likely effects on the receiving environment is provided.

Commercially exploitable shellfish and demersal fish are considered in Chapter 11.

8.2 Receiving Environment

The waters of the Inner Hebrides are highly productive, supporting a range of intertidal and subtidal benthic habitats. The broadscale habitats expected in the ÒnM Project area and surrounding area are presented in Figure 8-1 (Drawing no. P2585-Benthic-001-D) and Figure 8-2 (Drawing no. P2585-Benthic-002-D), as identified from EUSeaMap (2021) data (EMODnet, 2021).

8.3 Data Sources and Baseline

8.3.1 Data Sources

The data sources to describe the preliminary baseline characterisation for intertidal and subtidal Benthic Ecology include, but are not limited to the following:

- Joint Nature Conservation Committee (JNCC)
- European Marine Observation and Data Network (EMODnet)
- Marine Information Network (MarLIN)
- Scotland's Nature Agency (NatureScot)
- Marine Scotland Scottish National Marine Plan Interactive (NMPi) Map
- Previous SPR Sound of Islay Environmental Statement
- Other relevant literature, as outlined in the references.

8.3.2 Baseline Environment

8.3.2.1 Subtidal Habitats and Species

Previously identified marine sensitive habitats and species are also presented in this figure (Hiscock, 1983; Shucksmith, 2021 & NMPi, 2023). Based on previous records in this region, potential broadscale subtidal habitat descriptions that could be present within the ÒnM Project area, and their protection status, are listed in Table 8-1.

Much of the ÒnM Project area is dominated by high energy circalittoral seabed with numerous rock exposures, classified as high and low energy circalittoral and infralittoral rock. Infralittoral and circalittoral coarse sediment is expected at the northern and southern entrances to the Sound of Islay, A5.13 and A5.14, respectively (Figure 8-1; Drawing no. P2585-Benthic-001-D) and Table 8-2). An area at the northern extent of the AfL, ground-truthed during a 2019 survey (Shucksmith, 2021), recorded the biotope circalittoral mixed sediment (A5.44 – Table 8-2). Based on nearby records, key protected sensitive habitats that could be present within the ÒnM Project area include maerl, kelp and horse mussel beds as well as stony reef.

As outlined in Chapter 6, there are limited fluvial inputs within this region, which combined with coarse underlying geology, gives rise to low concentrations of suspended particulate matter. This results in relatively clear waters with increased photic depth compared with other regions within the UK (Jones *et al*., 1984). These conditions support a range of marine phyta. Of particular relevance to the ÒnM Project are macroalgae, kelp, and the coralline algae, maerl, which when recorded in 'beds' can constitute Priority Marine Features (PMF) (Figure 8-1).

Maerl beds previously identified in this region are presented in Figure 8-1 (Drawing no. P2585-Benthic-001-D). These data indicate that maerl beds were identified, with the closest record located 2.1km northeast of the ÒnM AfL, characterised by the biotope '*Phymatolithon calcareum'* maerl beds with red seaweeds in shallow infralittoral clean gravel or coarse sand' (A5.5111). Other biotopes containing mearl located in the north of the Sound of Islay include '*Phymatolithon calcareum* maerl beds in infralittoral clean gravel or coarse sand' (A5.511) located around 3.5km northeast of the ÒnM AfL and '*Phymatolithon calcareum* maerl beds with *Neopentadactyla mixta* (gravel sea cucumber) and other echinoderms in deeper infralittoral clean gravel or coarse sand' (A5.5112) located approximately 4.2km north of the ÒnM AfL. These records date back to a survey undertaken in 1982 (Hiscock, 1983). Maerl bed data points were identified 4.3km (closet record) south of the ÒnM AfL during a 2019 benthic survey and relate to the biotopes 'maerl beds' (A5.15). One data record for A5.5111 '*Phymatolithon calcareum* maerl beds with red seaweeds in shallow infralittoral clean gravel or coarse sand' was located towards the southern entrance to the Sound.

Kelp beds generally dominate the infralittoral zones within the Sound of Islay, with the species cuvie (*Laminaria hyperborea*), sugar kelp (*Saccharina latissima*) and oarweed (*Laminaria digitata*) identified (NBN, 2023; Naturescot, 2023a & NMPi, 2022). Biotopes recorded in close proximity to the ÒnM Project area, include '*Laminaria hyperborea* and foliose red seaweeds on moderately exposed infralittoral rock' (A3.214) and 'Kelp and seaweed communities on sublittoral sediment' (A5.5211), with derivatives of these previously recorded in a 2009 benthic survey undertaken by SeaStar located 1.4km to the south of the ÒnM Project area (SPR, 2010 and NMPi, 2023).

The strong tidal currents and nutrient rich waters in the Sound of Islay can support filter feeding organisms, including mussels. Horse mussel (*Modiolus modiolus*) individuals have been recorded in the waters around the ÒnM Project area with the nearest record approximately 1.5km northwest of the Project area (NBN, 2023). No horse mussel individuals were identified in the 2009 SeaStar benthic survey, however, blue mussel (*Mytilus edulis*) individuals were identified at one sampling station (SPR, 2010). Extensive mussel beds forming biogenic reefs (offered protection in UK; Table 8-2) have not been recorded in the Sound of Islay (EMODnet, 2023 & SPR 2010).

The ÒnM Project area is in an area of potential Annex I bedrock / stony reef (JNCC, 2023a), which punctuate the Sound of Islay and are more prevalent along the northern coasts of Islay and Jura (Figure 8-1 and Figure 8-2; Drawing no. P2585-Benthic-001-D and P2585-Benthic-002-D). Guidance for the classification of stony reef was published by Irving (2009), and therefore has not been integrated into some previously acquired site survey reports undertaken in the region, which were conducted prior to this (SPR, 2010 & Hiscock, 1983). As such, limited information is available for this habitat in the area.

8.3.2.2 Intertidal Habitats and Species

Various options are being explored for the subsea cable route to export the power generated by the turbines to shore at four potential landfall points on Islay (Bunnahabhain, Ardnahoe, Caol Ila and Port Askaig) and one on Jura (Whitefarland Bay). These landfall options are described in Chapter 5 (The Project).

Intertidal habitats within each of these five potential landfall AoS are expected to be littoral rock (and other hard substrata) as well as coarse sediments with grading of gravel / pebble particle size with distance up the shoreline.

The export cable will be surface-laid on the seabed, with some potential trenching as it approaches the foreshore area, depending on the findings of the EIA. Whether surface laid or trenched, intertidal sections along the export cable route including working corridors will be narrow (< 20m). Rocky substrates are expected to be dominated by mixed fucoids and occasional red seaweeds, with encrusting and mobile epifauna dominated by barnacles, molluscs and crustacea. None of the habitats or species expected within the landfall locations are protected by local or regional legislation. Further information on intertidal habitats expected in the ÒnM Project area, based on previous records, are presented in Table 8-2(SPR, 2010).

8.3.3 Protected and Designated Sites

The ÒnM Project area is not located within any Nature Conservation Marine Protected Areas (NCMPA) or SACs designated for the protection of benthic features (JNCC, 2023a). Conservation areas located within 50km of the ÒnM AfL area are presented in Figure 8-1 (Drawing no. P2585-Benthic-001-D) and listed in Table 8-1.

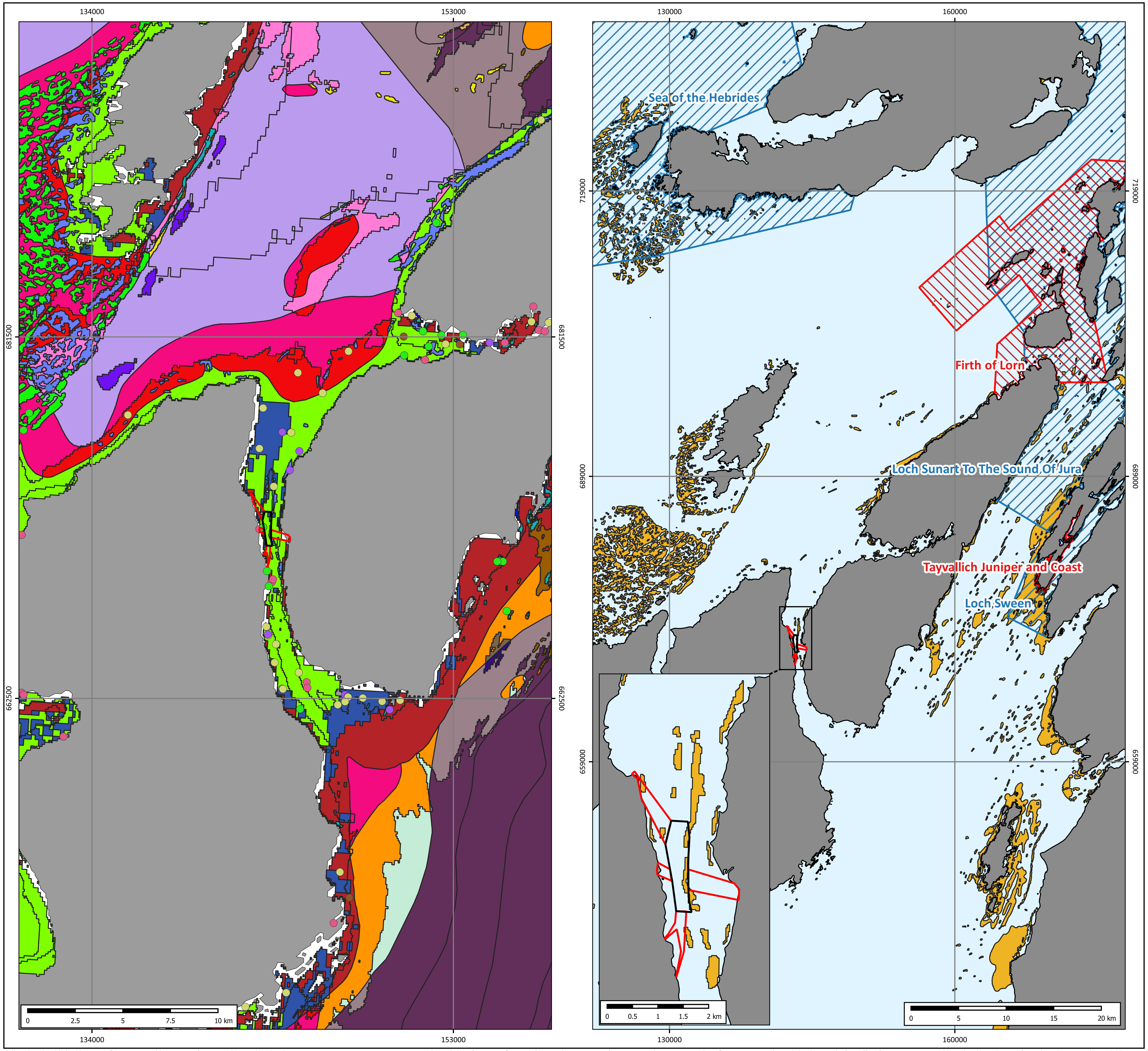
Table 8-1 Marine Protected Areas with benthic features around the Sound of Islay

Site name	Distance from ÒnM AfL	Designated Benthic Feature
Loch Sween MPA	18.5km (by water)	Burrowed mud, maerl beds, native oysters, and sublittoral mud and mixed sediment communities.
Loch Sunart to the Sound of Jura MPA	41km (by water)	Common skate and quaternary of Scotland: glaciated channels/troughs seabed features.
Sea of Hebrides MPA	43km (by water)	Marine geomorphology of the Scottish shelf seabed: Inner Hebrides Carbonate Production Area.
Firth of Lorn SAC	33.5km (by water)	Rocky/stony reef
Moine Mhor SAC	42km (by air)	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) as well as mudflats and sandflats not covered by seawater at low tide.
Tayvallich Juniper and Coast SAC	36km (by water)	Characterised by tidal rivers, estuaries, mud flats, sand flats, lagoons (including saltwork basins) as well as salt marshes, salt pastures, salt steppes, providing a habitat for the European otter (*Lutra lutra*).

8.3.4 Legislation and Policy

A range of legislation, policy and guidelines apply to the protection of benthic marine habitats and species in the the Sound of Islay. Since the UK's departure from the European Union in 2020 it has adopted some European policies relevant to UK waters. Relevant policies, legislation and guidelines to this chapter include but are not restricted to:

- Marine (Scotland) Act 2010;
- The Habitats Regulations 1994 (as amended in Scotland);
- The Habitats Directive (Directive 92/43/EEC);
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (the Bern Convention);
- The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention);
- UK Post-2010 Biodiversity Framework (2012);
- NatureScot Priority Marine Features (PMF);
- International Union for Conservation of Nature (IUCN) Red List of Habitats and Species; and
- European Union Alien Invasive Species Regulation.



EIA SCOPING FOR ÒRAN NA MARA ISLAY TIDAL PROJECT

BENTHIC

Marine Habitats and Evironmental Designations in the Òran na Mara Islay Project Area

Drawing No: P2585-BENTHIC-001	D

Legend

- AfL Area
- Areas of Search for Exploratory Cable Corridors

Environmental Designations

- SAC
- MPA
- Potential Reef

Priority Marine Features (PMF)

- Kelp and seaweed communities
- Kelp beds
- Maerl beds
- Ocean Quahog
- Stony Reef

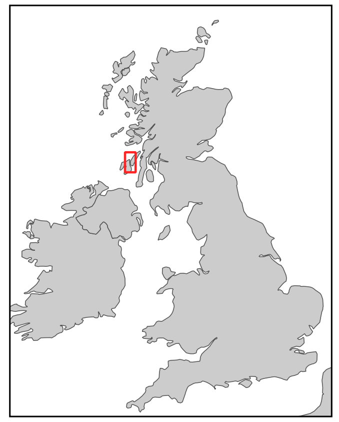
EUNIS Class (2007-2011)

- A3
- A3.1
- A3.2
- A3.3
- A4
- A4.1
- A4.12
- A4.2
- A4.27
- A4.3
- A4.33
- A5.13
- A5.14
- A5.23 or A5.24
- A5.25 or A5.26
- A5.27
- A5.33
- A5.35
- A5.37
- A5.43
- A5.44
- A5.45

Seabed Energy Class

- High energy
- Low energy
- Moderate energy
- No energy information

N



NOT TO BE USED FOR NAVIGATION

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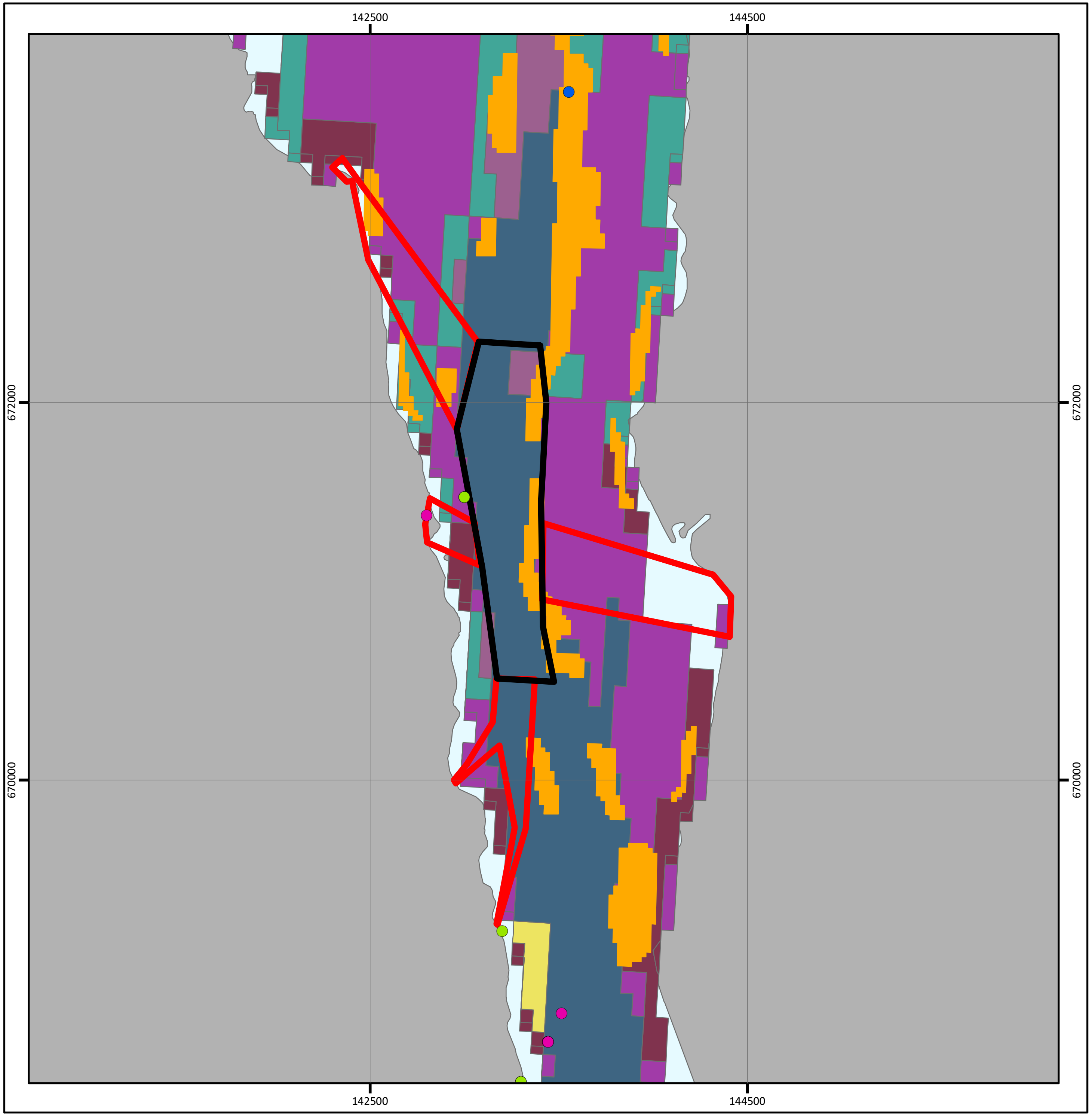
Created By	Oliver Bula
Reviewed By	Lewis Castle
Approved By	Paul Evans

NOVA INNOVATION intertek



EIA SCOPING FOR ÒRAN NA MARA ISLAY TIDAL PROJECT

BENTHIC
Marine Habitats in the Òran na Mara Islay Project Area

Drawing No: P2585-BENTHIC-002	D

Legend

- AfL Area
- Areas of Search for Exploratory Cable Corridors

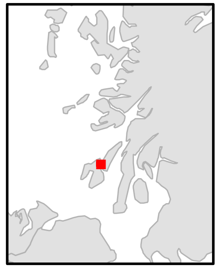
Priority Marine Features (PMF)

- Kelp and seaweed communities
- Kelp beds
- Stony Reef
- Potential Reef

EUNIS Class (2007-2011)

- A3.1: High energy infralittoral rock
- A3.2: Moderate energy infralittoral rock
- A3.3: Low energy infralittoral rock
- A4.1: High energy circalittoral rock
- A4.2: Moderate energy circalittoral rock
- High energy circalittoral seabed
- High energy infralittoral seabed
- Low energy circalittoral seabed
- Low energy infralittoral seabed
- Moderate energy circalittoral seabed
- Moderate energy infralittoral seabed

N W E S



NOTE: Not to be used for Navigation

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Created By	Oliver Bula
Reviewed By	Lewis Castle
Approved By	James Harding

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0 0.5 1 1.5 2 km

Table 8-2 Potential subtidal habitat types present in Project area and protection status

Habitat Type	Description	Protection Designation / Status	Source
Maerl Beds	Maerl is a calcareous free-living coralline red algae which can remain transient within the marine environment, becoming stable where attached in aggregations forming 'beds'. Maerl can form a hard interlocking substratum with elevation above the surrounding seabed (maerl beds). These can provide an important habitat for marine fauna and flora as well as an important nursery ground for commercially important Fish and Shellfish including scallops (*Pecten maximus*). Two main species of maerl are expected in the Sound of Islay, *Phymatolithon calcareum* and the less frequent *Lithothamnion glaciale*.	Priority Marine Feature OSPAR List of Threatened and Declining Habitats UK Post-2010 Biodiversity Framework (formally UK BAP) Priority Habitat	OSPAR (2008) NatureScot (2023b)
Kelp Beds	On the west coast of Scotland, dense kelp forests predominantly comprised of cuvie (*Laminaria hyperborea*), can occur on bedrock or large stable boulders in areas with low turbidity. They grow best in high energy hydrodynamic environments and are thought to provide storm protection to some coastlines. They occur in water depths from 5 to 30 m depending on sunlight water penetration and can support a variety of red seaweeds and fauna, with their protective holdfasts often being recorded as highly diverse. They can also be valuable spawning and nursery grounds for commercially important fish and cephalopod species.	Priority Marine Feature OSPAR List of Threatened and Declining Habitats	NatureScot (2023a) OSPAR (2021)
Horse Mussel Beds	Horse mussels (*Modiolus modiolus*) are a long living bivalve molluscs, that grow up to up to 20cm in length. They are usually subtidal, with most extensive beds identified in water depths of 5 to 70 m. Such extensive beds can modify currents and provide unique habitat for a diverse benthic community that can include soft corals, tubeworms, barnacles, hydroids, bryozoans and seaweeds, and provide shelter for fauna including brittlestars, crustaceans, polychaetes, molluscs, as well as commercially important shellfish such as scallops and whelks. All records of horse mussel in the Sound of Islay to date are of individuals rather than extensive beds forming biogenic reefs. Further, of the horse mussel individuals recorded, none were in the ÒnM Project area however this species/habitat may be present.	Priority Marine Feature OSPAR List of Threatened and Declining Habitats UK Post-2010 Biodiversity Framework (formally UK BAP) Priority Habitat BERN Convention Endangered Natural Habitat types The Habitats Directive Annex I Habitat (EU Code - 1170 Reef)	NatureScot (2023c)

Habitat Type	Description	Protection Designation / Status	Source
Blue Mussel Beds	Blue (or common) mussels (*Mytilus edulis*) are the most common mussel in UK waters, often forming dense aggregations (beds) both intertidally and on subtidal rock and shallow mixed sediments. Blue mussel beds can stabilise the underlying sediment creating a highly complex habitat for a diverse community of associated flora and fauna. Where finer sediment occur, they provide an important habitat and shelter for epifaunal species such as starfish, brittlestars, barnacles and crustacea, that would otherwise not inhabit the area. They have an important role in nutrient cycling by filtering sea water and removing potentially toxic algae and can be an important food source for macrofauna, wildfowl, seabirds and humans.	UK Post-2010 Biodiversity Framework (formally UK BAP) Priority Habitat OSPAR List of Threatened and Declining Habitats BERN Convention Endangered Natural Habitat types The Habitats Directive Annex I Habitat (EU Code - 1170 Reef)	OSPAR (2015) Marine Scotland (2018)
Stony Reef	Bedrock and stony reef can be highly variable, both in structure and in the communities they support. These can range from vertical rock walls to horizontal ledges, sloping or flat bed rock, broken rock, boulder fields, and aggregations of cobbles. The biotic communities of these geogenic features host can vary regionally with particularly distinct communities associated with rock type, water depth and substrate formation, with more dynamic environments providing a larger variety of communities. The presence of enhanced tidal streams often significantly increases species diversity with communities often comprised of barnacles, the soft coral *Alcyonium digitatum*, large sponges and hydroid/bryozoan turfs.	The Habitats Directive Annex I Habitat (EU Code - 1170 Reef)	JNCC (2023b)
Circalittoral Coarse Sediment (A5.14)	Often found in tidal channels of marine inlets, along exposed coasts and offshore, comprising of circalittoral coarse sands, gravel and shingle, generally in water depths below 15 to 20 m. This habitat may be characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g. *Neopentadactyla*) may also be prevalent in these areas along with the European lancelet, *Branchiostoma lanceolatum*.	ICUN red list vulnerable habitat in the North-East Atlantic (European Union [EU] 2016).	EEA (2023a)
Infralittoral Coarse Sediment (A5.13)	Often found on moderately exposed open coast or in tide-swept marine inlets, comprising of coarse sand, gravelly sand, shingle and gravel in the infralittoral zone, subject to exposure to tidal steams and wave action. As with the deeper biotope, this habitat is characterised by a robust fauna of infaunal polychaetes such as *Chaetozone*	ICUN red list vulnerable habitat in the North-East Atlantic (European Union [EU] 2016).	EEA (2023b)

Habitat Type	Description	Protection Designation / Status	Source
	setosa and *Lanice conchilega*, small crustacea such as *Iphinoe trispinosa* and *Diastylis bradyi*, and venerid bivalves. Habitats with the European lancelet *Branchiostoma lanceolatum* may also occur.		
Circalittoral mixed sediment (A5.44).	A highly varied and widespread biotope of heterogenous sediments, generally in depths below 15 to 20 m, including well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in or lying upon mud, sand or gravel. Such sediment heterogeneity can ensure a variety of communities can develop, which are often very diverse. A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones such as *Cerianthus lloydii* are often present in such habitat. The presence of hard substrata enables epifaunal species to become established, particularly hydroids such as *Nemertesia* spp and *Hydrallmania falcata*.	ICUN red list vulnerable habitat in the North-East Atlantic (European Union [EU] 2016).	EEA (2023c)
Tide-swept channels	Tidal-swept channels are found in the Scottish west coast and islands often formed by the scouring action of glaciers and ice sheets. They are associated by strong tidal currents which may be felt down to 30m. Fine, muddy particles are carried away, leaving a seabed of coarse materials – gravel, pebbles, boulders and bedrock that's been sandblasted in places by sand and gravel. The marine life associated with these habitats is abundant with epifauna including soft corals, hydroids, bryozoans, large sponges, anemones, mussels with maerl and brittlestars occurring in dense beds. In shallow water, bedrock and boulders often support kelp as well as red and brown seaweed assemblages.	Priority Marine Feature UK Post-2010 Biodiversity Framework (formally UK BAP) Priority Habitat	UKBAP (2016) NatureScot (2023d)

Table 8-3 Potential intertidal habitat types in Project area and protection status

Habitat Type	Description	Protection Designation / Status	Source
Barnacles and fucoids on moderately exposed shores Rock (A1.21)	Moderately exposed rocky shores characterised by a mosaic of fucoids and barnacles on bedrock and boulders. In this area dominant seaweeds of this biotope are expected to include channelled wrack (*Pelvetia canaliculata*) and spiral wrack (*Fucus spiralis*). Other species are normally present also include the winkle *Littorina saxatillis*, the dog whelk *Nucella lapillus*, the barnacle *Semibalanus balanoides* and the limpet *Patella vulgate*.	None	EEA (2023d)
Fucoids on sheltered marine shores (A1.31)	Dense blankets of fucoid seaweeds dominating in locally sheltered patches on exposed to moderately exposed rocky shores. Further represented in the Sound of Islay by 'rockweed (*Ascophyllum nodosum*) on full salinity mid eulittoral rock' (A1.3141), 'spiral wrack (*Fucus spiralis*) on full salinity upper eulittoral mixed substrata' (A1.3121) and 'serrated wrack (*Fucus serratus*) on full salinity lower eulittoral mixed substrata' (A1.3151).	None	EEA (2023d)
Supralittoral rock (lichen or splash zone) (B3.1)	Yellow and grey lichens on littoral fringe of very exposed to moderately exposed rocky shores further represented in this area by 'black lichen (*Verrucaria maura*) and sparse barnacles (*Semibalanus balanoides* and/or *Chthamalus montagui*) on exposed littoral fringe rock' (B3.1131).	None	EEA (2023f)
Shingle (pebble) and gravel shores (A2.11)	Shores of shingle (mobile cobbles and pebbles) or coarse gravel, typically deposited as a result of onshore wave action and long-shore drift. Due to the coarse and mobile nature of the sediment, it is typically impoverished with occasional opportunist amphipods and oligochaete worms. Ephemeral green algae (*Enteromorpha* spp.) may develop in summer.	None	EEA (2023g)
Strandline (A2.21)	The strandline is the shifting line of decomposing seaweed typically located on the upper extreme of the intertidal zone at each high tide, often providing shelter for communities of sandhoppers and dense ephemeral juvenile blue mussels attached to fucoids.	None	EEA (2023h)

Table 8-4 ÒnM Project potential impact pathways for benthic ecology receptors

Potential Source / Activity	Potential Impact	Construction	Operation	Decommissioning	Scoped In or Out?	Reasoning / Overview
Installation, maintenance and decommissioning of turbines and cables.	Physical disturbance or change (substratum type) to habitats and species and habitat loss.	Yes	Yes	Yes	In	Potentially sensitive habitats and species could be present within the ÒnM Project area. This will be determined in the EIA, including through site survey. No drilling is required to install project infrastructure with direct long-term effects associated with relatively small infrastructure footprints. Some pin-piling may be used on rock feet of larger turbines (refer to Chapter 5 for further details). Indirect effects are expected to be temporary. Micro-siting of turbines will avoid identified potentially sensitive habitats. Anthropogenic infrastructure can provide additional habitat for benthic species which could be seen as beneficial to the overall ecosystem.
	Abrasion/disturbance at the surface of the substratum causing habitat loss and disturbance.	Yes	Yes	Yes	In	Potentially sensitive habitats and species could be present within the ÒnM Project area. This will be determined in the EIA, including through site survey. Cables are expected to surface laid, with some trenching in the nearshore area if the need is identified. If required, cable protection measures will be used to secure surface laid cables. Habitat loss and disturbance is expected to be temporary. Micro-siting of cables will avoid identified potentially sensitive habitats.

Potential Source / Activity	Potential Impact	Construction	Operation	Decommissioning	Scoped In or Out?	Reasoning / Overview
						Deployment of anchors/anchor chains on the seabed will be kept to a minimum to reduce disturbance to seabed.
	Smothering of benthos and siltation rate changes.	Yes	No	Yes	In	Sediment resuspension is expected to be minimal, due to the limited footprint of infrastructure, the hard underlying geology and the tide-swept conditions at the site. Cable will be surface laid where possible. Some species previously recorded in the Sound of Islay which may be present at the Project area are known to be sensitive to siltation. These include sessile filter feeding organisms and those which rely on sunlight to produce energy. As such they could be affected by high concentrations of sediment loading, so on a precautionary basis this potential effect pathway will be scoped into the EIA.
Vessel activity	Pollution through accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels affecting seabed habitats.	Yes	Yes	Yes	Out	Control measures and oil/chemical pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I requirements for all Project vessels, and where applicable, to intertidal equipment, as discussed in Chapter 9. These best practices will ensure the likelihood of a accidental oil or chemical release significantly effecting benthic communities to be very low.
	Introduction of Invasive Non-Native Species (INNS) from survey, installation, maintenance and	Yes	Yes	Yes	In	Inadvertent introduction of INNS pose a significant threat to native biodiversity. Different benthic habitats have different sensitivities to INNS, to be assessed against site specific information.

Potential Source / Activity	Potential Impact	Construction	Operation	Decommissioning	Scoped In or Out?	Reasoning / Overview
	decommissioning vessels, displacing native marine species.					The risk of transferring marine non-native species to and from the Site will be kept to a minimum by ensuring bio-fouling management practices are implemented. Anthropogenic infrastructure projects can be seen as stepping stones for INNS to spread into different regions displacing native fauna and flora.
Turbine installation and presence	Turbine presence causing changes to the hydrodynamic regime, in the area potentially affecting the mechanisms within the local Benthic Ecology.	Yes	Yes	No	In	Potential for turbines to alter the movement of water, at a local level. Tidal turbines are designed is to harness water movement, increasing hydrodynamic disturbance compared with static infrastructure. Possible disruptions in sediment transport. Possible disruptions in supply of nutrients to sessile filter feeding organisms.

8.4 Early Consultation Responses

To support the development of this offshore scoping report, pre-scoping stakeholder engagement was undertaken. An online consultation workshop took place on 8th November 2022 as previously mentioned in Chapter 4. Benthic Ecology was one of the identified topics and discussions included survey methodologies and existing data proposed to be used for the EIA and assessment methodologies for Benthic Ecology. Workshop attendees included NatureScot, Marine Scotland Licensing Operations Team (MS-LOT), Marine Scotland Science (MSS) and the Royal Society for the Protection of Birds (RSPB). Further clarifications on data methodology and assessment have been requested in writing to be provided by NatureScot (November 2022).

8.5 Relevant Guidance and Assessment Tools

The approach to undertaking the full Benthic Ecology impact assessment will be informed by relevant policy and guidance documents, as specified in Table 8-5.

Table 8-5 Relevant legislation, policy and guidance documents

Legislation / Guidance / Policy	Reference
NatureScot (formally SNH) Guidance on Survey and Monitoring for Marine Renewables Developments in Scotland. Volume 5 Benthic Ecology	Saunders *et al*. (2011)
Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2	CIEEM (2022)
The identification of the main characteristics of stony reef habitats under the Habitats Directive	Irving (2009)
Refining the criteria for defining areas with a 'low resemblance' to Annex I stony reef	Golding *et al*. (2020)
Assessment of the Environmental Effects of Cables	OSPAR (2009)
Offshore Wind Farms: Guidance Note for Environmental Impact Assessments in Respect of FEPA and CPA Requirements	Cefas (2004)
Scoping Guidance on the Environmental Effects of Tidal Power Developments	EA (2009)

8.6 Potential Project Effects

Modifications to baseline Benthic Ecology may lead to potential effects on Benthic receptors. Table 8-6 details the potential effects of the ÒnM Project on Benthic Ecology. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA.

Table 8-6 Potential Effects of the Project on Benthic Ecology

Potential Effect	Project Phase	Rationale and Commentary
Physical disturbance or change (substratum type) to habitats and species and habitat loss.	All Phases	Potentially sensitive habitats and species could be present within the ÒnM Project area. This will be determined in the EIA, including through site survey. No drilling is required to install project infrastructure with direct long-term impacts associated with relatively small infrastructure footprints. Some pin-piling may be used on rock feet of larger turbines (refer to Chapter 5 for further details). Anthropogenic infrastructure can provide additional habitat for benthic species which could be seen as beneficial to the overall ecosystem. **This potential effect will be scoped into the EIA.**
Abrasion/disturbance at the seabed surface causing habitat loss and disturbance.	All Phases	Potentially sensitive habitats and species could be present within the ÒnM Project area. This will be determined in the EIA, including through site survey. Cables are expected to surface laid, with some trenching in the nearshore area if the need is identified. If required, cable protection measures will be used to secure surface laid cables. Micro-siting of cables will avoid identified potentially sensitive habitats. Habitat loss and disturbance during construction and decommissioning is expected to be temporary. Deployment of anchors/anchor chains on the seabed will be kept to a minimum to reduce disturbance to seabed. **This potential effect will be scoped into the EIA.**
Smothering of benthos and siltation rate changes.	Construction and Decommissioning	Sediment resuspension is expected to be minimal, due to the limited footprint of infrastructure, the hard underlying geology and the tide-swept conditions at the site. Cable will be surface laid where possible. Some species previously recorded in the Sound of Islay which may be present at the Project area are known to be sensitive to siltation. These include sessile filter feeding organisms and those which rely on sunlight to produce energy. As such they could be affected by high concentrations of sediment loading, so on a precautionary basis this potential impact pathway will be scoped into the EIA. See also 'Changes in suspended sediment' in Physical Processes chapter. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Introduction of Invasive Non-Native Species (INNS) from survey, installation, maintenance and decommissioning	All Phases	Inadvertent introduction of INNS poses a significant threat to native biodiversity. Anthropogenic infrastructure projects can be seen as stepping-stones for INNS to spread into different regions displacing native fauna and flora. Different benthic habitats have different sensitivities to INNS, to be assessed against site specific information. The risk of transferring marine non-native species to and from the Site will be kept to a minimum by ensuring bio-fouling management practices are implemented. A biosecurity plan for all Project phases will be developed.

Potential Effect	Project Phase	Rationale and Commentary
vessels, displacing native marine species.		**This potential effect will be scoped into the EIA.**
Turbine presence causing changes to the hydrodynamic regime, in the area potentially affecting the local benthic ecology.	Operation	Potential for the presence of the turbine structures to alter the movement of water, at a local level. This could lead to localised changes in scour or sedimentation. **This potential effect will be scoped into the EIA.**
Toxic contamination through accidental chemical release from turbines.	All Phases	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. **This potential effect has been scoped out of the EIA.**
Toxic contamination through accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels.	All Phases	Control measures and oil/chemical pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I requirements for all Project vessels, and where applicable, to intertidal equipment, as discussed in Chapter 9. These best practices will ensure the likelihood of an accidental oil or chemical release significantly impacting benthic communities to be very low. Chemical pollution could occur intermittently through the lifetime of a project through re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey *et al.,* 2014; Maxwell *et al.,* 2022). All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) and will follow an EMMP to reduce risk of effect. The tidal conditions at the site mean small spills will quickly disperse and therefore will have a limited interaction with Benthic Ecology. **This potential effect has been scoped out of the EIA.**

8.6.2 Cumulative Impacts

Assessment of cumulative impacts considers other activities that might lead to additional effects on benthic receptors due to neighbouring developments (e.g. the proposed Flex Marine tidal energy project or coastal development at Port Askaig), which have the capacity to overlap or contribute to those expected to occur due to the ÒnM Project area.

8.6.3 Transboundary Effects

The potential for introduction of Invasive Non-Native species (INNS) will be assessed for transboundary effects. There are not any transboundary effects or effects anticipated relating to the Benthic Ecology topic for the ÒnM Project area.

8.7 Mitigation Measures

The proposed project design envelope is outlined in Chapter 5. Key assumptions based on the worse-case scenario approach have been applied for outlined mitigation measures. Such mitigation parameters will be further assessed and refined within the Project EIA. It is anticipated that the subtidal and intertidal Benthic Ecology mitigation measures considered will include:

- Support structure footprint minimisation through turbine design to minimise direct and indirect effects;
- Submarine cables will be bundled together, to reduce the seabed footprint of installation activities;
- Deployment of anchors/anchor chains on the seabed will be kept to a minimum in order to reduce disturbance to the seabed;
- Rock and mattresses cable protection will only be used where required. The footprint of the deposits will be the minimum required to ensure cable safety and rock berm stability;
- Micro-siting of turbines and export cables will be used to avoid key sensitive habitats and species in subtidal and intertidal environments, as identified in baseline surveys and desktop study;
- Development of and compliance to emergency response plans for accidental spillage from contractor vessels and equipment with integration of best practice guidelines; and
- Development of and compliance to a biosecurity plan to prevent the introduction or spread of invasive non-native species (INNS). The plan will take guidance from the latest GB non-native species secretariat and International Convention for the Control and Management of Ship's Ballast Water and Sediment, where applicable.

8.8 Proposed Approach to EIA

MS-LOT and NatureScot were consulted during a scoping workshop held on 8 November 2022. No comments were made with regards to the outlined approach for EIA scoping on Benthic Ecology. Feedback on the approach outlined in this chapter is requested as part of the scoping consultation.

Considerations for effects will be assessed for the three main phases anticipated for the project lifecycle, namely construction, operation and maintenance (O&M), and decommissioning.

The assessment of potential effects on subtidal and intertidal Benthic Ecology will be established using the standard source-pathway-receptor approach. The significance of these potential effects will be considered against the baseline conditions which would be expected to occur if no development took place. Final design envelope outputs from the Marine Physical Processes chapter will be used to provide context to pathway mechanisms effecting benthic receptors, such as sediment transport.

The potential effect pathways for direct and indirect effect on Benthic Ecology will be established from specific ÒnM Project activities. Where there are multiple design options, then the realistic worst-case option will be determined to provide a conservative basis of assessment where all other options can be considered to lead to a lesser scale of effect (without providing further detailed assessments of other options). Where applicable, benthic receptors will be assessed as groups, for instance all biotopes containing maerl, will be grouped and assessed on the most sensitive biotope, following a worse-case approach.

Assessments will be undertaken based on an evidence-based approach, using existing and site-specific environmental baseline information. Receptor effects will be assessed using existing assessment criteria including NatureScot Feature Activity Sensitivity Tool (FeAST) and MarLIN Marine Evidence-based Sensitivity Assessment (MarESA) matrices.

8.8.1 Data Gaps and Proposed Surveys

There is sufficient baseline data to provide a general overview and site characterisation for the ÒnM Project area within the Sound of Islay. However, site-specific information is presently lacking to support a full and detailed baseline description and impact assessment for the EIA. A survey strategy for the ÒnM Project will be devised, taking account of advice provided in the Scoping Opinion.

The survey strategy may include the following methods to address data gaps for Benthic Ecology:

- **Geophysical survey** – the array area and export cable route would be surveyed to provide information about local bathymetry (multibeam) and key seabed sediments, bedforms and textures (side-scan sonar).
- **Subtidal Benthic survey** – Seabed locations across ÒnM Project area (including cable corridors) would be sampled using drop-down video and stills photography to ground-truth identified features, and delineate the extent of potential sensitive habitats. The coarse sediment expected in this area mean that a mini-Hamon grab ($0.1m^2$), or similar, would be used if sediment sampling is viable.
- **Intertidal survey** – Landfall locations will be assessed using a Phase 1 walkover methodology, mapping intertidal habitats between mean high water springs to mean low water spring tide mark.

All desk-based and survey data will be used to present the Benthic Ecology baseline used in the EIA to assess the likely significant effects of the Project.

9. MARINE MAMMALS

9.1 Introduction

This chapter considers the potential effects on Marine Mammals that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. Marine mammals considered in this assessment include cetaceans (whales, dolphins and porpoises) and pinnipeds (seals). This chapter describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the LSE to be considered within the EIA, and how these LSE will be assessed for the purpose of an EIA.

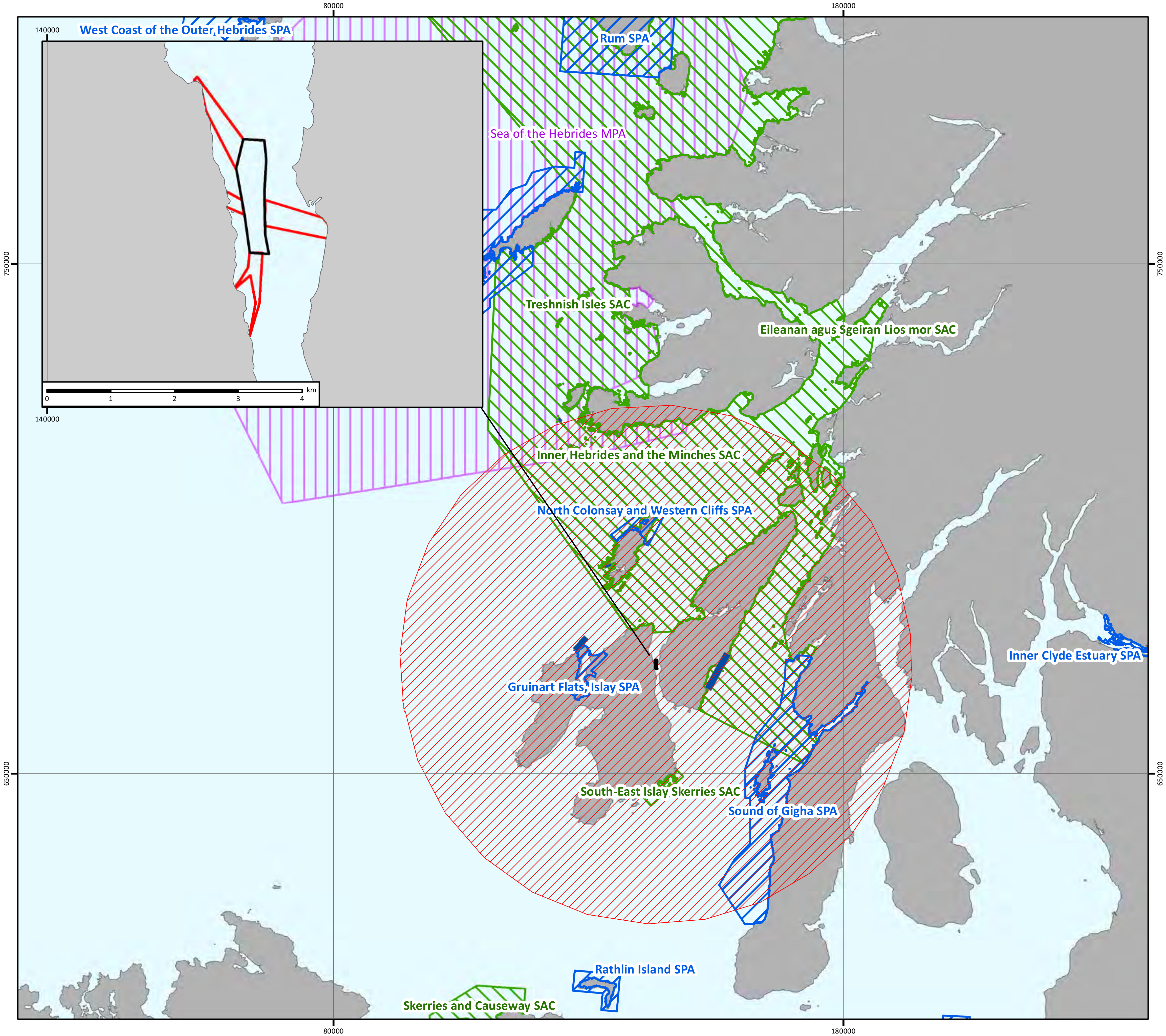
9.2 Receiving Environment

The study area (Figure 9-1 Drawing ref. LOC-002-B) for the marine mammal assessment encompasses the Project's scoping boundary and the export cable corridor (ECC), plus a 50km buffer zone. The marine mammal study area has been determined based on the zone of influence (ZoI) of the Project's activities. The main effect pathways of concern to Marine Mammals relate to Underwater Noise and collision risk. The ZoI, therefore, considers the propagation of noise, sensitivity of Marine Mammals to this effect and the spatial and temporal use of the water column by Marine Mammals in highly tidal environments.

ÒRAN NA MARA EIA SCOPING REPORT

LOCATION OVERVIEW
Protected Sites

Drawing No: P2585-LOC-002 | **B**

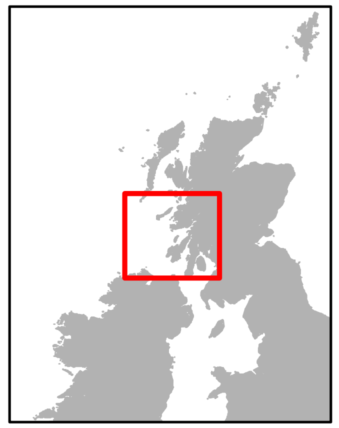


Legend

- AfL Area
- Areas of Search for Exploratory Cable Corridors
- Area for Lease 50km Buffer Zone

Environmental Designation

- SAC
- SPA
- MPA
- Seal Haulout



NOTE: Not to be used for Navigation

Date	20 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; OSOD; SNH; NIEA; Nova Innovation; The Crown Estate; JNCC
File Reference	J:\P2585\Mxd_QGZ\01_LOC\ P2585-LOC-002.mxd
Created By	Aodhfin Coyle
Reviewed By	Emma Kilbane
Approved By	Lesley Harris

km 0 10 20 30 40

Marine mammal management units (MUs) for cetaceans will be used as part of the approach for this scoping report, whereby these are 'functionally linked' to protected areas. Given that some MUs are greater than UK territorial waters, current knowledge on effects on Marine Mammals related to the Project and knowledge on the ecology of the relevant species were considered in the screening criteria for Marine Mammals.

For harbour (*Phoca vitulina*) and grey (*Halichoerus grypus*) seals, consideration is given to the seal management areas (SMAs), as opposed to OSPAR Regions, as SMAs are based on expert knowledge and opinion of seal ecology, using the most pragmatic approach to management of seals, without inferring discrete populations (SCOS, 2021).

The study area will be reviewed and may be amended for the EIA in response to design changes or feedback from consultation.

9.3 Data Sources and Baseline

9.3.1 Baseline

The following section presents the baseline review of the current environment and population trends of Marine Mammals known to occur within the study area. Key features requiring consideration within the EIA are:

- Cetacean species which occur regularly within the study area; and,
- Protected sites where Marine Mammals are a designated feature(s) (e.g. SACs and Marine Protected Areas (MPAs) and, where relevant, connectivity between the study area and the designated site, and haul-out dependence (seals) during breeding and moulting periods.

9.3.2 Cetaceans

Within Scotland, 23 species of cetacean have been recorded, with all 23 of these occurring within Hebridean waters (Hebridean Whale and Dolphin Trust, 2018). Of these, the harbour porpoise (*Phocoena phocoena*) is the most abundant cetacean species in UK waters and throughout the west coast of Scotland, which is reflected in the SCANS-III surveys which were undertaken in 2016. The study area overlaps with SCANS-III survey block G (Hammond *et al*., 2021) which has an estimated density of 0.336 animals/km² (CV=0.428; Table 9-1; Hammond *et al*., 2021; IAMMWG, 2022). Based on visual and acoustic surveys, the west coast of Scotland has one of the highest population densities of harbour porpoise in Europe, which include surveys within and around the Sound of Islay (e.g. Booth *et al*., 2013, Heinänen and Skov, 2015). The current conservation status and short-term trends for harbour porpoise within UK waters are unknown, due to insufficient data for the species (JNCC, 2019a). No designated features for harbour porpoise overlap with the study area; however, two SACs for harbour porpoise (Inner Hebrides and Minches SAC and Skerries and Causeway SAC) are nearby; therefore, there may be connectivity between the study area and individuals using both or either of the SACs.

Bottlenose dolphin (*Tursiops truncatus*) are present across the west coast of Scotland, where they are part of two groups, with 12–15 individuals located around the Isle of Barra, and between 30 and 45 individuals in the Inner Hebrides between Skye and Kintyre (Thompson *et al*., 2011; Cheney *et al.* 2012). Bottlenose dolphin were recorded within Block G of the SCANS-III survey, which had an estimated density of 0.1206 animals/km² (CV=0.682; Hammond *et al*., 2021). The current conservation status and short-term trends for bottlenose dolphin within UK waters are unknown, due to insufficient data for the species (JNCC, 2019b). No designated features for bottlenose dolphin overlap with the study area.

Minke whale (*Balaenoptera acutorostrata*) are the most common baleen whale species around the British Isles and occur seasonally throughout Scottish waters. In the Hebrides, sightings occur in all seasons, with peaks between July and September (Macleod *et al*., 2004; Anderwald *et al*., 2012). Minke whales were recorded within Block G of the SCANS-III survey, which had an estimated density of 0.0271 animals/km² (CV=0.700; Hammond *et al*., 2021). The current conservation status and short-term trends for minke whale within UK waters are unknown, due to insufficient data to establish current trends or future prospects for the species (JNCC, 2019c). No designated features for minke whale overlap with the study area; however, there may be connectivity between the study area and the individuals using the nearby Sea of the Hebrides MPA, for which minke whale are a designated feature.

Short-beaked common dolphin (*Delphinus delphis*) occur primarily in continental shelf waters and are present throughout the year in waters off the west coast of Scotland, with peak sightings in the autumn months, and May and June (Paxton *et al.,* 2011; Hammond *et al.,* 2013). Common dolphin were not recorded within Block G of the SCANS-III survey (Hammond *et al.,* 2021), but were recorded in the Inner Hebrides during multiple cetacean surveys and studies summarised in Hague *et al.* (2020; e.g. HWDT vessel based surveys 2003-2019, WDC shorewatch surveys 2005-2019, ORCA ferry-based surveys 2016-2019). The current conservation status and short-term trends for common dolphin within UK waters are unknown (JNCC, 2019d). No designated features for common dolphin overlap with the study area.

Risso's dolphin (*Grampus griseus*) occur primarily in continental shelf waters, with UK sightings peaking in offshore areas in the Outer Hebrides between May and October (Weir *et al.,* 2019; Hague *et al*., 2020). Risso's dolphin were not recorded within Block G of the SCANS-III survey (Hammond *et al.,* 2021), but were recorded in the Inner Hebrides during multiple cetacean surveys and studies summarised in Hague *et al.* (2020; e.g. HWDT vessel based surveys 2003-2019). The current conservation status and short-term trends for Risso's dolphin within UK waters are unknown due to insufficient data (JNCC, 2019e). No designated features for Risso's dolphin overlap with the study area.

Other cetaceans recorded in the Inner Hebrides include striped dolphin (*Stenella coeruleoalba*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*), killer whale (*Orcinus orca*), long-finned pilot whale (*Globicephala melas*), fin whale (*Balenoptera physalus*), sperm whale (*Physeter macrocephalus*), northern bottlenose whale (*Hyperoodon ampullatus*), humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*) and sei whale (*Balaenoptera borealis*).

Table 9-1 Cetacean abundance estimates in SCANS-III and Management Unit (MU) areas for the Study Area, including Confidence Intervals (CI) and Coefficient of Variation (CV). Source: Hammond et al. (2021) and IAMMWG (2022).

Common name	Latin name	Hammond *et al.* (2021)	IAMMWG (2022)
Harbour porpoise	*Phocoena phocoena*	Block G: 5,087 (95% CI=1,701-10,386)	West Scotland MU: 24,305 (CV=0.18, 95% CI=17,121-34,505)
Bottlenose dolphin	*Tursiops truncatus*	Block G: 1,824 (95% CI=0-4,474)	Coastal West Scotland & Hebrides MU: 45 (95% CI=33-66)
Minke whale	*Balaenoptera acutorostrata*	Block G: 410 (95% CI=0-1,259)	Celtic and Greater North Seas MU: 10,288 (CV=0.26, 95% CI=6,210 – 17,042
Short-beaked common dolphin	*Delphinus delphis*	-	Celtic and Greater North Seas MU: 57,417

Common name	Latin name	Hammond *et al.* (2021)	IAMMWG (2022)
			(CV=0.32, 95% CI=30,850 – 106,863)
Risso's dolphin	*Grampus griseus*	-	Celtic and Greater North Seas MU: 8,687 (CV=0.63, 95% CI=2,810 – 26,852
White beaked dolphin	*Lagenorhynchus albirostris*	-	Celtic and Greater North Seas MU: 34,025 (CV=0.28, 95% CI=20,026 – 57,807)
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	-	Celtic and Greater North Seas MU: 12,293 (CV=0.64, 95% CI=3,891 – 38,841)

9.3.3 Pinnipeds

Two seal species are found in UK waters, harbour (*Phoca vitulina*) and grey seals (*Halichoerus grypus*). Both species are present along the west coast of Scotland and have been recorded within and around the study area (Paterson *et al*., 2015; SCOS, 2021). Harbour seals are particularly vulnerable to disturbance during the breeding season in June and July, and moulting season in August and September (Paterson *et al*., 2015). Whereas grey seals are particularly vulnerable to disturbance during the breeding season from mid-September to December and moulting season from December to April (Paterson *et al.,* 2015).

Harbour seals have an 'unfavourable – inadequate' conservation status in the UK due to their unknown short-term trend and a population estimate which is below the favourable reference range (JNCC, 2019f). The latest population estimate for harbour seals in Scotland is approximately 37,300 (95% CI: 30,500-49,700) individuals, with 78% of those recorded in west Scotland (Morris *et al*., 2021). Harbour seals have been recorded foraging up to 50km from haul-out sites and show high site fidelity (Hague *et al*., 2020; Carter *et al.* 2022). The study area does not overlap with any SACs for harbour seal; however, the study area is within foraging range from the SE Islay Skerries SAC, for which harbour seals are a designated feature, and the animals using this site represent between 10-14% of the west coast of Scotland's harbour seal population (Table 9-2; Paterson *et al*., 2015; Morris *et al*., 2021). Eileanan agus Sgeiran Lios mor SAC, another site for which harbour seals are a designated feature, is located 85km away from the study area, which is outside of the estimated foraging range. Therefore, this SAC is screened out of the assessment.

Grey seals have a 'favourable' conservation status in the UK due to their improving population trend (JNCC, 2019g). The latest population estimate for grey seals in Scotland is approximately 106,300 (95% CI: 88,800-132,400) individuals, with 41% of those recorded in west Scotland (Morris *et al*., 2021). Grey seals typically forage up to 100km off the coast and telemetry studies indicate individual movement between haul-out sites (Hague *et al*., 2020; Carter *et al.,* 2022). The study area does not overlap with any SACs for grey seals; however, grey seals use the Sound between Islay and Jura to forage and haul-out (Paterson *et al*., 2015). The study area is within foraging range from the Maidens SAC and Treshnish Isles SAC, for which grey seals are designated features.

Table 9-2 Pinniped count data within Seal Management Areas (SMAs) and Special Areas of Conservation (SACs) relevant to Study Area. Source: Morris & Duck (2018), Morris et al. (2021) and SCOS (2021).

Common name	Latin name	Seal Management Area (SMA) population estimate (2016-2019)	Special Area of Conservation (SAC) (2018)
Harbour seal	*Phoca vitulina*	Southwest Scotland: 1,709	South-East Islay Skerries SAC: 706
		West Scotland: 15,600 *(South: 7,069; Central: 7,447; North: 1,084)*	Eileanan agus Sgeiran Lios mor SAC: 238
Grey seal	*Halichoerus grypus*	Southwest Scotland: 517	The Maidens SAC: 12 Treshnish Isles SAC: 160
		West Scotland: 4,174 *(South: 2,922; Central: 772; North: 479)*	

9.3.4 Protected Sites

Table 9-3 lists all the SACs and MPAs for further consideration within the EIA. In addition to these SACs and MPAs, there are six designated seal haul-out sites within 50km of ÒnM, two of which are breeding colony sites, these are 002 Craighouse Jura, 015 Nave island, BC002 013 Oransay, and BC003 Soa island. The potential effects on species connectivity to these protected sites will be assessed in the HRA.

Table 9-3 Marine mammal protected sites and designated features with approximate distance from the Study Area.

Site	Approximate Location	Protected Species	Approximate distance from ÒnM
Marine Protected Area			
Sea of the Hebrides	Hebrides	Minke whale	50km
Special Area of Conservation			
SE Islay Skerries	Inner Hebrides	Harbour seal	15km
Treshnish Isles	Inner Hebrides	Grey seal	80km
Inner Hebrides and Minches	Hebrides	Harbour porpoise	10km
Skerries & causeway	Northern Ireland	Harbour porpoise	85km
The Maidens	Northern Ireland	Grey seal	100km

9.3.5 Marine Mammal Surveys

Monthly VP surveys have been conducted in two areas to the north and south boundary of the lease area since April 2022. Surveys are conducted across two sectors of the study area and a 500m buffer zone. These surveys will continue until July 2023. Alongside counts of animals during the survey, the following metadata are recorded, precipitation, cloud cover, visibility, tidal state, direction and speed of tidal flow, and sea state. Survey effort covers 6 hours per VP per month, covering both peak flow and slack tide periods, more information on the surveys, is provided in Appendix B.

Surveys conducted between April and August 2022 observed harbour seal, grey seal, 'seal species' and 'dolphin species'.

9.3.6 Data Sources

A desk-based literature review has identified current key data sources that have been used to inform the scoping report, these include project specific survey data. Table 9-4 does not provide an exhaustive list to which the assessment must be restricted; where new, relevant data are published, these would be incorporated into future assessments as part of the EIA.

Table 9-4 Key sources to inform baseline for marine mammals

Source	Summary	Reference
Atlas of cetacean distribution in north-west European waters	This Atlas provides an account of the distribution of all 28 cetacean species that are known to have occurred in the waters off north-west Europe, at the time of publication. Content fully covers the study area.	Reid *et al.* (2003)
Modelled density surfaces of cetaceans in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys	The report describes the density surface modelling for those cetacean species for which sufficient data were obtained during SCANS-III surveys across the North-East Atlantic. Species included the harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), white-beaked dolphin (*Lagenorhynchus albirostris*), common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), long-finned pilot whale (*Globicephala melas*), all beaked whale species combined (*Ziphiidae*), minke whale (*Balaenoptera acutorostrata*) and fin whale (*Balaenoptera physalus*). Content fully covers the study area.	Lacey *et al*. (2022)
Revised Phase III data analysis of joint cetacean protocol data resources	This report collates and provides information on the abundance and distribution of cetacean species in the UK. Content fully covers the study area.	Paxton *et al*. (2016)
Strandings data from Scottish Marine Animal Stranding Scheme (SMASS)	Stranding records and post-mortem information for marine fauna across Scotland. Content partially covers the study area.	Brownlow *et al*. (2020)
Marine Mammal Management Units (MUs) in UK waters	This report details abundance estimates for species and their MUs for the seven most common cetacean species in UK waters. Content fully covers the study area.	IAMMWG (2022)
Scientific Advice on Matters Related to the Management of Seal Populations	The Special Committee on Seals (SCOS) provide scientific advice to government on matters relating to the management of UK seal populations. There have been numerous reports collated by the that identify any conservation and management issues, including ecology, behaviour, population trends and estimates, important areas and the status of both grey and harbour seals in the UK. Content fully covers the study area.	SCOS (2020; 2021)
Habitat-based predictions of at sea distribution for grey and harbour seals in the British Isles	This report provides estimates of at-sea distribution for both grey and harbour seals from haul-outs in the British Isles. The predictions are based on regional models of habitat preference. Content fully covers the study area.	Carter *et al*. (2020; 2022)
Estimated at-sea distribution of grey and harbour seals	Telemetry tagging studies to identify the distribution of grey and harbour seals in the UK and provide UK-wide usage maps.	Russell *et al.* (2017)

Source	Summary	Reference
	Content partially covers the study area.	
Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters	This report collates and provides information on the abundance and distribution of marine mammal species in the Scottish Northern North Sea region and Scottish Atlantic waters, with a focus on what were the draft plan option (DPO) sites identified in the Draft Sectoral Marine Plan for Offshore Wind Energy for Scotland. Content partially covers the study area.	Hague *et al*. (2020)
Guidance on survey and monitoring in relation to marine renewable deployments in Scotland. Volume II Cetaceans and Basking Sharks and Volume III Seals	These reports discuss cetacean and seal species and habitats of potential concern when considering potential effects of wave and tidal devices in Scotland. The guidance advises survey and monitoring methodology and protocols in relation to these effects.	MacLeod *et al.* (2011) Sparling *et al.* (2011)
Hebridean marine mammal atlas series	Hebridean Whale and Dolphin Trust (HWDT) has collected data over 15 years monitoring the Hebrides for Marine Mammals on dedicated visual and acoustic surveys from their research vessel, Silurian. In addition, HWDT run a citizen science programme through the Whale Track app where data feeds into distribution analysis. These studies have resulted in a species heat map across the west coast of Scotland which indicates areas of high use and species seasonality. Content fully covers the study area.	HWDT (2018)
Marine Protected Area mapper	Accessible map displaying features and information on designated sites across UK waters. Content fully covers the study area.	JNCC (2022)
Seal haul-out sites	Online map presenting designated seal haul-out sites across the UK. Content fully covers the study area.	Marine Scotland (2017)
Review of current knowledge of Underwater Noise emissions from wave and tidal stream energy devices	This review describes publicly available data on noise emissions from tidal stream energy devices. It highlights potential effects of noise on marine receptors. Content excludes the study area.	Robinson and Lepper (2013)
Passive Acoustic Monitoring (PAM) for Marine Mammals during operation of a tidal turbine	This study used PAM to monitor dolphins and porpoise behaviour surrounding an operational tidal turbine in the Ramsay Sound, UK.	Malinka *et al.* (2018)
Marine mammals and tidal energy: Annual report to Scottish Government	This report discusses data from a monitoring system using passive and active acoustic monitoring, and video devices used to monitor marine mammal behaviour surrounding MeyGen, the operational tidal site in the Pentland Firth.	Palmer *et al.* (2019)

Source	Summary	Reference
Marine Mammal HiCUP	This report describes the design and performance of a seabed mounted high current underwater platform (HiCUP) designed for the long-term monitoring of fine-scale marine mammal behaviour around tidal turbines.	Gillespie *et al.* (2022)
Foraging strategies at high energy, tidal corridors	These papers highlight marine mammal foraging behaviour targeting high energy tidal sites to ambush prey moving through tidal corridors.	Pierpoint (2008) Thompson (2014) Hastie *et al.* (2016)
Sound of Islay environmental statement	This report describes the process and findings of the Environmental Impact Assessment for the installation of a tidal development site within the Sound of Islay, located south of the current project. Content partially covers the study area.	SPR (2010)
Project specific VP surveys of seabirds and Marine Mammals	RPS has been commissioned to carry out monthly VP surveys for seabirds and Marine Mammals in the survey area between April 2022 and March 2022 as part of the site characterisation process. Content fully covers the study area.	RPS (unpublished)

9.4 Early Consultation Responses

To support the development of this offshore scoping report, pre-scoping stakeholder engagement was undertaken. An online consultation workshop took place on 8 November 2022, as previously mentioned in Chapter 4, to discuss general project introductions to key stakeholders and regulators, survey methodologies and existing data proposed to be used for the EIA stage, options for cable corridors, and approaches for marine mammal, bird, and Benthic Ecology impact assessment. Key stakeholders engaged with thus far include NatureScot, MS-LOT, Marine Scotland Science (MSS), RSPB, Hebridean Whale and Dolphin Trust (HWDT), and Whale and Dolphin Conservation (WDC). After the workshop, further clarifications on data methodology and assessment were requested in writing to Marine Scotland and NatureScot (November 2022).

Upon advice provided, the following will be considered in the EIA:

- Baseline data characterisation will be based on site-specific surveys contracted by Nova, HWDT citizen science and vessel-based surveys and publicly available data;
- Assessment of the harbour porpoise SACs noted in Table 9-3 will be considered against the conservation objectives for the SAC and will include information on likely collision risk/encounter rates and implications of displacement from a transiting route; and,
- CIA will consider the effects of any project within the vicinity that is scheduled to reach or progress past scoping up to three months or more prior to submission.

9.5 Relevant Guidance and Assessment Tools

9.5.1 Legislation and Policy

All Marine Mammals are protected under various legislation (refer to Table 9-5). This section identifies the relevant legislation and policy context which has informed the scope of the assessment. Further information on legislation and policies relevant to the EIA for the Project can be found in Chapter3.

Table 9-5 Relevant legislation and policy for marine mammals

Relevant legislation and policy	Relevance to the assessment
Legislation	
The Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (referred to as the Habitats Regulations)	▪ Annex II: cetaceans & seals; ▪ Annex IV: cetaceans & seals; and, ▪ Annex V (a): seals.
Marine Strategy Regulations 2010 (transposed into UK law from the EU Directive 2008/56/EC – Marine Strategy Framework Directive)	▪ Annex I: cetaceans & seals.
The Convention on the Conservation of Migratory Species of Wild Animals (the 'Bonn Convention')	▪ Appendix I: conserve migratory species and their habitats by providing strict protection for endangered migratory species; and, ▪ Appendix II: lists migratory species which would benefit from multilateral agreements for conservation and management.
The Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention')	▪ Appendix II: harbour porpoise, bottlenose dolphin, common dolphin, Risso's dolphin, white-beaked dolphin and minke whale; and, ▪ Appendix III: cetaceans & seals.
Wildlife and Countryside Act 1981 (as amended)	The Wildlife and Countryside Act consolidates and amends existing national legislation to implement the Convention on the

Relevant legislation and policy	Relevance to the assessment
Legislation	
	Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive). The act makes it an offence to intentionally (or recklessly) kill, injure or take any wild animal listed on Schedule 5 of the Act, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. All cetacean species are protected within the 12 nm territorial waters under Schedule 5 of the Wildlife and Countryside Act.
Nature Conservation (Scotland) Act 2004	The Nature Conservation (Scotland) Act builds upon the Wildlife and Countryside Act 1981 by further improving protection of cetaceans from intentional disturbance. This further protection incorporates risk from reckless disturbance.
Marine (Scotland) Act 2010	Section 117: provides improved protection for seals from intentional or reckless harassment, where certain haul-out sites have been designated as protected sites.
Protection of Seals (Designation of Haul-Out Sites) (Scotland) Act 2014	This Act identifies 194 haul-out sites (seals) independent from SACs across Scotland for designation.
The European Biodiversity Strategy to 2030	the Project may affect marine mammal species, in turn affecting biodiversity. The actions include restoring marine ecosystems and international ocean governance along with strict protection on existing Natura 2000 areas.
The Aichi Biodiversity Targets	The United Nations' (UN) Convention on Biological Diversity, including the 'Aichi' biodiversity targets, has five strategic goals set to address biodiversity loss and promote greater awareness to sustain biodiversity in the future.
Marine policy	
Scotland's National Marine Plan (Marine Scotland, 2015)	Scotland's first national marine plan managing both inshore (out to 12 nm) and offshore (12 to 200 nm) waters that aims to promote the sustainable development of marine areas and sustainable use of marine resources. This policy builds on implementing the Marine (Scotland) Act 2010. Although this policy does not specifically mention Marine Mammals, it does include a pledge to comply with legal requirements for protected areas and species (e.g. Marine Mammals) and to avoid any significant effect on Priority Marine
Scottish Priority Marine Features (SNH, 2014)	The term Priority Marine Features relates to habitats and species in Scotland deemed to be conservation priorities. All marine mammal species recorded in and surrounding the Project are listed in this policy.
UK Marine Policy Statement 2011	This statement incorporates policy covering economic growth, climate change, agriculture and biodiversity, and historic environment and landscape.

9.5.1 Technical Guidance

The marine mammal assessment will consider the following technical guidance documents and advice where relevant to this topic:

- Development and adherence to an Environmental Monitoring and Mitigation Plan (EMMP) during construction and operational periods, including a Marine Pollution Contingency Plan;

- Use of 'low order' techniques such as deflagration for UXO disposal, where possible and required;
- Development and adherence to a Vessel Management Plan (VMP) which will detail the number and type of vessels used on the Project. Vessels will adhere to current guidance such as the Scottish Marine Wildlife Watching Code to minimise risk of disturbance or injury;
- Development and adherence to a project specific Marine Mammal Mitigation Plan (MMMP), which will include all the relevant mitigation guidelines to follow throughout the Project;
- Application and further assessment for an EPS licence and further mitigation, if required, for construction works;
- Development and adherence to an Operations and Maintenance (O&M) Plan; and,
- The development and adherence to a decommissioning programme.

9.6 Design parameters

9.6.1 Key Design Parameters

The marine mammal scoping assessment is based on the following key assumptions, which are also set out in Chapter 5.

9.6.2 Embedded Mitigation

The following proposed environmental measures are all required under at least one of the following, Section 36 (Electricity Act), Section 105 and 114 (Energy Act) and the Marine Licence consent conditions. Proposed measures include:

- Development and adherence to an Environmental Monitoring and Mitigation Plan (EMMP) during construction and operational periods, including a Marine Pollution Contingency Plan;
- Use of 'low order' techniques such as deflagration for UXO disposal, where possible and required;
- Development and adherence to a Vessel Management Plan (VMP) which will detail the number and type of vessels used on the project. Vessels will adhere to current guidance such as the Scottish Marine Wildlife Watching Code to minimise risk of disturbance or injury;
- Development and adherence to a project specific Marine Mammal Mitigation Plan (MMMP), which will include all the relevant mitigation guidelines to follow throughout the Project;
- Application and further assessment for an EPS licence and further mitigation, if required, for construction works;
- Development and adherence to an Operations and Maintenance (O&M) Plan; and,

The development and adherence to a decommissioning programme.

9.7 Potential Project Effects

This marine mammal assessment highlights the potential environmental effects associated with the Project and identifies those to be scoped into or out of the EIA process. The assessment will consider value, sensitivity, and likelihood of effect on Marine Mammals (Table 9-6). All offshore infrastructure, including turbines, foundations and cables will form part of the assessment. Effects resulting from the Project may have an adverse, positive or no effect on Marine Mammals. The process of identifying effects will involve consideration of all types of effect.

Table 9-6 Terminology used in the marine mammal assessment

Term	Definition
Value	The importance of the Sound of Islay to Marine Mammals
Sensitivity	Consideration of species ecology and behaviour and whether this makes individuals more vulnerable to project specific effects
Likelihood	The probability of effect the proposed project has on Marine Mammals

The sensitivity of Marine Mammals to potential effects will be determined qualitatively based on the current understanding of species' ecology and behaviour. Judgement will take account of information available on the responses of Marine Mammals to various stimuli (e.g. Underwater Noise and visual disturbance caused by tidal turbine arrays, where such data exist) and whether their ecology makes them particularly vulnerable to potential effects (e.g. species that typically have high sensitivity to Underwater Noise). Upon production of a cetacean risk assessment where injury or disturbance may affect Marine Mammals after mitigation measures are applied, an EPS licence may need to be sought.

Following the EIA Regulations 2017 (as amended), the EIA will consider effects with risk of an LSE. Table 9-7 details the potential effects of the ÒnM Project on Marine Mammals . Additional comments are provided for each potential effect pathway, detailing evidence to support initial judgment of the likely significance. All the effects identified as potentially significant will be considered further in the EIA.

Table 9-7 Potential Effects of the Project on Marine Mammals

Potential Effect	Project Phase	Anticipated Significance	Rationale and Commentary
Mortality, injury and/or disturbance from unexploded ordnance (UXO) clearance	Construction	Potential significance of effect	Detonation of UXO could result in mortality, injury (e.g. Permanent Threshold Shift (PTS) in hearing), or disturbance resulting in behavioural change (Benda-Beckmann et al., 2015). Appropriate mitigation guidelines to limit injury are advised by JNCC (2010) in the case of UXO clearance. **This potential effect will be scoped into the EIA.**
Disturbance (noise and visual presence) from vessel traffic	All Phases	Potential significance of effect	Vessel traffic is assumed to be greatest during the construction phase, but vessels will also be required for maintenance and decommission. Local disturbance from vessel presence could illicit behavioural change in Marine Mammals which may reduce foraging success, cause temporary avoidance of the area, and/or influence surface behaviour (e.g. Pirot a *et al.*, 2015). The modular nature of Nova's turbines means that all offshore infrastructure can be installed using small vessels (see Chapter 5 for more details). Any visual or acoustic disturbance from vessels during offshore works is highly unlikely to exceed background levels. **This potential effect will be scoped into the EIA.**
Disturbance from operational noise generated by the devices	Operation	Potential significance of effect	Noise levels from operating devices are not predicted to be significantly greater than the ambient noise in the Sound or at levels likely to cause injury or significant behavioural changes; however, operational tidal turbines have caused harbour seal densities to be affected up to 2km of the devices, which was found to be within the auditory range of the study species (Onoufriou *et al.,* 2021). **This potential effect will be scoped into the EIA.**
Indirect effects of underwater noise or barrier effects on marine mammal prey species	Operation	Potential significance of effect	The addition of fixed structures in the marine environment can introduce habitat changes, such as creating an artificial reef which could either positively or negatively affect foraging opportunities for Marine Mammals (Ounanian *et al*., 2020; Todd *et al*., 2016). Operational noise of the tidal turbines has the potential to displace fish species sensitive to noise, these include typical prey of Marine Mammals, such as cod, herring, sprat and whiting. **This potential effect will be scoped into the EIA.**

Potential Effect	Project Phase	Anticipated Significance	Rationale and Commentary
Disturbance and/or injury from pin pilling	Construction	Potential significance of effect	Pile driving emits impulsive underwater noise into the environment which can have the following negative effects on marine mammals; hearing impairment at close range (*e.g.* temporary threshold shift (TTS) or PTS in hearing; Kastelein *et al.,* 2019; Steven, 2014), masking of biologically relevant signals which can reduce an individual's ability to communicate, forage and navigate (Southall *et al.,* 2019) and changes in behaviour resulting from consequences of displacement, such as increased stress and decreased foraging success (Forney *et al.,* 2017; Russell *et al.,* 2016). **This potential effect will be scoped into the EIA.**
Disturbance from noise above the sea surface	All Phases	Potential significance of effect	Construction of land-based structures for cable export could disturb seals when hauled out at sites within the Sound. Disturbance resulting from activities above the sea surface has the potential to affect the southeast Islay Skerries SAC. **This potential effect will be scoped into the EIA.**
Barrier to movement or displacement due to presence of turbines	Operation	Potential significance of effect	The presence and operation of tidal turbines could act as a barrier to potentially important ecological corridors. The level of significance depends on whether ÒnM will cause displacement, how frequently travelled the Sound is by Marine Mammals for access to feeding and/or breeding grounds, and if there are alternative routes available which do not affect energy expenditure. **This potential effect will be scoped into the EIA.**
Risk of collision with vessels	All Phases	Potential significance of effect	High tidal currents can lead to faster vessel speeds through the sound, in addition, high currents also limit animal movement against the current flow. These conditions have the potential to increase collision risk, which can result in injury or death (Maxwell *et al.*, 2022). **This potential effect will be scoped into the EIA.**
Risk of collision with tidal turbines	Operation	Potential significance of effect	There is no direct evidence that a collision event has occurred between Marine Mammals and tidal turbines (Copping *et al.,* 2020; Hastie *et al.,* 2018). Such a risk is likely to be site specific; therefore, the potential effect requires consideration for the species present, their behaviour at the site, and the type of device(s) installed. **This potential effect will be scoped into the EIA.**
Disturbance from electromagnetic	Operation	Unlikely to be significant	Cables emit EMF; the highest forces will be associated with high-voltage export cables. Primary effects on Marine Mammals are unknown, but studies suggest no significant effects (either positive or negative; Copping *et al.*, 2020).

Potential Effect	Project Phase	Anticipated Significance	Rationale and Commentary
field (EMF) from export cables			Potential secondary effects as a result of disturbance to prey species such as migratory diadromous fishes (Maxwell *et al*., 2022) may occur. The Project will utilize low-power Alternating Currents (AC) which produce much lower EMF than the common high-power subsea Direct Current (DC) transmission systems. Nova's systems are also delta-connected which means the three electrical phases are always balanced and no external electrical field should be present. If a fault occurred it would only be transient until the electrical protection would trip, during which time, a small electrical field may be produced (<100ms). The earthed double-armour and integral drain wires act as a screen for these emissions. The magnetic fields and resultant induced EMF in the sea around the cable(s) will therefore be negligible. **This potential effect has been scoped out of the EIA.**
Toxic contamination through accidental chemical release from turbines.	All phases	Unlikely to be significant	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. **This potential effect has been scoped out of the EIA.**
Toxic contamination through accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels.	All Phases	Unlikely to be significant	Control measures and oil/chemical pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I requirements for all Project vessels, and where applicable, to intertidal equipment, as discussed in Chapter 9. These best practices will ensure the likelihood of an accidental oil or chemical release significantly impacting marine mammals to be very low. Chemical pollution could occur intermit ently through the lifetime of a project through re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey et al., 2014; Maxwell et al., 2022). All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) and will follow an EMMP to reduce risk of effect. The tidal conditions at the site mean small spills will quickly disperse and therefore will have a limited interaction with Marine Mammals.**This potential effect has been scoped out of the EIA.**
Increased suspended sediment	All Phases	Unlikely to be significant	Potential risk of temporary increase in suspended sediment concentrations and associated sediment deposition from cable and foundation installation, decommissioning and maintenance. This risk is deemed to have a low effect

Potential Effect	Project Phase	Anticipated Significance	Rationale and Commentary
concentrations and associated sediment deposition			for Marine Mammals due to the high tidal nature of the study area and installation technique (i.e. gravity bases). **This potential effect has been scoped out of the EIA.**

9.7.2 Cumulative Impacts

Section 2.10 details the approach which will be undertaken for the CIA of the Project and relevant neighbouring developments. Marine mammals could experience cumulative impacts from other planned and/or operational tide, wave, and wind projects within and surrounding the Inner Hebrides, such as MachairWind (SPR), West of Islay Tidal array (DP Marine Energy), coastal development at Port Askaig, SSE Jura Hydro Scheme, and Flex Marine Tidal array, for example.

With respect to the spatial scale for inclusion of other operational and consented offshore projects, the assessment will consider MUs for relevant species; however, it is acknowledged that MUs are often vast. Therefore, consideration on current knowledge of species behaviour and distribution, alongside the findings of the Project-level effect assessment, will also be considered when identifying which projects should be included in the CIA. The approach to the CIA will include identification where periods of offshore construction and operation overlap across projects and development. Main effects for consideration include effects from Underwater Noise (e.g. UXO clearance, piling, vessels, seismic surveys), barrier effects, and collision risk occurring within the region and in relation to protected areas for Marine Mammals. The marine mammal CIA for ÒnM will consider the worst-case scenario for each relevant project and any associated activities, in line with the methodology outlined in Chapter 2.

In the absence of guidance on when to consider the baseline to be for a CIA; the baseline will be taken from the point in which site-specific data were collected (i.e. from April 2022). New guidance is to be issued by Marine Scotland which will be considered, if issued in advance of the CIA.

9.7.3 Transboundary Effects

Marine mammals are often wide ranging and highly mobile which can mean individuals move between territorial waters. This is reflected in the MUs of some species, which do extend beyond the UK Exclusive Economic Zone (EEZ; e.g. minke whale and common, bottlenose and Risso's dolphin). Therefore, depending on the significance of the effects identified in the Project assessment (e.g. Underwater Noise modelling) and the CIA, transboundary effects may require assessment. The assessment of potential transboundary effects and determination of their significance draws on the use of ZoI for key categories of effect.

Risk of transboundary effects affecting the integrity of transboundary European designated sites will be assessed and presented in the HRA.

9.8 Mitigation Measures

Section 9.6.2 introduces embedded mitigation measures required under Marine Licence consent conditions. A suitable EMMP will be developed during consultation with key stakeholders, including Marine Scotland and NatureScot, and will be in line with relevant SNCB mitigation and monitoring guidelines. This EMMP will include an adaptive management strategy.

Table 9-8 describes approaches to mitigation measures of potential effects highlighted in Table 9-7 where the potential significance of effect is uncertain.

Table 9-8 Marine mammal mitigation and monitoring

Potential effect	Approach to mitigation measures
Mortality, injury and/or disturbance from unexploded ordnance (UXO) clearance	If required, mitigation measures will follow JNCC guidelines for minimising the risk of disturbance and injury to Marine Mammals whilst using explosives (JNCC, 2010) and where possible, use 'low order' techniques for UXO disposal (Joint Interim Position Statement, 2022).

Potential effect	Approach to mitigation measures
Disturbance (noise and visual presence) from vessel traffic	An EMMP will assess species behaviour prior (baseline), during and post installation to estimate the level of effect on Marine Mammals.
Disturbance from operational noise generated by the devices	
Disturbance from electromagnetic field (EMF) from export cables	
Indirect effects of Underwater Noise or barrier effect on marine mammal prey species	
Barrier to movement or displacement due to presence of ÒnM	
Risk of collision with tidal devices	
Disturbance from noise above the surface	Where onshore noise (e.g. cable landfall construction activities) has a LSE, activities should be limited to occur outside sensitive periods, such as moulting or breeding periods for harbour seals at SE Islay Skerries SAC.
Risk of collision with vessels	Not expected to be required if vessels follow the VMP and Scottish Marine Wildlife Watching Code.

9.9 Proposed Approach to EIA

The Project wide approach to the assessment methodology is set out in Chapter 2; however, while this has informed the approach that has been used in this marine mammal chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the marine mammal assessment.

Where methods and approaches to construction are still not finalised, the assessment will be based on a precautionary worst-case scenario and where this approach is taken it will be clearly indicated in the EIAR together with a definition of the worst-case scenario for the specific assessment.

Table 9-4 outlines key data sources which will be used to inform the marine mammal baseline, including relevant literature and site-specific surveys.

A separate offshore HRA screening report will be produced to consider and evaluate the potential effect on protected sites (including sites featured in Table 9-3

Technical guidance highlighted in Section 9.5.1 will inform environmental plans and mitigation to reduce any potential effect on Marine Mammals as a result of the Project.

9.9.1 Underwater Noise Assessment

The assessment of Underwater Noise to predict the extent and magnitude of noise propagation for all potential noise sources, including UXO clearance, installation activities and operational noise will be either based on theoretical or empirical predictions. Detailed source level modelling may be used where appropriate. The outputs from this noise assessment will be used to assess the potential risk of physical injury (e.g. permanent threshold shift (PTS) in hearing), disturbance or displacement effects for Marine Mammals. Any modelling will take account of species sensitivity to noise using Southall *et al.* (2019) noise exposure criteria, and the most up-to-date information on the ecology of the relevant species and the likely importance of the Project area to them. The risk of injury will be based on both the cumulative sound exposure level (SEL_{cum}) and peak sound pressure level (SPL_{peak}). Chapter 15 describes expected noise sources during all phases of the Project.

9.9.2 Collision Risk Modelling

Collision risk is considered the effect pathway with the greatest theoretical potential to lead to population effects on Marine Mammals. Collision risk models (CRMs) can be used to quantify the risk collision with tidal turbine arrays pose to Marine Mammals. Current CRMs include Band CRM (Band *et al.,* 2016), encounter rate model (ERM; Wilson *et al.,* 2006; SNH, 2016), and simulation-based approaches (Horne *et al.,* 2021). In the absence of any empirical data, these models often assume an avoidance rate that ranges between 0%, where all animals predicted to collide do, and 98%, where only 2% of animals predicted to collide with the device actually do.

The ERM has been used to predict collision risk in the Sound of Islay for harbour seal, grey seal, and harbour porpoise with horizontal axis tidal turbines with two rotor sizes (3.3m and 5.0m diameter; Vallejo and McCarthy, 2021). The predictions within that assessment will be considered in the context of ÒnM, where the turbines will have a rotor diameter of 7.0-9.0m. It is expected that a project specific CRM will be undertaken; the most appropriate modelling approach for this Project will be discussed in consultation with the relevant stakeholders.

It is assumed that animals can and do avoid colliding with tidal turbine arrays, and if a collision event did occur, it does not always result in mortality. The EIA will draw on relevant guidance, the SNCB's response to the relevant scoping question, as well as approaches taken by other tidal energy stream projects to determine the best approach to collision risk modelling for this project.

9.9.3 Assessment of Mortality, Injury or Disturbance – UXO

If required, ÒnM will undertake UXO clearance as part of a separate Marine Licence and EPS licence application. At both the scoping and EIA stage, the number and size of any UXO requiring clearance is unknown. The EIA will present a worst-case scenario for number of UXO, and charge size based on data gathered through literature review of previous UXO surveys for other developments in the Inner Hebrides and neighbouring regions. Where possible, clearance will use 'low order' techniques, but for assessment of a worst-case scenario both high and low order detonations will be assessed.

The Temporary Threshold Shift (TTS)-onset threshold will be used as a proxy for disturbance as outlined by Southall *et al.* (2007; 2019). Disturbance from low-order UXO clearance will also be assessed using TTS-onset thresholds for worst-case low order deflagration donor charge sizes.

9.9.4 Assessment of Vessel Collision and Disturbance

Increased vessel presence in the Sound of Islay from ÒnM causes a potential for increased collision risk and disturbance to Marine Mammals. Assessment of effect will include a comparison of vessel activity from baseline levels to the expected number of additional vessels associated with each phase of the Project (refer to Chapter 13).

9.9.5 Assessment of Disturbance – Noise Above Sea Surface

Although seals have a reduced hearing ability in air, they can still be disturbed by noise emitted during land-based construction. Assessment will consider the effect of construction of cable export structures in relation to relevant known haul-out sites for harbour and grey seals.

9.9.6 Assessment of Indirect Effects

Indirect effects are those created through an effect pathway, such as habitat loss and disturbance from noise or EMF, which could affect marine mammal prey species distribution, abundance and/or availability. This change could effect fitness-related traits such as foraging and breeding opportunities. Assessment will include identifying areas of important habitats (e.g. feeding and/or breeding grounds) surrounding the Sound of Islay and estimating the likelihood and significance of any associated in-direct effect pathways.

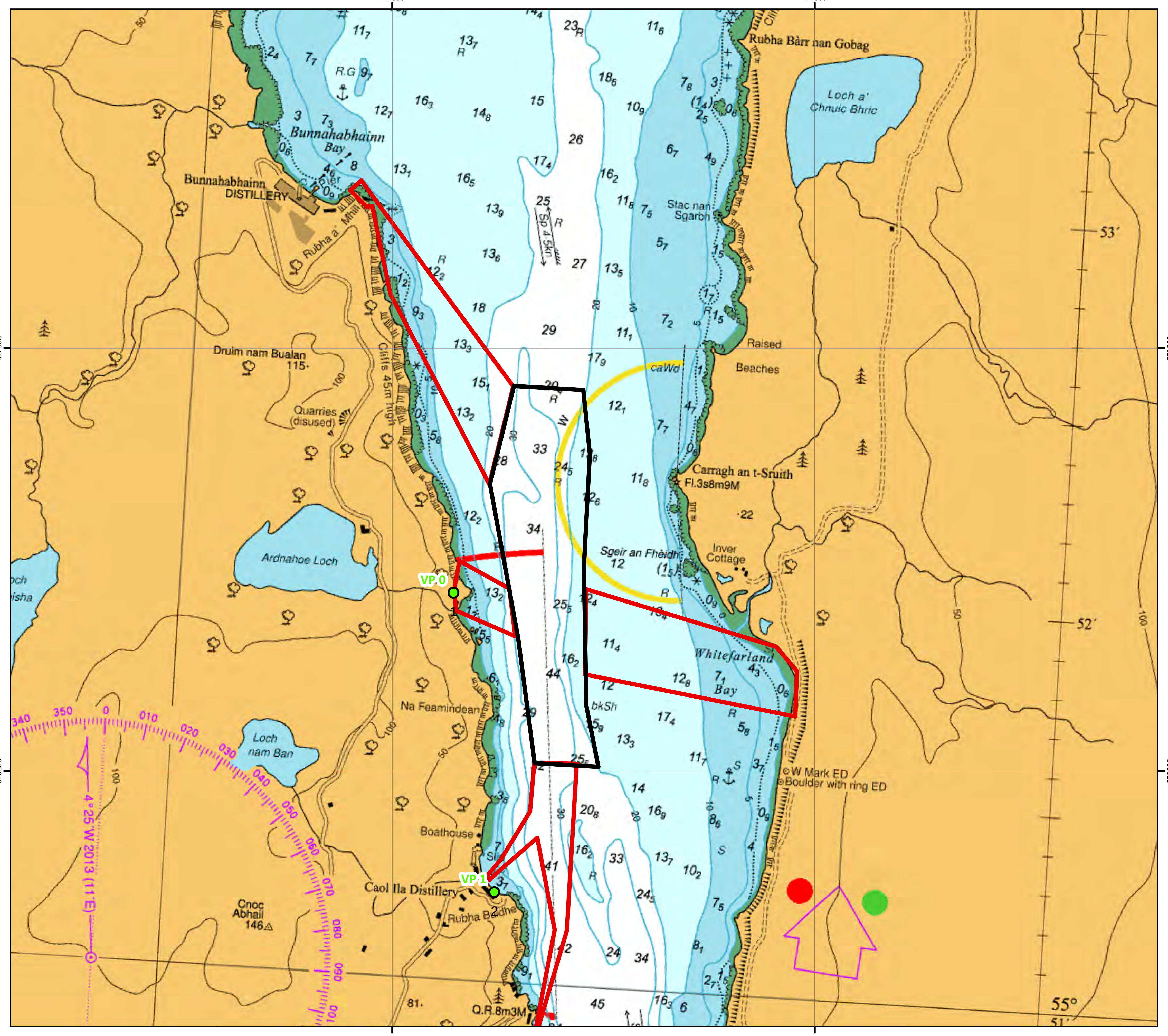
10. MARINE ORNITHOLOGY

10.1 Introduction

This chapter considers the potential likely effects on Marine Ornithology receptors that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It outlines the ornithological interests within the offshore scoping area through a desk study that provides an overview of the baseline conditions at the site and the datasets to be used to inform the EIA. It also describes the proposed methodology to be applied in the EIA to consider the potential effects on bird species in the marine environment that may arise from the construction, operation and decommissioning of the Project.

10.2 Receiving Environment

The study area for the offshore ornithological scoping report encompasses the Project's application boundary plus a 0.5km buffer zone, as presented in Figure 10-1 (Drawing no. P2585-LOC-003). The offshore ornithological study area has been determined based on the ZoI of the Project's activities. The potential effect pathways of concern to bird species in the marine environment are detailed in Section 10.7.



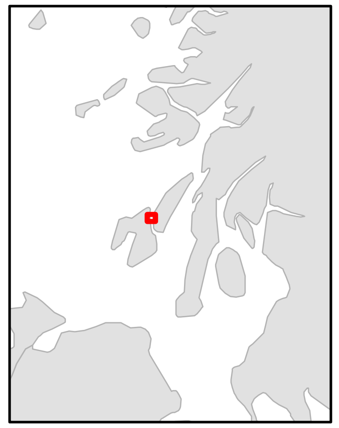
ÒRAN NA MARA EIA SCOPING REPORT

LOCATION OVERVIEW
Immediate Project Area

Drawing No: P2585-LOC-003 | **E**

Legend

- AfL Area
- Areas of Search for Exploratory Cable Corridors
- Vantage Point Surveys



NOTE: Not to be used for Navigation

Date	20 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; Nova Innovation; The Crown Estate
File Reference	J:\P2585\Mxd_QGZ\01_LOC\P2585-LOC-003.mxd
Created By	Aodhfin Coyle
Reviewed By	Lewis Castle
Approved By	Lesley Harris

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10.3 Data Sources and Baseline

10.3.1 Baseline

The study area is a deep sea channel in between the Hebridean islands of Jura and Islay on the west coast of Scotland. Benthic habitat within the Sound includes coarse sediment and tide swept rock providing a habitat for a range of prey for various seabirds (NRP, 2010).

To inform the baseline at scoping, a combination of desk-based review and site-specific field survey data have been used to determine the bird species likely to occur within the study area. These have been used to determine the seasonal distribution and abundance of bird species within the study area. To do this, a combination of the following data were used:

- Desk-based review of relevant bird data, including British Trust for Ornithology (BTO) Wetland Bird Survey data (WeBS) and Seabird Monitoring data from the JNCC database;
- SPR ornithological data from the Sound of Islay Tidal Demonstration Site: Birds Technical Report.
- Site specific-survey data from the ornithological VP surveys recorded birds within the study area (five of 12 months available to inform this scoping report), as described in Section 10.3.2.

To gain a greater understanding of species behaviours within the study area and potential responses to the Project, a review of existing data designed to look at bird behaviour, such as flight direction, foraging behaviour and responses to underwater turbines (see Section 10.3.4) has also been undertaken.

A review of the Sound of Islay Tidal Demonstration site survey data indicates similar ornithological receptors, at similar levels of abundance to that recorded within the Project's study area. Given the Sound of Islay Tidal Demonstration is adjacent to the Project's study area, Nova would welcome feedback on whether the Sound of Islay Tidal Demonstration baseline data could be used alongside the Project's 15 months of site-specific survey data to sufficiently characterise the Project's baseline.

10.3.2 Bird Surveys

A 15-month programme of monthly land-based VP surveys of the study area began in April 2022. The survey area covers the proposed application boundaries (AfL) and a surrounding 0.5km buffer. The MHWS formed the landward extent of the survey area and so distance bands of 0.5, 1.0 and 1.5km from the MHWS mark were used to understand the seaward extent of the survey area. The survey area was split into section A (in the north) and section B (in the south), with each section being adequately surveyed through a VP that yielded maximum viewshed coverage. The survey methodology followed a procedure whereby one section was surveyed for three hours and then the next section was surveyed for three hours. Within each hour four separate ten-minute scans were conducted with a five minute break between each, with all birds seen sitting on the water as well as flying gannets[28] being recorded. Alongside counts of birds during the survey, the following metadata were recorded; precipitation, cloud cover, visibility, tidal state, direction and speed of tidal flow and sea state. Survey effort covered six hours per VP per month, covering both peak flow and slack tide periods. More information on the Ornithology surveys have been provided by the survey contractor in Appendix B.

Surveys conducted between April and August 2022 observed the following bird species (including number of surveys in which they were present out of the total of seven):

- Canada goose (*Branta canadensis*) (1);
- Eider (*Somateria mollissima*) (4);

[28] Flying gannets were recorded in the basis of advice from Dr James Waggitt.

- Grey plover (*Pluvialis squatarola*) (1);
- Great black-backed gull (*Larus marinus*) (1);
- Guillemot (*Uria aalge*) (2);
- Razorbill (*Alca torda*) (5);
- Black guillemot (*Cepphus grylle*) (7);
- Red-throated diver (*Gavia stellata*) (4);
- Black-throated diver (*Gavia arctica*) (2);
- Great northern diver (*Gavia immer*) (3);
- Gannet (*Morus bassanus*) (7);
- Cormorant (*Phalacrocorax carbo*) (1);
- Shag (*Gulosus aristotelis*) (7);
- Hen harrier (*Cirus cyaneus*) (1).

A tidal array demonstration site in the Sound of Islay (SPR, 2010) provides further data on bird species utilising the area from surveys carried out from May 2009 to February 2010. The findings from that project's site-specific surveys recorded a number of additional seabird species in the Sound of Islay that included Manx shearwater, mute swan and additional species of gulls, terns, skuas, ducks, waders and raptors.

10.3.3 Designated Sites

There are no offshore designated areas associated with bird species features with direct overlap of the Ornithology study area. However, there are several bird species that are either features of designated sites or of importance, with potential connectivity with the Project. There are no seabird breeding colonies within the immediate Project area though there are seabird species present that may be connected to a number of different designated sites that are at varying distances from the study area.

10.3.4 Data Sources

A desk-based literature review has identified current key data sources that have been used to inform the scoping report and that will be used in the EIA. Table 10-1 does not provide an exhaustive list to which assessments in the EIA would be restricted. Where new, relevant data are published, these would be incorporated into the EIA following scoping.

Table 10-1 Key sources of offshore ornithology data and guidance

Source	Summary
Furness et al, 2012	Guidance and research – sensitivity of birds to tidal stream turbines.
Furness 2015; Mitchell et al, 2004; JNCC seabird monitoring programme database; designated site citations / departmental briefs / conservation advice from the websites of SNCBs.	Bird population estimates.
Cleasby et al, 2020, 2018; Waggit et al, 2019; Woodward et al, 2019; Wakefield et al, 2017, 2013; Kober et al, 2010; Stone et al, 1995, specific tracking studies for north east Scotland seabird breeding colonies e.g. MacArthur Green (2018, 2019), Waggit et al, 2020	Seabird foraging ranges and distribution at sea.
Long, 2017	Guidance, research and methodology – displacement analysis due to marine energy conversion systems.
SNH, 2016; McCluskie et al, 2012; Grant et al, 2014.	Guidance, research and methodology – various methods to conduct collision risk modelling, avoidance rates for birds and tidal stream devices. Models include Collision Risk Model, Exposure Time Population Model and the Encounter Rate Model.

10.4 Early Consultation Responses

To support the development of this offshore scoping report, pre-scoping stakeholder engagement was undertaken. An online consultation workshop took place on 8th November 2022 as previously mentioned in Chapter 4. Marine Ornithology was one of the identified topics and discussions included survey methodologies and existing data proposed to be used for the EIA and assessment methodologies for birds. Workshop attendees included NatureScot, MS-LOT, Marine Scotland Science (MSS) and the Royal Society for the Protection of Birds (RSPB). Of note, further clarifications on data methodology and assessment have been requested in writing to be provided by NatureScot (November 2022).

Upon advice provided, the following is proposed to be considered in the EIA in relation to the offshore Ornithology baseline:

- Baseline data characterisation based on site specific surveys contracted by Nova and other publicly available data collected within the past 5 years; and,
- CIA to consider the effects of any project within the vicinity that is scheduled to reach or progress past scoping up to three months or more prior to submission.

10.5 Relevant Guidance and Assessment Tools

10.5.1 Technical Guidance

The assessment of potential effects on Marine Ornithology receptors will consider and take account of technical guidance documents and advice detailed in Table 10-2 where relevant to this topic:

Table 10-2 Technical guidance for consideration for marine bird species effect assessments.

Guidance reference	Implications to the assessment
Scottish Natural Heritage (2016)	Guidelines on the approaches that are possible to assess for collision risk against the relevant bird species.
CIEEM (2019)	Guidelines on the approach to EIA recommending that the conservation values of receptors are considered. This guidance will be considered when assessing potential effects at the EIA scale.
Furness (2015)	Provides Biologically Defined Minimum Population Scales (BDMPS) used to define nonbreeding season populations. This guidance will be considered to inform species demographics and non-breeding season population assessments.
NatureScot (2018)	Interim guidance on apportioning effects from marine renewable developments to breeding seabird populations in SPAs. This guidance will be considered when apportioning potential effects to individuals SPAs for HRA.
NatureScot (2020)	Guidance on seasonal periods for ornithological receptors in the Scottish marine environment used to define breeding seasons for the key species in assessment. This guidance will be considered to inform generic species season component months for Scottish seabirds.
Woodward et al (2019)	Defines the mean maximum +1SD seabird foraging ranges used for screening statutory designated sites into apportioning calculations. This guidance will be considered to define species / colonies with connectivity to the Project during the breeding season.

In addition, during the EIA scoping workshop, NatureScot referred to guidance currently being drafted on avian flu. If available, and if relevant to the Project impact assessment, this guidance will be taken into account in the Project EIA.

10.6 Design Parameters

10.6.1 Key Design Parameters

The Marine Ornithology scoping assessment is based on key assumptions, which are set out in Chapter 5 (The Project).

10.7 Potential Project Effects

10.7.1 Potential Effects

A review of potential effects on Marine Ornithology associated with the Project identified those to scope into or out of the EIA. The review of effect assessment methodology followed guidance for the impact assessment of ecological receptors (CIEEM, 2018). In line with this guidance, the Marine Ornithology effect assessments will follow the 'source-pathway-receptor' model, identifying likely effects resulting from Project construction, operation, maintenance and decommissioning stages. This process means a link between effect sources and potentially sensitive receptors can be provided. The parameters of the 'source-pathway-receptor' model are defined in Section 2.3.

All offshore infrastructure and activities will be included in the assessment. Effects resulting from the Project may have an adverse, positive or no effect on bird species. The process of identifying effects will involve consideration of all types of effect. The approach to EIA can be found in Chapter 2.

The sensitivity of ornithological features to potential effects will be determined subjectively based on species' ecology and behaviour. Judgement will take account of information available on the responses of bird species to various stimuli (e.g. existing tidal turbine arrays, where such data exist) and whether their ecology makes them vulnerable to potential effects (e.g. species that typically have high sensitivity to collision with underwater turbines).

Table 10-3 details the potential effects of the ÒnM Project on Marine Ornithology receptors. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the identified as potentially significant will be considered further in the EIA.

Table 10-3 Potential Effects of the Project on Marine Ornithology

Potential Effect	Project Phase	Rationale and Commentary
Underwater collision risk from turbines	Operation	There is potential for deep diving species to collide with underwater blade devices which could lead to injury or fatality, the likelihood of such effects will be considered further within the EIA. There are currently three models that are accepted that are able to assess collision risk for bird species, these are: the Exposure Time Population Model (ETPM); the Collision Risk Model (CRM) and the Encounter Rate Model (ERM). The most appropriate model can be assigned during the EIA stage. **This potential effect will be scoped into the EIA.**
Disturbance and displacement from vicinity of turbines.	Operation	Significant displacement is unlikely given the small scale of the Project and small footprint in relation to similar available habitat in the vicinity. **This potential effect is unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Disturbance and displacement by vessel activity (above water)	All Phases	There is some potential for temporary increase in vessel traffic during construction, maintenance and decommissioning activity. However, the modular nature of Nova's turbines means that all offshore infrastructure can be installed using small vessels (see Chapter 5 for more details). Any above water visual or acoustic disturbance from vessels during offshore works is unlikely to exceed background levels. **This potential effect is unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Effects on foraging from changes in turbulence	Operation	The potential for turbines to cause localised changes in turbulence is considered in Chapter 6 (Marine Physical Processes). Should any such changes arise, the effects on foraging success of marine birds are unknown. However, given the small scale of the Project and small footprint in relation to similar available habitat in the vicinity, no significant effects are anticipated. **This potential effect is unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Seabed feeding habitat loss/change, due to presence of devices and offshore infrastructure	Operation	The addition of fixed structures in the marine environment can introduce habitat changes, such as creating an artificial reef which could either positively or negatively affect foraging opportunities for diving birds. Detrimental habitat loss or change is unlikely given the small scale of the Project and small footprint in relation to similar available habitat in vicinity. **However, on a precautionary basis this potential effect will be considered further in the EIA.**

Potential Effect	Project Phase	Rationale and Commentary
Disturbance and displacement by vessel activity (under water)	All phases	There is some potential for temporary increase in vessel traffic during construction, maintenance and decommissioning activity. However, the modular nature of Nova's turbines means that all offshore infrastructure can be installed using small vessels (see Chapter 5 for more details). Any underwater acoustic disturbance from vessels during offshore works is unlikely to exceed background levels. **However, on a precautionary basis this potential effect will be considered further in the EIA.**
Toxic contamination through accidental chemical release from turbines.	All Phases	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. **This potential effect has been scoped out of the EIA.**
Toxic contamination through accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels.	All Phases	Chemical pollution could occur intermit ently through the lifetime of a project through re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey *et al.,* 2014; Maxwell *et al.,* 2022). Small spills in a tidal environment mean the area surrounding the Project will likely show a high dispersal rate and therefore will have a limited interaction with marine birds. All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) and will follow an EMMP to reduce risk of effect. **This potential effect has been scoped out of the EIA.**
Increased suspended sediment concentrations and associated sediment deposition	All Phases	Potential risk of temporary increase in suspended sediment concentrations and associated sediment deposition from cable and foundation installation, decommissioning and maintenance. This risk is deemed to have a low effect for marine birds due to the high tidal nature of the study area and installation technique (i.e. gravity bases). **This potential effect has been scoped out of the EIA.**

10.7.2 Cumulative Impacts

Section 2.10 details the approach which will be taken in the CIA of the Project and surrounding development which could further effect individuals within the vicinity. Bird species could experience cumulative impacts from other planned tidal, wave, and wind renewable energy development sites within and surrounding the Inner Hebrides such as, MachairWind Offshore Wind Farm (SPR), West of Islay Tidal Array (DP Marine Energy), coastal development at Port Askaig, SSE's Jura Hydro Scheme and the Flex Marine Tidal Array.

All operational and consented offshore projects within the area will be initially scoped into the assessment. The approach to the Marine Ornithology CIA will include identification of where periods of offshore construction and operation overlap across projects and developments. The main potential effects for consideration include underwater collision risk occurring within the region and disturbance and displacement from renewable energy array areas. The Marine Ornithology CIA for the Project will consider the worst-case scenario put forward for other projects considered and any associated activities in line with the methodology outlined in Chapter 2.

10.7.3 Transboundary Effects

The potential for effects to occur on receptors from outside of Scottish and UK waters (transboundary) from the construction, operation (including maintenance) and decommissioning activities associated with the Project will be considered, where appropriate and consulted on to ensure compliance with EIA methods outlined in Chapter 2.

10.8 Mitigation Measures

Mitigation aims to avoid or limit any adverse effects on bird populations. Due to the nature of the Project, mitigation is not considered to be a likely requirement at this stage. However, if a specific risk is identified during construction, one mitigation measure would be the deployment of a Bird deterrent device such as a 'Looming Eye Buoy', this buoy would deter diving seabirds from the vicinity of the tidal turbines, thus reducing the likelihood of collisions.

10.9 Proposed Approach to EIA

The Project wide approach to the assessment methodology is set out in Chapter 2. While this has informed the approach that has been used in this Marine Ornithology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the ornithology assessment.

Where methods and approaches to construction are still not finalised, the assessment will be based on a precautionary 'worst-case scenario'. Where this approach is taken it will be clearly indicated in the EIAR together with a definition of the worst-case scenario for the specific assessment, in line with MS-LOT guidance outlined in Section 2.6.1.

A separate offshore HRA screening report will be produced to consider and evaluate the potential connectivity of Natura sites within the assessment and report associated effects, a screening statement on HRA is provided in Chapter 19.

Technical guidance highlighted in Section 10.5.1 will inform environmental plans and mitigation to reduce any potential effect on marine birds as a result of the Project.

11. FISH AND SHELLFISH ECOLOGY

11.1 Introduction

This chapter considers the potential effects on Fish and Shellfish Ecology that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It outlines the fish and shellfish interests within the offshore scoping area through a desk study that provides an overview of the baseline conditions at the site and the datasets which will be used to inform the Fish and Shellfish Ecology chapter of the EIA Report. It also describes the proposed methodology to be applied in the EIA to consider the potential direct and indirect effects on Fish and Shellfish ecology in the marine environment that may arise from the construction, operation and decommissioning of the Project.

11.2 Receiving Environment

The receiving environment consists of the following areas:

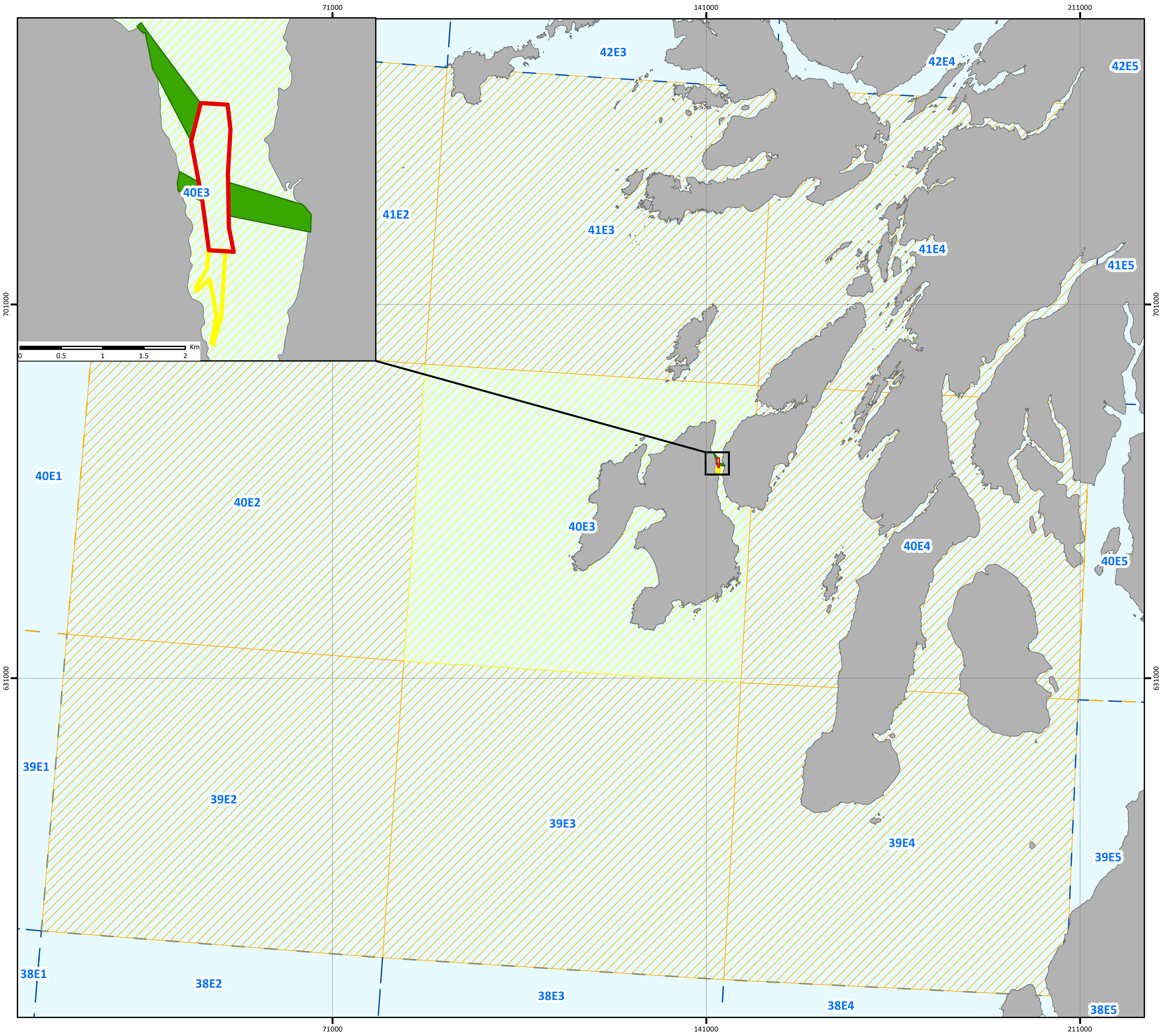
- The Project area or ÒnM
- The study area
- The wider study area

The west coast of Scotland is located in the ICES "Celtic Seas" ecoregion, further defined as ICES Division 6a (ICES, 2020). This Division is used in ICES stock assessments and management advice, so has an ecological basis. The ÒnM Project area and AoS for export cable routes are located entirely within ICES rectangle 40E3. This block is considered the 'study area'.

Due to the mobile and migratory nature of fish, the ICES rectangles immediately surrounding the ÒnM (39E2, 39E3, 39E4, 40E2, 40E4, 41E2, 41E3, 41E4) will be included in the wider study area for this chapter of the EIA Scoping Report (Figure 11-1, Drawing no. P2585-FISH-001). This area is considered precautionary but appropriate as it allows a larger area to be reviewed to consider wider context for this Scoping Report and migratory fish, which may travel over longer distances, for example twaite shad have been known to migrate 100km to get to inform the Fish and Shellfish Ecology baseline for this Scoping Report.

The proposed Fish and Shellfish Ecology study area will be defined further at the EIA stage using the ZoI for the different activities of the ÒnM, and in response to any design changes or feedback from consultation.

The receiving environment for the Fish and Shellfish Ecology chapter is displayed in Figure 11-1 (Drawing no. P2585-FISH-001).



EIA SCOPING REPORT ÓRAN NA MARA ISLAY TIDAL

FISH AND SHELLFISH
Location Overview

Drawing No: P2585-FISH-001	A

Legend

- AfL Area
- Cable Corridor
- Exploratory Cable Corridor

ICES Rectangle

Study Area

- Study Area
- Wider Study Area
- Other

N
W E
S

NOTE: Not to be used for Navigation

Date	19 January 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; ICES; NOVA; OSOD
File Reference	J:\P2585\Mxd_QGZ\03_FISH\ P2585-FISH-001.mxd
Created By	Emma Kilbane
Reviewed By	Lewis Castle
Approved By	Aodhfin Coyle

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11.3 Data Sources and Baseline

11.3.1 Data Sources

A desk-based review of literature and data sources has identified a number of data sources for Fish and Shellfish Ecology, with the key sources listed in Table 11-1. These are not an exhaustive list to which the assessment must be restricted. Where new, relevant data are published, these would be incorporated into future assessments as part of the EIA.

Previous SPR Sound of Islay Environmental Statement will be used to inform the baseline for this EIA. Reference to Chapter 4 Marine Fish/Shellfish of the Environmental Statement (ES) for the Sound of Islay Demonstration Tidal Array, compiled by Scottish Power Renewable (SPR, 2010) will be used to inform the ÒnM EIA. In particular, survey information on anadromous fish in adjacent waters to the Sound of Islay will be utilised to further inform the fish assemblage baseline.

Table 11-1 Baseline data sources for Fish and Shellfish Ecology

Data Type	Source
Region baseline	Region 14 South-west Scotland: Ballantrae to Mull (JNCC, 1995); Marine Scotland - National Marine Plan Interactive; Scottish Executive (2007) Scottish Marine SEA: Environmental Report Section Appendix C Environmental Baseline and Trends: Section 1 Nature Conservation and Biodiversity; Marine Scotland - National Marine Plan Interactive (NMPi); Sound of Islay environmental statement (SPR, 2010); DATRAS Scottish West Coast Groundfish Survey (SCOWCGFS) (ICES, 2013); Manual for Version 3 of the Groundfish Survey Monitoring and Assessment Data Product Scottish Marine and Freshwater Science Vol 8 No 18 (Marine Scotland, 2017)
Seabed habitats	EMODnet; EUNIS; Marine Scotland Sectoral marine plan: West regional locational guidance; Marine Scotland - National Marine Plan Interactive; Scottish Executive (2007) Scottish Marine SEA: Environmental Report Section Appendix C Environmental Baseline and Trends: Section 1 Nature Conservation and Biodiversity
Shellfish production areas	Marine Scotland – NMPi; Sound of Islay environmental statement (SPR, 2010); Annual report on the results of the Shellfish Official Control Monitoring Programmes for Scotland (Cefas, 2021)
Spawning, nursery, and feeding areas and species migration and	Marine Scotland Fisheries Sensitivity Maps in British and Irish Waters (Coull et al., 1998; Ellis et al., 2012); Updating Fisheries Sensitivity Maps in British Waters (Aire et al., 2014); Centre for Environmental, Fisheries and Aquaculture Science (Cefas);

Data Type	Source
wintering areas	Guidance on Survey and Monitoring in Relation to Marine Renewable Deployments in Scotland (Vol 2: Cetaceans and Basking Shark); Scottish Executive (2007) Scottish Marine SEA: Environmental Report Section Appendix C Environmental Baseline and Trends: Section 1 Nature Conservation and Biodiversity; Essential spawning grounds of Scottish herring: current knowledge and future challenges (Frost and Diele, 2022); Fish and shellfish sensitivity reports (MarLIN); National Biodiversity Network Atlas Scotland
Fisheries landing data, fisheries VMS/AIS and commercial fishing grounds	Marine Scotland (2022a) 2021 Scottish Sea Fisheries Statistics - Fishing Effort and Quantity and Value of Landings by ICES Rectangles; Marine Scotland (2020) Automatic Identification System (AIS) for fishing vessels - Part 1; Scottish Government (2018) Marine and fisheries compliance: vessel monitoring system; ICES (2022); Evidence Gathering in Support of Sustainable Scottish Inshore Fisheries Work Package 4 Final Report (MASTS, 2015)
Management plans to inform baseline species	Marine Scotland Sectoral marine plan: West regional locational guidance, provides information on aquaculture and diadromous fish protected sites (Marine Scotland, 2020); Islay Community Demonstration Environmental Management Plan (EMP), ;
Potential Effects	Scottish Government (2012) West Coast Regional Locational Guidance - Tidal Energy in Scottish Waters. Edinburgh, UK; Collaborative Offshore Wind Research Into the Environment (COWRIE); Review of current knowledge of Underwater Noise emissions from wave and tidal stream energy devices (Robinson and Lepper, 2013); Sound of Islay environmental statement (SPR, 2010); Marine Evidence based Sensitivity Assessment (MarESA) (The Marine Life Information Network (MarLIN)); Intersessional Correspondence Group on Cumulative Impacts (OSPAR, 2011); Fish and shellfish sensitivity reports (MarLIN); Wave & Tidal Consenting Position Paper Series: Effects on Fish and Shellfish Ecology (Natural Environment Research Council, 2013); Scottish Executive (2007) Scottish Marine SEA
Protected sites	Marine Scotland - NMPi; Marine Protected Area mapper (JNCC, 2023); Site Link (NatureScot, 2023);

11.3.2 Baseline

The following sections present the review of the current environment and population trends for Fish and Shellfish Ecology.

11.3.2.1 Commercial Fish assemblage

A number of variables affect fish distribution. These include abiotic drivers like water temperature, salinity, depth, regional scale habitat features, and substrate type, biotic factors such as predator-prey interactions, competition, and human pressures, E.G. infrastructure and the intensity of commercial fishing.

Reports on landings within ICES blocks from Marine Scotland identifies targeted commercial species caught within the study area (ICES block 40E3) (Marine Scotland, 2022). These landings report indicate the following fish species could cur within the ÒnM project area:

Brill (Scophthalmus rhombus)

Cod (Gadus)

Corkwing wrasse (Symphodus melops)

Goldsinny-wrasse (Ctenolabrus rupestris)

Haddock (Melanogrammus aeglefinus)

Hake (Merluccius merluccius)

Halibut (Hippoglossus stenolepis)

John Dory (Zeus faber)

Lemon Sole (Microstomus kitt)

Ling (Molva molva)

Megrim (Lepidorhombus whiffiagonis)

Monks or Anglers (Lophius/Lophiiformes)

Plaice (*Pleuronectes platessa*)

Pollack (*Pollachius pollachius*)

Red gurnard (*Chelidonichthys cuculus*)

Rock cook (*Centrolabrus exoletus*)

Skates and Rays (*Rajidae* and *Batoidea*)

Sole (*Solea solea*)

Thornback Ray (*Raja clavate*)

Turbot (*Scophthalmus maximus*)

Whiting (*Merlangius merlangus*)

Witch (*Glyptocephalus cynoglossus*)

Wrasses (*Labridae*)

In the wider study area (surrounding ICES blocks) additional species were reported (Table 11-2), which can indicate that these species could be found within the immediate ÒnM Project area and make up the baseline fish assemblage. The wider study area is being used for this Scoping Chapter only to provide a wider context to the environment, however, the study area in the EIA will be refined further after detailed desktop review of the baseline data and finalisation of the Project activities to inform the expected zones of influences.

Table 11-2 Additional fish species caught in the wider ÒnM study area

ICES Rectangle	Fish Species
39E2	Atlantic cod /Torsk (*Gadus morhua*) Tusk/Cusk (*Brosme brosme*) Herring (*Clupea harengus harengus*) Lesser Spotted Dog (*Scyliorhinus canicular*) Sand sole (*Pegusa lascaris*)
39E3	Blonde Ray (*Raja brachyura*) Conger Eel (*Conger conger*) Dogfish (*Scyliorhinidae*) Flounder or Flukes (*Paralichthys* or *Trematoda*) Lesser Spotted Dog (*Scyliorhinus canicular*) Mackerel (*Scomber scombrus*) Spotted Ray (*Aetobatus narinari*)
39E4	Ballan Wrasse (*Labrus bergylta*) Blonde Ray (*Raja brachyura*) Conger Eel (*Conger conger*) Dabs (*Limanda*) Gurnard and Latchet (*Chelidonichthys*) Herring (*Clupea harengus harengus*) Horse Mackerel (*Trachurus trachurus*) Mackerel (*Scomber scombrus*) Saithe (*Pollachius virens*) Sharks (*Selachimorpha*)
40E2	Greater Forked Beard (*Phycis blennoides*) Mackerel (*Scomber scombrus*)
40E4	Ballan Wrasse (*Labrus bergylta*) Bass (*Micropterus salmoides*) Blonde Ray (*Raja brachyura*) Conger Eel (*Conger conger*) European Flying Squid (*Todarodes sagittatus*) Gurnard and Latchet (*Chelidonichthys*) Lesser Spotted Dog (*Scyliorhinus canicular*) Mackerel (*Scomber scombrus*) Saithe (*Pollachius virens*) Sprats (*Sprattus sprattus*) Spotted Ray (*Aetobatus narinari*)

ICES Rectangle	Fish Species
	Thornback Ray (*Raja clavate*) Wrasses (*Labridae*)
41E2	Cuckoo Ray (*Leucoraja naevus*) Lesser Spotted Dog (*Scyliorhinus canicular*) Mackerel (*Scomber scombrus*) Saithe (*Pollachius virens*) Sand sole (*Pegusa lascaris*) Spotted Ray (*Aetobatus narinari*) Surmullet (*Mullus surmuletus*) Thornback Ray (*Raja clavate*)
41E3	Ballan Wrasse (*Labrus bergylta*) Blonde Ray (*Raja brachyura*) Cuckoo Ray (*Leucoraja naevus*) Four-Spotted Megrim (*Lepidorhombus boscii*) Gurnard and Latchet (*Chelidonichthys*) Herring (*Clupea harengus harengus*) Mackerel (*Scomber scombrus*) Saithe (*Pollachius virens*) Spotted Ray (*Aetobatus narinari*) Sprats (*Sprattus sprattus*) Surmullet (*Mullus surmuletus*) Thornback Ray (*Raja clavate*)
41E4	Ballan Wrasse (*Labrus bergylta*) Blonde Ray (*Raja brachyura*) Grey Gurnards (*Eutrigla gurnardus*) Mackerel (*Scomber scombrus*) Saithe (*Pollachius virens*) Spotted Ray (*Aetobatus narinari*) Sprats (*Sprattus sprattus*) Surmullet (*Mullus surmuletus*) Thornback Ray (*Raja clavate*) Wrasses (*Labridae*)

11.3.3 Diadromous Fish Species

Diadromous species are those which migrate between marine and freshwater as part of their lifecycle. The Atlantic salmon (*Salmo salar*), Sea lamprey (*Petromyzon marinus*), River Lamprey (*Lampetra fluviatilis*), and Twaite Shad (*Alosa fallax*) are listed on Annex II on the EC Habitats Directive (Fourth Schedule of the Habitats Regulation). These species spawn within freshwater but complete their lifecycle in the sea.

The National Biodiversity Network (NBN) Atlas Scotland collates records of different species from public observations. There are no records of twaite or allis shad observations on the Isle of Islay or Sound of Jura. There are records of Atlantic salmon utilising the ÒnM Project area, three records in the direct vicinity of the AfL and cable corridors, and multiple records in the wider study area. There are no records of sea lamprey within the Project area but there are approximately nine records within the wider study area.

Other diadromous species that may be present are the European eel (*Anguilla anguilla*) and the seatrout (*Salmo trutta trutta*), which are prevalent in Scottish rivers and lochs which drain into the sea and have a marine phase of their life cycle. The European eel spawns in the Sargasso Sea and then grows up in freshwater as an elva (NatureScot, 2023). Adult sea trout, on the other hand, spawn in fresh water and then travel to the sea to feed after a few years. Given that both species have a marine stage, it is feasible that they could be found in the ÒnM at different times of the year. There is little information to suggest that rivers on Islay or Jura in the vicinity of the ÒnM support European eel. There are four records of European eel sightings within the Sound of Islay (in the vicinity of the ÒnM however not within the Project boundary) and a further seventeen sightings were noted around the coast of Islay and seven around the coast of Jura (NBN Atlas, 2021). Therefore, it is unlikely that European eel will be within the Project area in high numbers. Four observations of sea trout have been recorded within the sound, with higher reportings of sea/brown trout around Islay (twenty five) and Jura (fourteen) (NBN Atlas, 2021). These records indicate that European Eel and sea/brown trout migrating to the sea may pass through the Sound of Islay and the ÒnM Project area.

11.3.3.1 Commercial shellfish assemblage

Commercial fishing data for the study and wider study area indicates that a range of shellfish species occur in these areas. Landings of commercial shellfish species reported by Marine Scotland (Marine Scotland, 2022) for ICES rectangle 40E3 indicate that the following species outlined in Table 11-3 are present in the study area:

Table 11-3 Commercial shellfish species found in the study area

Species	Latin Name
Shellfish	
Brown shrimp	*Crangon crangon*
Crawfish	*Palinuridae*
Green crab	*Carcinus maenas*
Norway Lobster (or Dublin Bay prawn)	*Nephrops norvegicus*
Queen scallops	*Aequipecten opercularis*
Razor clam	*Siliqua patula*
Scallops	*Pectinidae*
Spider crab	*Macrocheira kaempferi*
Squat lobster	*Galathea strigose*
Velvet crab	*Necora puber*
Whelks	*Buccinidae*
Molluscs (including cephalopods)	
Squid	*Teuthoidea*

There are no aquaculture sites within the direct vicinity of the ÒnM project area (i.e. in the Sound of Islay) (Scotland's Aquaculture 2022). Within the study area there is one aquaculture site for native oyster (Ostrea edulis) and pacific oyster (Crassostrea gigas), located in Loch Gruinart (Site ID: SS0452, Name: Islay) on the north of Islay (approximately 15km from ÒnM over land). In the wider study area, another aquaculture site for pacific oyster is located approximately 19km north of the Project on The Strand on the south coast of Colonsay.

In the wider study area (surrounding ICES blocks) additional species were reported (Table 11-4), which can indicate that these species could be found within the immediate ÒnM project area and make up the baseline shellfish assemblage.

Table 11-4 Additional shellfish (or other mollusc) species caught in the wider ÒnM study area

ICES Rectangle	Fish Species
39E2	Native oysters
39E3	Common octopus (mollusc family) Sea Urchin (mollusc family)
39E4	No additional species to 40E3
40E2	No additional species to 40E3
40E4	Shrimps - Pink (Northern prawn) Octopus
41E2	No additional species to 40E3
41E3	Deepwater Red Crab Mixed Squid and Octopi Common Prawns Octopus (mollusc family) Periwinkle
41E4	Common Prawns

11.3.3.2 Spawning and nursery grounds

The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) provide information on spawning grounds (the location where eggs are laid) and nursery areas (the location where juveniles are common) for fish stock in Scottish coastal waters in the form of fisheries sensitivity maps (Coull et al. 1998, Ellis et al. 2012). These data indicate that the ÒnM project is located within the spawning and or nursery grounds for 14 species which overlap the study area (40E3, used for the purposes of describing the baseline of this EIA Scoping Chapter). Spawning and nursery grounds are illustrated in Figure 11-2, Figure 11-3, and Figure 11-4(Drawing no. P2585-FISH-002, P2585-FISH-003, P2585-FISH-004). The species are; Anglerfish (Lophius piscatorius), Atlantic cod (*Gadus morhua*), blue whiting (*Micromesistius poutassou*), common skate (*Dipturus batis*), European hake *(Merluccius merluccius*), herring (*Clupea harengus*), ling (Molva molva), mackerel (*Scomber scombrus*), Norway lobster (*Nephrops norvegicus*), plaice (*Pleuronectes platessa*), sandeel (*Ammodytida spp*.), sprat (*Sprattus sprattus*), spotted ray (*Aetobatus narinari*), spurdog (*Squalus*), and whiting (*Merlangius merlangus*). Table 11-5 displays all nursing and spawning species within the study and wider study area including the period of both spawning and nursing.

Table 11-5 CEFAS Spawning (S) and Nursery (N) grounds for species within the study and wider area

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Anglerfish †	N	N	N	N	N	N	N	N				
Atlantic Cod (*Gadus morhua*)	N	N	N	N	N	N						
Atlantic herring (*Clupea harengus*)								S	S	S	S	
Atlantic mackerel (*Scomber scombrus*) †			N	N	N	N	N	N	N			

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Blue Whiting (*Micromesistius poutassou*)				N	N	N	N	N				
Common Ling (*Molva molva*)		N	N	N	N	N	N					
Common Skate (*Dipturus batis*)	?	?	?	?	?	?	?	?	?	?	?	?
European Hake (*Merluccius merluccius*)	N	N	N	N	N	N	N	N				
Haddock (*Melanogrammus aeglefinus*)		SN*	SN*	SN*	SN	N	N					
Norway Lobster (*Nephrops norvegicus*)	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN
Plaice (*Pleuronectes platessa*)	S*	S*	S									S
Sandeels (*Ammodytida*)	S	S									S	S
Spotted Ray (*Aetobatus narinari*)				?	S*	S*	S*	?				
Sprat (*Sprattus sprattus*)					S*	S*	S	S				
Spurdog (*Squalus*)	Viviparous species (gravid females can be found all year)											
Whiting (*Merlangius merlangus*)		N	N	N	N	N	N	N				

Key = S = Spawning, N = Nursery, SN = Spawning and Nursery, ? = No Data, † High intensity nursery and *peak spawning period. Key in "Species" column note whether species are spawning or nursing within the study and wider area

Source: Coull et al. (1998); ICES (2009). Ellis et al. (2012). Marine Institute (2020a), O'Sullivan et al (2013).

Note: Viviparous species are species which do not lay eggs but instead produce living young.

The CEFAS sensitivity maps indicate that sandeel (*Ammodytida*) (nursery grounds could occur within the ÒnM study area and spawning grounds within the wider study area. Sandeel have a high level of habitat specialisation with studies showing a preference for medium/coarse grained sands and absence from sediments with silt content (Wright et al., 2000; Holland et al.,2005; Green, 2017). Sandeels display burrowing behaviour which is thought to help avoid predation, displacement by currents to less suitable areas, and to conserve energy (Green, 2017). Additionally, sandeels like herring (*Clupea harengus*), are demersal spawners and lay their eggs directly onto the substrate (Wright et al., 2017; Wright, 2019). Planktonic larvae are transported by currents and settle back into the sand as juveniles (Wright et al., 2017; Wright, 2019). The presence of sandeel eggs and burrowing sandeels of different life stages, make these habitats susceptible to disturbance. Sandeel are known for their patchy distribution. There are indications that sandeels have a high level of site fidelity and are not successful re-colonisers (Jensen et al. 2011), although some research (Haynes and Robinson 2011) indicates that patch fidelity amongst young sandeel in particular may be short term.

Similarly, herring are also noted to nursing in the area with a spawning site located approximately 60km away. Herring are also benthic spawners and are reliant on specific benthic spawning habitats with particular substrate types such as gravel and rock (O'Sullivan et al. 2013). The dependency of herring on these specific substrates makes the species potentially susceptible to disturbance.

CEFAS data indicates that there are nursery areas for various elasmobranchs species including common skate (*Dipturus batis*); spotted ray (*Aetobatus narinari*) and spurdog (*Squalus*) within the Project area and study area. Skates and rays are particularly vulnerable to seabed disturbance because they lay their eggs on the seabed, live on the seabed and exhibit slow growth rates, late maturity, low fecundity and productivity which limits their capacity to recover from population declines.

Chapter 8 of this EIA Scoping Reports considers the Benthic Ecology of the Project area. Desktop review highlights that the area is dominated by high energy circalittoral seabed with rock exposures. However, benthic survey data will characterise the benthic environment and Sediment Particle Size Analysis (PSA) will be sampled for subsequent analysis. As some species are reliant on specific benthic conditions analysis of the sediment will further clarify if the area is suitable for spawning conditions within the Project area and AoS for cable corridors.

The Fisheries Ecosystem Assessment Services (FEAS), a team within the Marine Institute in Republic of Ireland, are responsible for meeting Ireland's obligations under the EU Data Collection Framework. As part of this work FEAS carry out Groundfish Trawl Surveys, Acoustic Surveys, Plankton Surveys and Underwater Television surveys (Marine Institute, 2020). The data available from FEAS overlaps with some Scottish waters and highlights additional species spawning and nursing areas within the study area and wider study area (used for the purposes of describing the baseline of this EIA Scoping chapter).

- Horse Mackerel (*Trachurus trachurus*) – Nursery, March – October (within the ÒnM Project area (AfL and AoS for cable corridors)
- Megrim *(Lepidorhombus whiffiagonis)* – Nursery, January – June (Within block 40E2 and partially 40E3 not overlapping ÒnM area)

Figure 11-2 Spawning and Nursing Grounds within the Fish and Shellfish study area and wider Study Area (Sheet 1 of 3) (Drawing No. P2585-FISH-002-A)

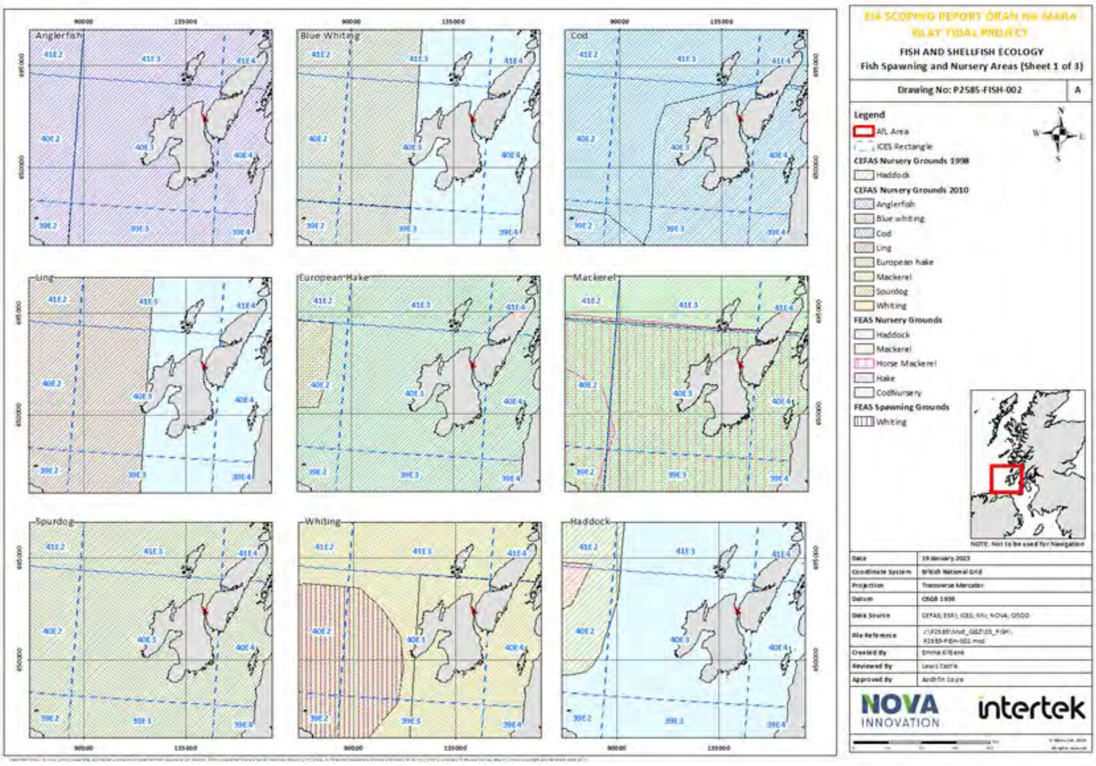


Figure 11-3 Spawning and Nursing grounds within the Fish and Shellfish study area and wider study area (Sheet 2 of 3) (Drawing No. P2585-FISH-003-A)

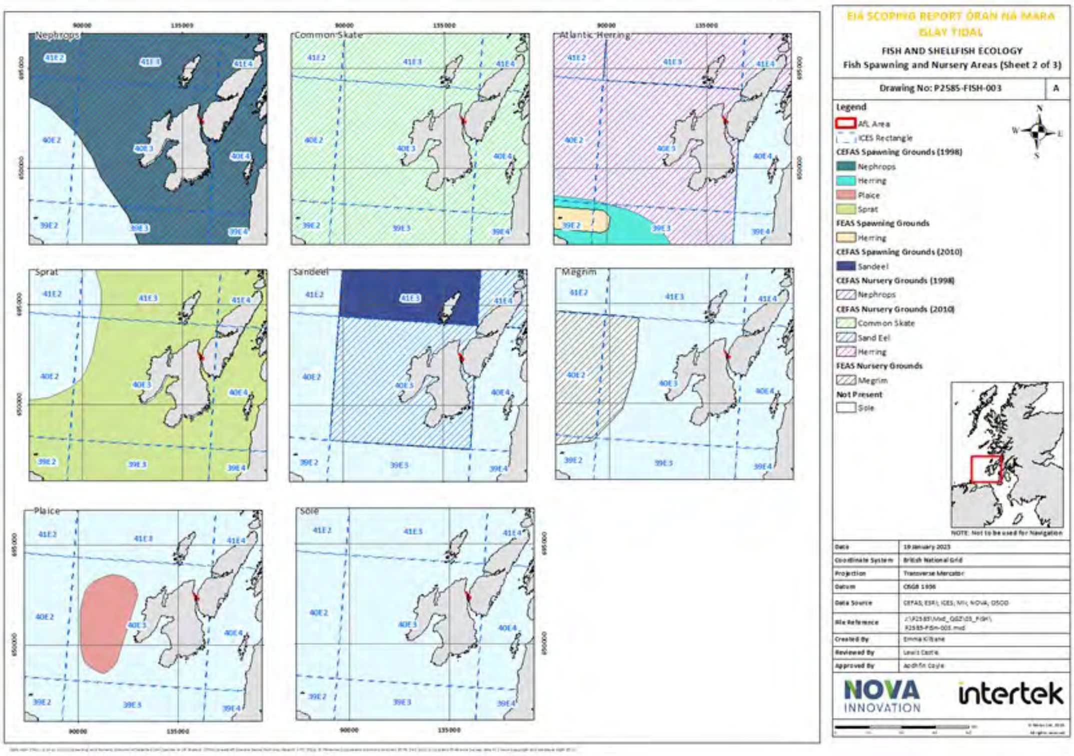
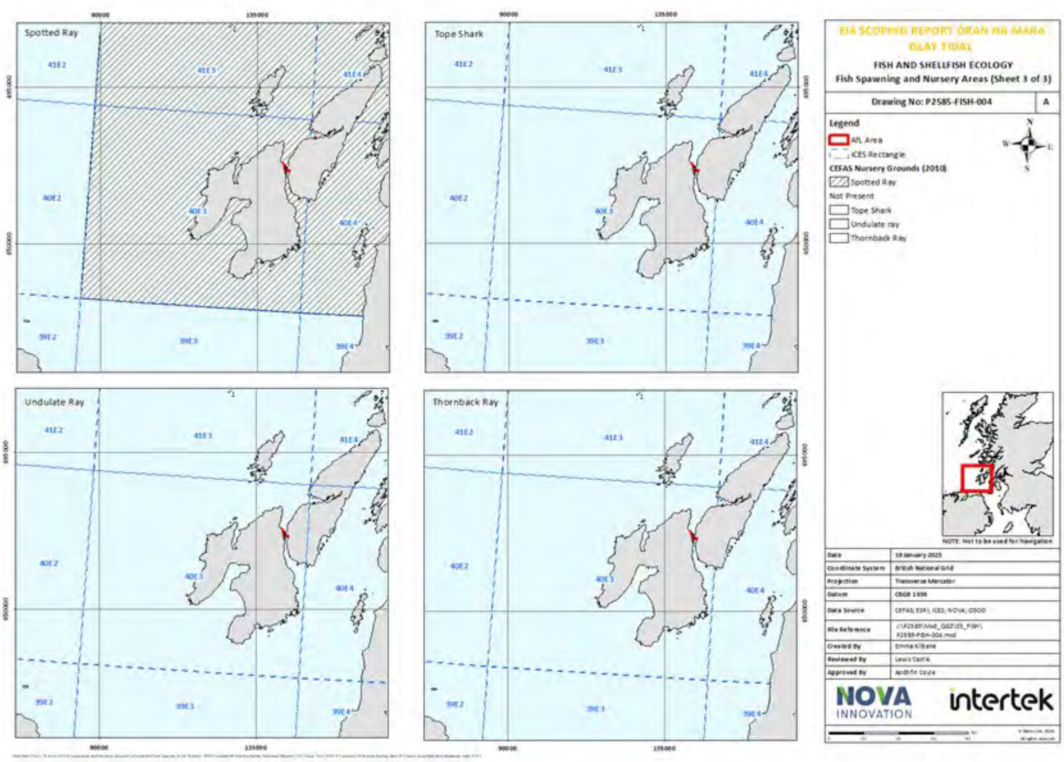


Figure 11-4 Spawning and Nursing grounds within the Fish and Shellfish study area and wider study area (Sheet 3 of 3) (Drawing No. P2585-FISH-004-A)



11.3.3.3 Designated sites

SACs

There are no SAC's designated for fish or shellfish species within the study area (40E3) or wider study area, indicating limited likely connectivity. However, the potential for the Project to affect sites with fish or shellfish features will be considered in the HRA for the Project.

Marine Protected Areas (MPAs)

The Marine Scotland Act (2010) and the UK Marine Coastal Access Act (2009) provides measures to protect and enhance the marine area and environment in Scottish inshore and offshore waters, including through the creation of Marine Protected Areas (MPAs). Scotland's Nature Conservation MPA network currently consists of 30 MPAs (Marine Scotland, 2019). The nearest of these with fish species features are listed in Table 11-6. The wide-ranging nature of fish species means the qualifying features of these MPAs could occur within the ÒnM Project area. There are no MPAs designated for shellfish within the study area or the wider study area.

Table 11-6 Relevant protected sites designated for fish species

Designation	Name	Qualifying Fish/Shellfish Feature	Approximate Distance (km)
MPA (NC)	Sea of the Hebrides	Basking shark (*Cetorhinus maximus*)	42
MPA (NC)	Sound of Jura	Flapper skate (*Dipturus intermedius*)	27

11.3.3.4 Protected species

There is the potential for species of conservation importance to occur in the ÒnM area. Several forms of legislation afford protection to different species of fish and shellfish.

European Legislation

Species listed under Annex II of the Habitats Regulation (1994) are species of community interest whose conservation requires the designation of SACs. Annex II species are described in Section 11.3.3 however, there are no designated sites for Fish and Shellfish within the ÒnM Project area. However, as part of the full EIA process a HRA will be carried out. Table 11-7 lists the Annex II and Annex IV species which may be encountered at the ÒnM project area. Species listed under Annex IV of the Habitats Regulations (1994) are subject to strict protection as "European Protected Species" (EPS). It is an offence to deliberately or recklessly (NatureScot, 2020a):

- Capture, injure or kill such an animal;
- Harass an animal or group of animals;
- disturb an animal while it is occupying a structure or place used for shelter or protection;
- disturb an animal while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place, or otherwise deny an animal use of a breeding site or resting place;
- disturb an animal in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;

- disturb an animal in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and
- disturb an animal while it is migrating or hibernating.

European Legislation has been transposed into Scottish Law. In Scotland, the Habitats Directive is translated into specific legal obligations by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended on numerous occasions). This piece of legislation is usually known as the Habitats Regulations (NatureScot, 2020d). These Regulations apply on land in Scotland, and in Scottish inshore waters (the area of sea adjacent to Scotland from 0 to 12 nautical miles) (Scottish Government, 2020).

Due to Britain's separation from the EU, EU legislation is no longer monitored by the EU and some changes to the Conservation (Natural Habitats, &c.) Regulations 1994 have been made. Although there have been some terminology changes and some functions that were previously handled at the EU level are now performed by the Scottish Ministers, the policy of the protections and standards provided by the Habitats Regulations has not changed (Scottish Government, 2020).

National Legislation

Schedule 3 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) where it is an offence to use certain methods to catch or take fish in freshwater (therefore, not relevant to this project) and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) where full protection is given and it is an offence to (NatureScot, 2020b):

- intentionally or recklessly kill, injure or take fish;
- possess or sell fish; and
- intentionally or recklessly disturb or harass fish.

Allis shad and twaite shad are protected under Schedule 5 only in terms of regulating how they can be killed or taken (NatureScot, 2020b). However, as discussed in Section 11.3.3, there are no records of twaite or allis shad observations on the Isle of Islay or Sound of Jura. Table 11-7 highlights protected species which have been recorded in the study and wider study area and therefore may be potentially impacted by activities occurring from the ÒnM project.

Table 11-7 Protected species which have been observed in the ÒnM wider study area: HR - Habitats Regulation, WCA - Wildlife and Countryside Act (adapted from NatureScot, 2020c)

Taxon	Common name	Current taxon name	Relevant legislation	Schedule or Annex listing
Fish	Allis shad	*Alosa alosa*	HR 1994	Schedule 3 (Annex II)
			WCA 1981	Schedule 5
Fish	Atlantic salmon	*Salmo salar (only in fresh water thus no pressure-receptor pathway for this project)*	HR 1994	Schedule 3 (Annex II)
Fish	Basking shark	*Cetorhinus maximus*	WCA 1981	Schedule 5
Fish	River lamprey	*Lampetra fluviatilis*	HR 1994	Schedule 3 (Annex II)
Fish	Sturgeon	*Acipenser sturio*	HR 1994	Schedule 2: European protected species (Annex IV)
Fish	Twaite shad	*Alosa fallax*	HR 1994	Schedule 3 (Annex II)
			WCA 1981	Schedule 5

Elasmobranchs (sharks, skates, rays, basking shark) are among the most vulnerable marine fish to anthropogenic effects due to their slow growth rates, late maturity, low fecundity and productivity which limits their capacity to recover from population declines.

Oslo-Paris Convention (OSPAR)

All sharks and rays are on the OSPAR List of Threatened and/or Declining Species and Habitats (Agreement 2008-06) (OSPAR, 2008).

International Union for Conservation of Nature (IUCN)

Flapper (Common) Skate (Dipturus batis) is another ray species and is listed as Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

11.4 Relevance Guidance and Assessment Tools

The EIA shall be carried out in accordance with the following guidance:

- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (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
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015).

There are a variety of publicly available Fish and Shellfish datasets and reports of relevance to the ÒnM Fish and Shellfish study and wider area. The baseline characterisation of Fish and Shellfish will also be informed by site-specific information gathered as part of pre-application surveys. These may include drop down video and benthic grab samples. Grab samples (if required and relevant) will determine whether the habitat is suitable for herring (*Clupea harengus*) spawning and sandeels (*Ammodytidae spp.*). The baseline information in this Scoping repot will be further validated using fish assemblage data obtained by incidental observations of Fish and Shellfish species in any drop-down video or grab sampling.

Basking shark are recorded during pre-application marine mammal and bird surveys carried out at the Project area (see **Chapters 9** for further details). No further site-specific Fish and Shellfish Ecology surveys are proposed.

11.5 Design Parameters

11.5.1 Key Design Parameters

The Fish and Shellfish Ecology scoping assessment is based on the key assumptions, which are set out in Chapter 5**.**

11.5.2 Embedded Mitigation

There are a number of standard measures that will be applied to the Project to ensure and demonstrate compliance with national and international statute and best practice guidance. These measures, which are outlined below, will help to minimise any likelihood that ÒnM will negatively affect water or sediment quality.

- Development and adherence to a Cable Specification and Installation Plan (CSIP) which will include cables to be buried to where possible and cable protection as necessary (the potential effect of this measure will be consulted upon with statutory consultees throughout the EIA process).
- Development and adherence to a Construction Method Statement (CMS).
- Development of, and adherence to, an Environmental Management Plan, an Invasive and Non-Native Species (INNS) Management Plan, and a Marine Pollution Contingency Plan (MPCP) which will include planning for accidental spills, address all potential contaminant releases and include key emergency details.
- Development and adherence to an EMMP during construction and operational periods, including a Marine Pollution Contingency Plan;
- Development and adherence to a Vessel Management Plan (VMP) which will detail the number and type of vessels used on the Project. Vessels will adhere to current guidance such as the Scottish Marine Wildlife Watching Code to minimise risk of disturbance or injury;
- Development and adherence to an Operations and Maintenance (O&M) Plan; and,
- The development and adherence to a decommissioning programme.

11.6 Potential Project Effects

This Fish and Shellfish Ecology assessment highlights the potential environmental effects associated with the Project and identifies those to be scoped into or out of the EIA process. The assessment will consider value, sensitivity, and likelihood of effect on Fish and Shellfish (Table 11-8). All offshore infrastructure, including turbines, foundations and cables will form part of the assessment. Effects resulting from the Project may have an adverse, positive or no effect on Fish and Shellfish Ecology. The process of identifying effects will involve consideration of all types of effect.

The sensitivity of Fish and Shellfish to potential effects will be determined qualitatively based on the current understanding of species' ecology and behaviour. Judgement will take account of information available on the responses of Fish and Shellfish to various stimuli (e.g. Underwater Noise and visual disturbance caused by tidal turbine arrays, where such data exist) and whether their ecology makes them particularly vulnerable to potential effects (e.g. species that typically have high sensitivity to Underwater Noise). Upon production of a cetacean risk assessment where injury or disturbance may affect Fish and Shellfish after mitigation measures are applied, an EPS licence may need to be sought.

Table 11-8 details the potential effects of the ÒnM Project on Fish and Shellfish. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA.

Table 11-8 Potential Effects of the Project on Fish and Shellfish

Potential Effect	Project Phase	Rationale and Commentary
Changes to or loss of fish or shellfish habitat	All Phases	Potentially sensitive or important fish or shellfish habitats could be present within the ÒnM Project area. This will be determined in the EIA, including through site survey. Cables are expected to surface laid, with some trenching in the nearshore area if the need is identified. If required, cable protection measures will be used to secure surface laid cables. Micro-siting of cables will avoid identified potentially sensitive habitats. Habitat loss and disturbance during construction and decommissioning is expected to be temporary. Deployment of anchors/anchor chains on the seabed will be kept to a minimum to reduce disturbance to seabed. **This potential effect will be scoped into the EIA.**
Effects of Electromagnetic Fields (EMF)	Operation	Cables emit EMF; the highest forces will be associated with high-voltage export cables. Studies suggest no significant effects, but still some uncertainty for particularly sensitive species (Copping et al., 2020). Some disturbance may be possible to migratory diadromous fishes (Maxwell et al., 2022). However, the Project will utilize low-power Alternating Currents (AC) which produce much lower EMF than the common high-power subsea Direct Current (DC) transmission systems. Nova's systems are also delta-connected which means the three electrical phases are always balanced and no external electrical field should be present. If a fault occurred it would only be transient until the electrical protection would trip, during which time, a small electrical field may be produced (<100ms). The earthed double-armour and integral drain wires act as a screen for these emissions. The magnetic fields and resultant induced EMF in the sea around the cable(s) will therefore be negligible.

Potential Effect	Project Phase	Rationale and Commentary
		This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.
Effects of underwater noise and vibration effects to hearing and pressure sensitive species	All Phases	No drilling is required to install project infrastructure, but some pin-piling may be used on rock feet of larger turbines (refer to Chapter 5 for further details). Underwater noise and vibration during offshore works and turbine operations has the potential to affect particularly sensitive species. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Effects of siltation and smothering	Construction and Decommissioning	Sediment resuspension is expected to be minimal, due to the limited footprint of infrastructure, the hard underlying geology and the tide-swept conditions at the site. Cable will be surface laid where possible. Some species previously recorded in the Sound of Islay which may be present at the Project area are known to be sensitive to siltation. These include sessile filter feeding organisms and those which rely on sunlight to produce energy. As such they could be affected by high concentrations of sediment loading, so on a precautionary basis this potential impact pathway will be scoped into the EIA. See also 'Changes in suspended sediment' in Physical Processes chapter. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Risk of fish collision with tidal turbines	Operation	There is no direct evidence that a collision event has occurred between fish and tidal turbines (Copping *et al.,* 2020). Such a risk is likely to be site specific; therefore, the potential effect requires consideration for the species present, their behaviour at the site, and the type of device(s) installed. No collision or near misses between turbines and fish have been observed from Nova's environmental monitoring programme at the Shetland Tidal Array. **This potential effect will be scoped into the EIA.**
Introduction of Invasive Non-Native Species (INNS).	All Phases	Inadvertent introduction of INNS with vessels engaged in works poses a potential threat to fish and shellfish. The risk of transferring marine non-native species to and from the Site will be kept to a minimum by ensuring bio-fouling management practices are implemented. A biosecurity plan for all Project phases will be developed. **This potential effect will be scoped into the EIA.**
Toxic contamination through accidental chemical release from turbines.	All phases	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. **This potential effect has been scoped out of the EIA.**
Toxic contamination through	All Phases	Control measures and oil/chemical pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I

Potential Effect	Project Phase	Rationale and Commentary
accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels.		requirements for all Project vessels, and where applicable, to intertidal equipment, as discussed in Chapter 9. These best practices will ensure the likelihood of an accidental oil or chemical release significantly impacting benthic communities to be very low. Chemical pollution could occur intermittently through the lifetime of a project through re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey *et al.,* 2014; Maxwell *et al.,* 2022). All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) and will follow an EMMP to reduce risk of effect. The tidal conditions at the site mean small spills will quickly disperse and therefore will have a limited interaction with Fish and Shellfish. **This potential effect has been scoped out of the EIA.**

11.6.2 Cumulative Impacts

Section 2.10 details the approach which will be undertaken for the CIA of the Project and relevant neighbouring developments. Fish and shellfish species could experience cumulative impacts from other planned and/or operational tidal, wave, and wind projects within and surrounding the Inner Hebrides. The Project's which are most likely to have a potential to cause a cumulative impact are listed in Table 11-9.

The approach to the CIA will include identification where periods of offshore construction and operation overlap across projects and development. Main effects for consideration include effects from Underwater Noise (e.g. UXO clearance, pin-piling (if used), vessels, seismic surveys), barrier effects, and collision risk occurring within the region and in relation to protected areas for Marine Mammals.

The Fish and Shellfish Ecology CIA for ÒnM will consider the worst-case scenario for each relevant project and any associated activities, in line with the methodology outlined in Section 2.10 of this Scoping Report.

In the absence of guidance on when to consider the baseline to be for a CIA; the baseline will be taken from the point in which site-specific data were collected (i.e. from April 2022). New guidance is to be issued by Marine Scotland which will be considered, if issued in advance of the CIA.

Table 11-9 Projects to be included in Cumulative Impact Assessment for ÒnM

Cumulative Impact	Construction	Operation	Decommissioning
SPR Sound of Islay project - MachairWind	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.
Flex Marine Tidal Array	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.
DP Energy - West of Islay Tiday Array	This project is located outside the Sound of Islay, cumulative impacts are unlikely.	This project is located outside the Sound of Islay, cumulative impacts are unlikely.	This project is located outside the Sound of Islay, cumulative impacts are unlikely.
SSE Jura Hydro Scheme	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.

11.6.3 Transboundary Effects

The Project zone of influence will be determined further in the EIAR and assessment of transboundary effects will depend on the significance and distance of project effects. Transboundary effects will be considered further, if required. Transboundary effects on protected species migrating and utilising the ÒnM Project area may also occur.

The HRA, which will be carried out in addition to the full EIA, will assess any species from protected sites in areas beyond the study area and will assess species which may migrate to the area.

11.7 Mitigation Measures

Section 11.5.2 introduces embedded mitigation measures for the Project. A suitable EMMP will be developed during consultation with key stakeholders, including Marine Scotland and NatureScot, and will be in line with relevant SNCB mitigation and monitoring guidelines. This EMMP will include an adaptive management strategy.

Fish and Shellfish mitigation and monitoring Table 11-10 describes approaches to mitigation measures for potential effects highlighted in Table 1-1 where the potential significance of effect is uncertain.

Table 11-10 Fish and Shellfish mitigation and monitoring

Potential effect	Approach to mitigation measures
Siltation rate changes, including smothering (depth of vertical sediment overburden)	An EMMP will assess species behaviour prior (baseline), during and post installation to estimate the level of effect on Marine Mammals. If required, mitigation measures will follow JNCC guidelines for minimising the risk of disturbance and injury to Marine Mammals whilst using explosives (JNCC, 2010) and where possible, use 'low order' techniques for UXO disposal (Joint Interim Position Statement, 2022).
Electromagnetic changes	
Effects of Underwater Noise and vibration effects to hearing and pressure sensitive species	
Death or injury by collision	
Potential cumulative impacts	Not expected to be required if vessels follow the VMP and Scottish Marine Wildlife Watching Code.

11.8 Proposed Approach to EIA

The Project wide approach to the assessment methodology is set out in Chapter 2. While this has informed the approach that has been used in this Fish and Shellfish Ecology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the Fish and Shellfish assessment in the EIA.

The Fish and Shellfish assessment in the EIA will confirm the baseline distribution of species (including spawning & nursery grounds). The sensitivities of these species to effects from the construction, operation and maintenance and decommissioning of the Project will be assessed. There will be particular focus on assessing potential effects on the following:

- Species with commercial or recreational importance or value;
- Species that are of conservation importance;
- Species of commercial or conservation interest known to have nursery and/or spawning grounds within the topic-specific study area;
- Species of commercial or conservation interest known to migrate through the study area; and
- Species of commercial or conservation interest known to be sensitive to the specific potential effects of OWF development.

Particular focus will be given to sandeels and herring which are recognised as sensitive to seabed disturbance if such habitats are identified within the Project area. There will also be a focus on those species that are sensitive to potential subsea noise effects, i.e. fish with swim bladders, of the noise assessment indicates that noise levels generated by activities associated with the Project could be problematic for such species.

A detailed desk-based review of relevant literature will inform the Fish and Shellfish baseline for the EIA. Consultation with relevant stakeholders will help to further inform and identify any data gaps and additional needs including through site surveys.

Sensitivity of the Fish and Shellfish receptors to identified effects will be defined based on criteria including conservation or commercial value. The magnitude (and significance) of any effects will be informed by evidence-based data and outputs from any project specific modelling. Where appropriate, mitigation measures will be proposed, and potential residual effects presented.

Potential cumulative impacts on fish & shellfish receptors have the potential to arise from interaction of the development of the ÒnM and other activities in the region. Consideration of the potential cumulative impacts is a key part of the assessment process and will be assessed as part of the EIA.

12. COMMERCIAL AND LOCAL FISHERIES

12.1 Introduction

This chapter considers the potential effects on Commercial and Local Fisheries that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project.

Commercial and Local Fisheries are an important part of the economy along the west coast of Scotland, including in and around the ÒnM Project area in the Sound of Islay. Pots (creels) are used to catch shellfish such as crabs, lobsters and Nephrops (Dublin Bay Prawns / Langoustines) in sheltered areas. In the open sea around Islay there are valuable fisheries for finned fish including mackerel, blue whiting, ling and haddock.

The Scottish Government produced Regional Locational Guidance (RLG) for tidal energy in 2012. The West coast RLG characterised the key features of the area, including Commercial Fisheries (Scottish Government, 2012). The RLG highlighted the value of the creel fishery for crabs, lobsters and Nephrops in the inshore waters in this region.

The Commercial and Local Fisheries chapter of the EIAR will set out the available information about the scale, location, timing and character of commercial fishing activity in the vicinity of the ÒnM Project area. This section of the Scoping Report identifies the key sources of information that will be used in the EIAR and provides an initial indication of the likely effects of the Project on Commercial Fisheries, based on a preliminary review of available information.

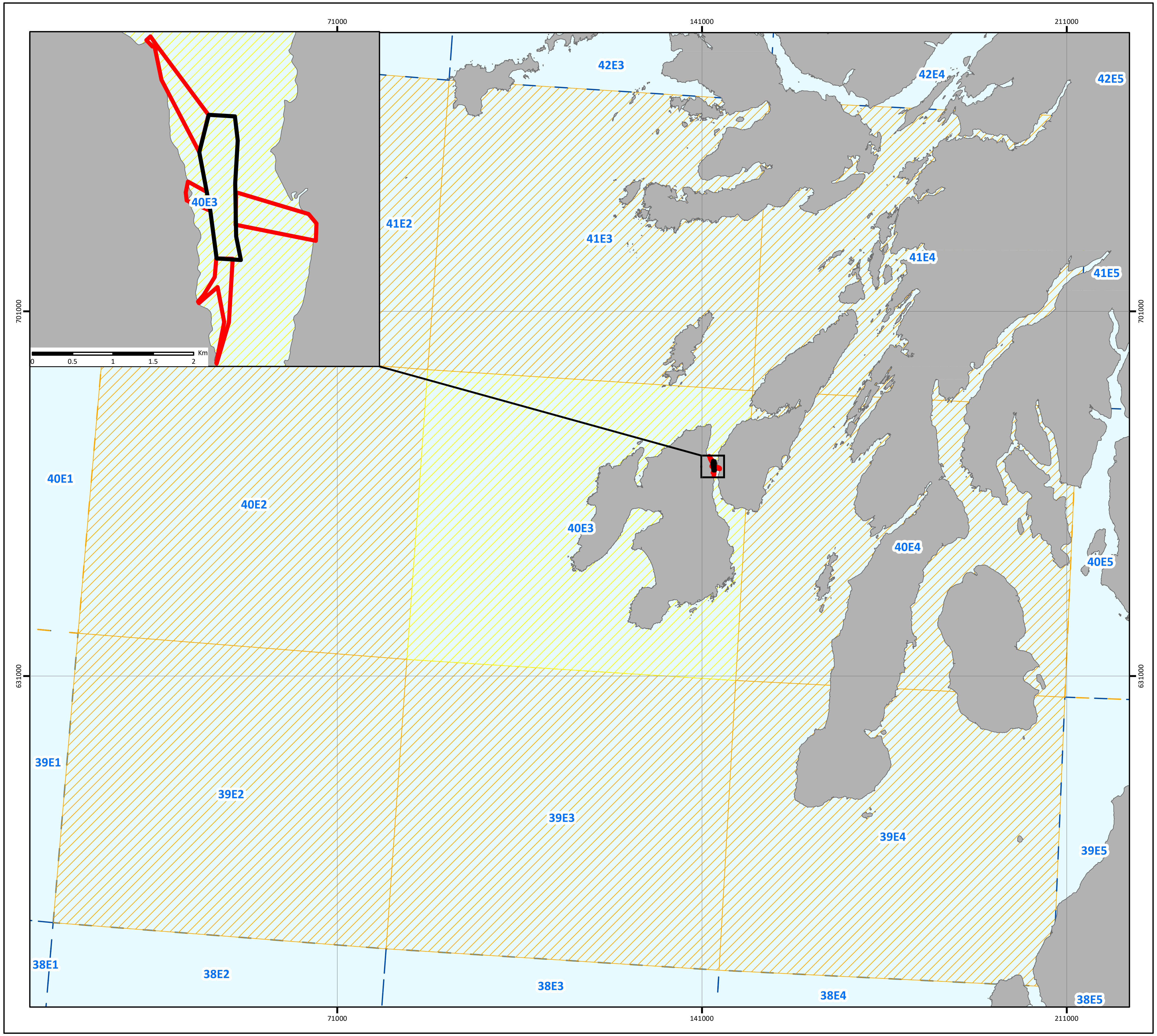
12.2 Receiving Environment

The receiving environment consists of the following areas as described in Section 12:

- The wider region;
- The study area; and
- The Project area.

The extent of these areas is shown in Figure 12-1 (Drawing no. P2585-FISH-001). The west coast of Scotland is located in the ICES “Celtic Seas” ecoregion which has been previously described in Chapter 11.

The proposed Commercial and Local Fisheries study area will be defined further at the EIA stage using the ZoI for the different activities of the ÒnM, and in response to any design changes or feedback from consultation.



EIA SCOPING REPORT ÓRAN NA MARA ISLAY TIDAL

FISH AND SHELLFISH
Location Overview

Drawing No: P2585-FISH-001	C

Legend

AfL Area
Area of Search for Exploratory Cable Corridors

ICES Rectangle

Study Area
Wider Study Area
Other

N W E S

NOTE: Not to be used for Navigation

Date	13 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; ICES; NOVA; OSOD
File Reference	J:\P2585\Mxd_QGZ\03_FISH\ P2585-FISH-001.mxd
Created By	Emma Kilbane
Reviewed By	Lewis Castle
Approved By	Aodhfin Coyle

NOVA INNOVATION intertek

0 10 20 30 40 Km

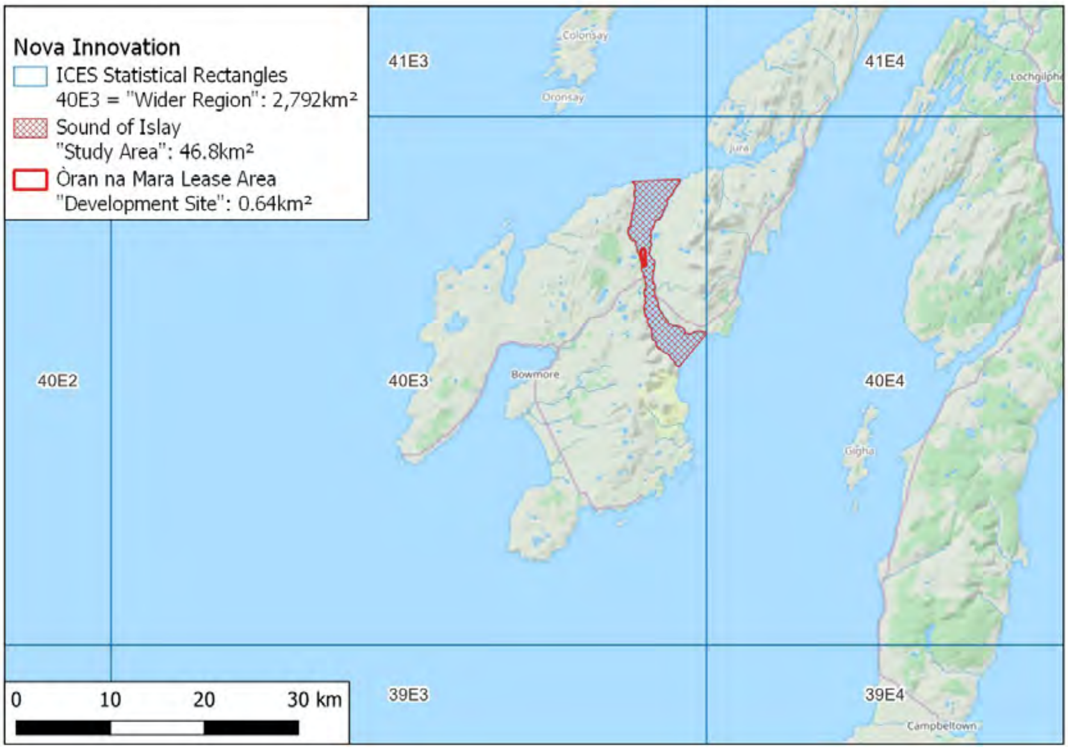
12.3 Data Sources and Baseline

12.3.1 Marine Scotland Landings Data

The monitoring and management of fisheries in the North East Atlantic and the collation of data about Commercial Fisheries is overseen by the ICES, which is an international scientific and advisory organisation (ICES, 2022). The west coast of Scotland is located in ICES Division 6a. This Division is used in ICES stock assessments and management advice.

Information about fishing activity in the North East Atlantic is gathered by ICES participants by reference to a grid of "ICES Rectangles" that extend between 36°N and 85°30'N and between 44°W and 68°30'E. The rectangles within this grid measure 30° of latitude and 1° of longitude, and each has a unique reference number. The ÒnM Project area and AoS for export cable routes are located entirely within ICES rectangle 40E3, as shown in Figure 12-2.

Figure 12-2 Location of the ÒnM Project area relative to the Sound of Islay (study area) and ICES statistical rectangle 40E3 (wider region)



Fishing data (landings and fishing effort) are published annually by Marine Scotland for all of the ICES rectangles in Scottish waters (Marine Scotland, 2022a). The official data relating to rectangle 40E3 can be extracted from the published data and show the baseline commercial fishing activity in the "wider region" around Islay, both in terms of the species caught and the relative importance of different fishing methods.

Data from Marine Scotland covering 2017 to 2021 show that the key features of fishing activity in the wider region around the Project area are:

- Most of the fishing effort in the area is associated with traps (creels and pots), averaging around 816 fishing days per year in this rectangle. This is significantly more effort than dredging (241 days per year) or trawling (56 days per year). There is some inter-annual variation (Figure 12-3) but this pattern is consistent over time;

- A total of 39 different fish and shellfish species were landed by commercial fishing vessels from rectangle 40E3 over this period;
- The most abundant species caught in this rectangle were brown crab (Cancer pagurus, or C.P in the figures below), averaging around 520t per year (see Figure 12-4); and
- Brown crab were also the most valuable catch from this rectangle, with a first sale value of around £1.1M per year (see Figure 12-5).

Figure 12-3 Annual fishing effort for different fishing methods used within ICES Rectangle 40E3 for the Period 2017-21 (Marine Scotland, 2022a)

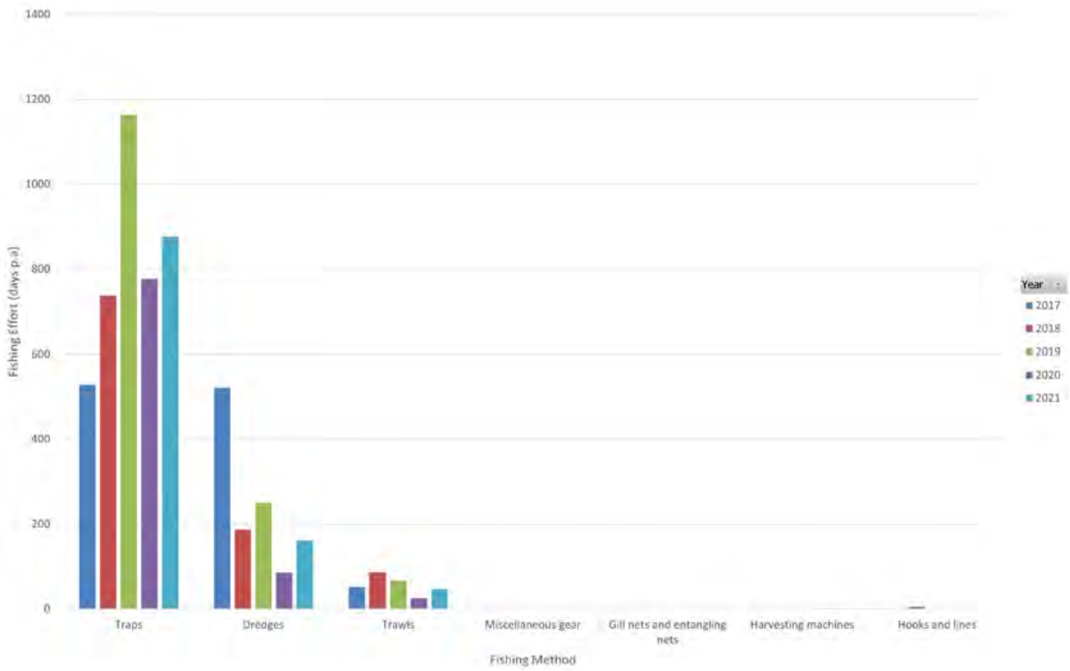


Figure 12-4 Annual landings (tonnes) of "Top 10" fish and shellfish caught within ICES Rectangle 40E3 for the period 2017-21 (Marine Scotland, 2022a)

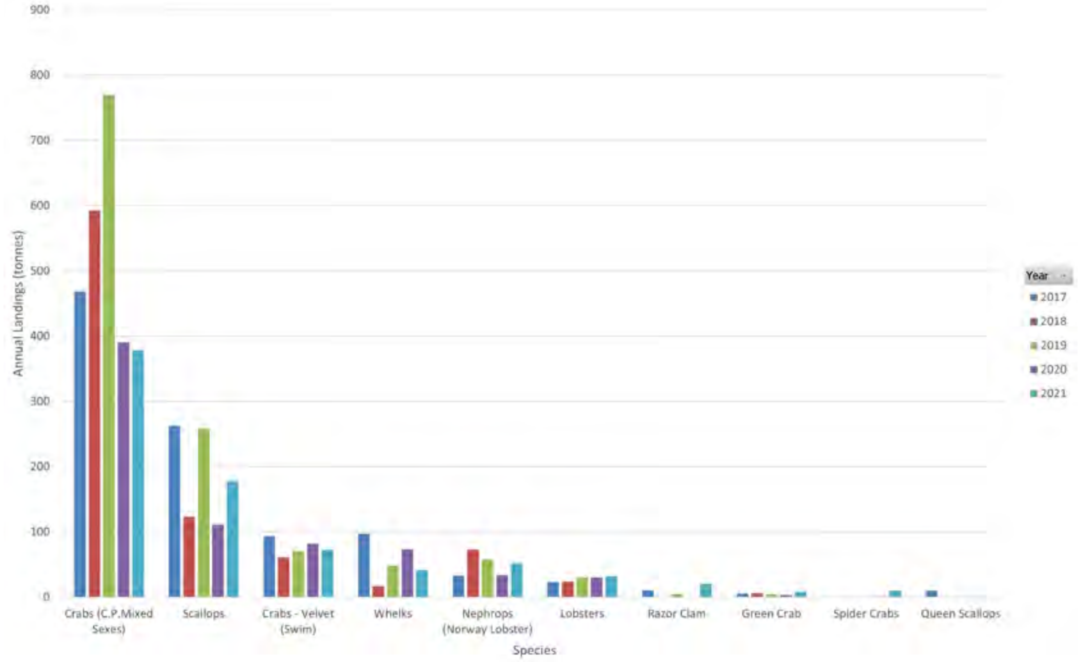


Figure 12-5 Value of Annual Landings (£) of "Top 10" Fish and Shellfish Caught within ICES Rectangle 40E3 for the Period 2017-21 (Marine Scotland, 2022a)

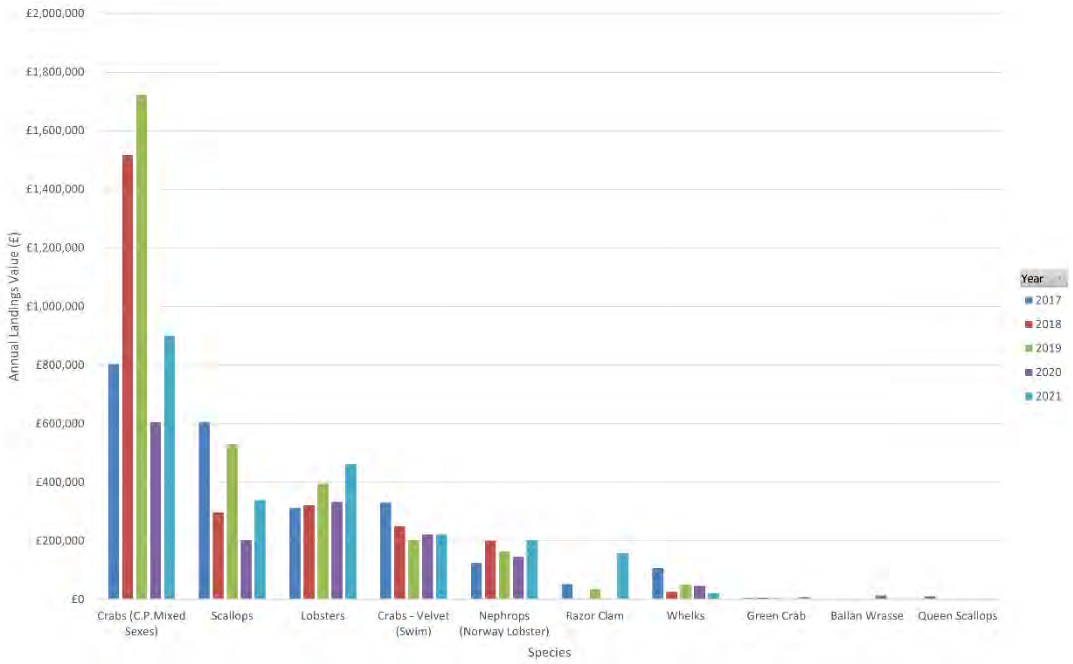


Table 12-1 Annual landings (Tonnes Weight and Value) of fish and shellfish caught within ICES Rectangle 40E3 for the period 2017-21, sorted by mean value over this period (Marine Scotland, 2022a)

Species	2017		2018		2019		2020		2021		Mean	
	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value
Brown crab (C.P.Mixed Sexes)	468.4	£803,066	592.6	£1,516,940	770.3	£1,722,873	390.5	£605,390	378.0	£901,293	520.0	£1,109,913
Scallops	262.6	£604,519	123.1	£297,603	257.5	£530,239	110.7	£203,136	177.8	£340,773	186.4	£395,254
Lobsters	23.2	£311,953	23.7	£322,439	30.3	£394,320	30.3	£333,138	32.3	£462,287	28.0	£364,828
Crabs - Velvet (Swim)	93.3	£330,083	60.6	£249,448	70.9	£202,843	82.4	£221,801	72.0	£222,388	75.8	£245,313
Nephrops (Norway Lobster)	33.0	£125,193	72.7	£201,175	57.5	£163,865	33.5	£146,674	52.0	£202,686	49.8	£167,919
Razor Clam	10.2	£52,049	0.4	£3,565	4.8	£34,955	0.5	£3,150	20.5	£158,471	7.3	£50,438
Whelks	97.4	£107,130	16.8	£25,652	48.3	£50,756	73.1	£46,372	41.4	£21,821	55.4	£50,346
Green Crab	5.6	£4,681	5.9	£5,307	4.5	£4,358	3.6	£3,216	8.0	£7,799	5.5	£5,072
Ballan Wrasse	0	£-	0	£-	0	£-	0.1	£13,427	0	£-	0.0	£2,685
Queen Scallops	9.8	£10,739	0.9	£1,158	0	£-	0	£-	0	£-	2.1	£2,379
Spider Crabs	0.3	£454	0.0	£19	0.2	£59	1.1	£1,138	9.8	£4,085	2.3	£1,151
Brown Shrimps	0	£-	0.0	£36	0	£-	0	£-	0.1	£3,108	0.0	£629
Goldsinny-wrasse	0	£-	0	£-	0	£-	0.0	£2,884	0	£-	0.0	£577
Rock cook	0	£-	0	£-	0	£-	0.0	£2,063	0	£-	0.0	£413
Crawfish	0.0	£-	0.0	£-	0.0	£-	0.0	£1,036	0.0	£362	0.0	£280
Monks or Anglers	0.0	£34	0.4	£890	0.1	£449	0	£-	0	£-	0.1	£275
Thornback Ray	0	£-	0.4	£520	0.9	£780	0	£-	0	£-	0.3	£260
Corkwing wrasse	0	£-	0	£-	0	£-	0.0	£1,279	0	£-	0.0	£256
Haddock	0.0	£11	0.6	£868	0.0	£9	0	£-	0	£-	0.1	£178
Turbot	0.0	£82	0.0	£227	0.0	£56	0	£-	0.2	£448	0.1	£163
Lobster - Squat	0.0	£45	0.1	£503	0	£-	0.0	£66	0.0	£142	0.0	£151

Species	2017		2018		2019		2020		2021		Mean	
	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value	Tonnes landed	Value
Sole	0.0	£22	0.2	£513	0.0	£5	0	£-	0	£-	0.0	£108
Wrasses	0	£-	0	£-	0	£-	0.0	£257	0	£-	0.0	£51
Lemon Sole	0.0	£23	0.0	£94	0.0	£125	0	£-	0	£-	0.0	£48
Brill	0.0	£26	0.0	£140	0.0	£33	0	£-	0	£-	0.0	£40
Mixed Crabs	0	£-	0	£-	0	£-	0	£-	0.0	£97	0.0	£19
Gurnards - Red	0	£-	0.1	£95	0	£-	0	£-	0	£-	0.0	£19
Witch	0.0	£3	0.1	£65	0.0	£5	0	£-	0	£-	0.0	£15
Cod	0	£-	0.0	£65	0	£-	0	£-	0	£-	0.0	£13
Megrim	0.0	£2	0.1	£53	0.0	£10	0	£-	0	£-	0.0	£13
John Dory	0.0	£6	0.0	£17	0.0	£34	0	£-	0	£-	0.0	£12
Hake	0.0	£6	0.0	£20	0	£-	0	£-	0	£-	0.0	£5
Pollack	0	£-	0.0	£24	0	£-	0	£-	0	£-	0.0	£5
Ling	0	£-	0.0	£1	0.0	£9	0	£-	0	£-	0.0	£2
Whiting	0	£-	0.0	£9	0	£-	0	£-	0	£-	0.0	£2
Squid	0	£-	0.0	£9	0	£-	0	£-	0	£-	0.0	£2
Plaice	0	£-	0.0	£5	0.0	£2	0	£-	0	£-	0.0	£1
Halibut	0	£-	0	£-	0.0	£2	0	£-	0	£-	0.0	£0
Skates and Rays	0	£-	0.0	£0	0	£-	0	£-	0	£-	0.0	£0
Grand Total	**1,003.8**	**£2,350,125**	**898.9**	**£2,627,462**	**1,245.7**	**£3,105,787**	**726.0**	**£1,585,028**	**792.2**	**£2,325,760**	**933.3**	**£2,398,832**

12.3.2 Local Knowledge

The small size of the ÒnM project area (0.64km²) relative to the ICES rectangle (a sea area of 2,792km²) means that site-specific information from local fishing operators and organisations will be vital for the assessment of effects and design of mitigation measure.

Interviews with individual fishers and their representative organisations for the wider region will be carried out to ensure that the EIA is well informed. In addition, Nova has found that early discussion with local fishers can be of great benefit in informing the overall design of its tidal projects, such as where to place turbines to make best use of the energy resource while avoiding conflict with existing activities like potting.

At this stage in the process the following sources of local knowledge have been identified:

- **Clyde Fishermen's Association (CFA)** – this is a representative body for fishermen in the Firth of Clyde and adjacent waters. A project description has been shared with the CFA and arrangements to discuss the Project and potential effects on local fishing are in hand.
- **Scottish Creelers and Divers (SCAD)** – this is a representative body for creelers and divers. A Project description has been shared with SCAD and arrangements to discuss effects are in hand.
- **Islay Crab Exports** – this is a commercial operation based on Islay at Glenegedale. A project description has been shared with this company, and its implications have been discussed. The company have provided contact details for some local fishermen.
- **West Coast Regional Inshore Fisheries Group (WCRIFG)** – this is one of five RIFGs in Scotland, which exist to improve the management of inshore fisheries, up to 12nmi offshore. WCRIFG covers the waters from Cape Wrath to the national boundary with England in the Solway Firth. A project description has been shared with WCRIFG and arrangements to discuss effects are in hand.
- **Local fishermen** – discussions have been held with local fishers operating out of Port Askaig. There are presently five full time and two part-time fishers based here, all with small potting vessels. They work in the waters around Islay, focussing on the northern part of the Sound of Islay during the winter months when this area provides sheltered, reliable and safe fishing opportunities. Project details have been shared with these fishers, and they have provided some initial feedback about the proposal.

The value of securing accurate and verifiable local knowledge is illustrated by the feedback from CFA for the SPR project in 2011, Section 12.3.4.

12.3.3 Vessel Tracking Information

The movements of fishing vessels in Scottish waters are monitored by Marine Scotland. This information can help to verify and confirm information provided by other sources. The movements of other vessels are outlined in Chapter 13.

There are two independent sources of information that may help to characterise fishing activity in and around the ÒnM site:

- **Vessel Monitoring System (VMS)** – it is a legal requirement for all vessels larger than 12m length overall (LOA) to be fitted with a working VMS transponder, which transmits a signal of the vessel's location, speed and heading to a satellite once every two hours (Scottish Government, 2018); and
- **Automatic Identification System (AIS)** – is a maritime navigation safety communications system adopted by the International Maritime Organization (IMO) to provide vessel information, primarily for the purposes of maritime safety. All fishing vessels larger than 15m LOA are required to transmit an AIS signal at all times when at sea (Marine Scotland, 2020). Smaller vessels have

discretion about the use of AIS and are often equipped with an AIS transmitter as a safety measure. Again, the AIS data show the vessel's location, speed and heading.

One of the key differences between VMS and AIS data is that VMS data can only be obtained by request from government, whilst AIS data are publicly available. Websites such as Marine Traffic (www.marintraffic.com) produce maps that show the location and past movements of commercial and leisure craft all around the world based on their AIS transmissions.

Fishing vessel tracks from both VMS and AIS sources can be used to determine where vessels are fishing. This process requires knowledge of the type of fishing activity that the vessels are carrying out – typically vessels moving at more than 5 knots are unlikely to be engaged in fishing activity. Trawlers and dredgers typically fish at speeds of between 2 and 5 knots; potting vessels typically fish at speeds of less than 2 knots. These thresholds can be used to produce maps that indicate where fishing vessels typically operate, and in recent years the processed information has been made available on websites such as Global Fishing Watch (www.globalfishingwatch.org).

Global Fishing Watch data for the wider region and study area are shown in Figure 12-6 to Figure 12-10. These figures show the amount of activity reported by AIS transmitters on fishing vessels over the period 1st January 2018 to 5th November 2022, plotted on a grid of 0.5km² cells to create a "heat map" of fishing activity. The key points to note are:

- Most of the fishing effort (by all methods) around Islay is located in the Sound of Jura and off Rhinn Point (Figure 12-6);
- Most of the fishing around Islay with pots and traps takes place off Rhinn Point on the west coast of Islay (Figure 12-9); and
- Very little fishing effort is reported by AIS over this 5-year period within the Sound of Islay (Figure 12-10).

Figure 12-6 All fishing methods: Map of Apparent Fishing Effort (hours fished per 0.5km²) From Automatic Identification System (AIS) data, January 1st 2018 to November 5th 2018 (Global Fishing Watch, 2022)

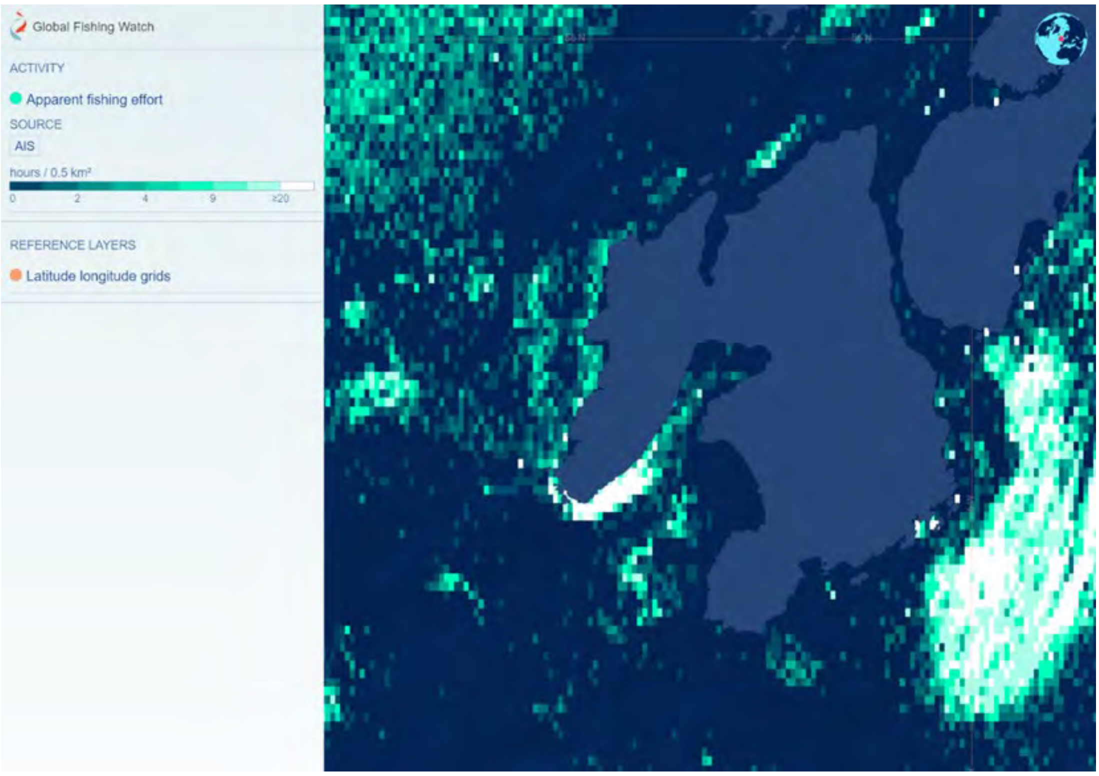


Figure 12-7 Pots and Traps: Map of Apparent Fishing Effort (hours fished per 0.5km²) from Automatic Identification System (AIS) data, January 1st 2018 to November 5th 2018 (Global Fishing Watch, 2022)

Figure 12-8 All Fishing Methods: Detailed Map of Sound of Islay Showing Apparent Fishing Effort (hours fished per 0.5km²) from Automatic Identification System (AIS) data, January 1st 2018 to November 5th 2018 (Global Fishing Watch, 2022)

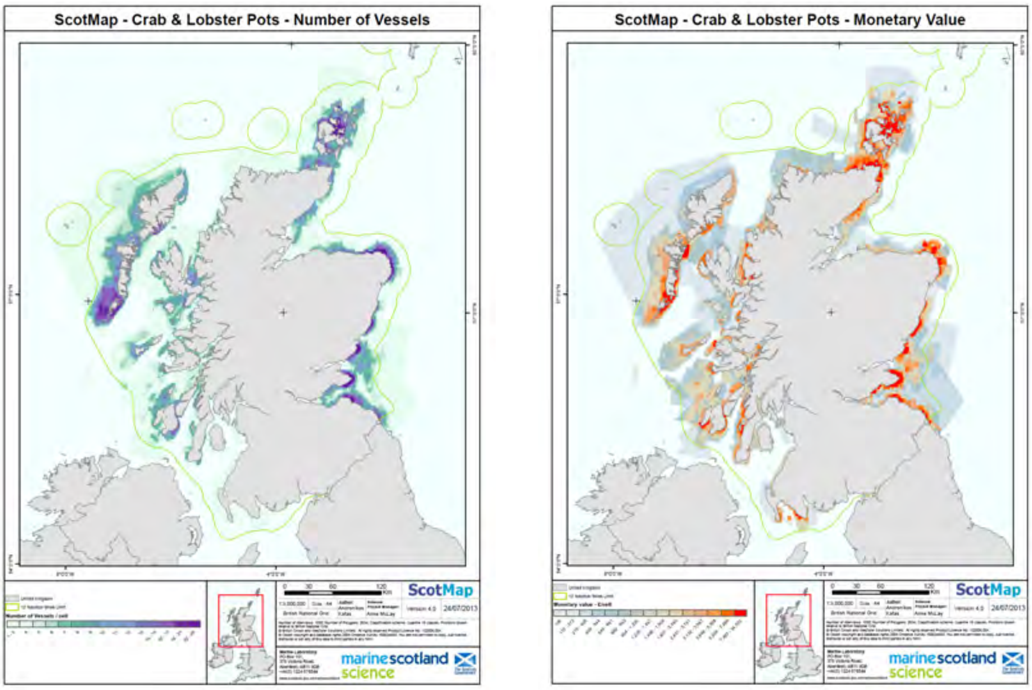
These AIS data can be taken as an indication of relative fishing effort by larger fishing vessels which are required to transmit an AIS signal. These data do not conclusively describe the level fishing activity within the ÒnM Project area. AIS transmitters are not mandatory on small vessels which may be operating in this area, and also AIS transmitters can be switched off. Small vessels could, therefore, have been active in this area without leaving an AIS record. This observation underlines the importance of direct consultation with local fishers.

12.3.4 Historical Data

Some historical data are available that may help to validate information gathered from local fishers and stakeholders. Two studies conducted by Marine Scotland several years ago may be useful, and are summarise briefly here.

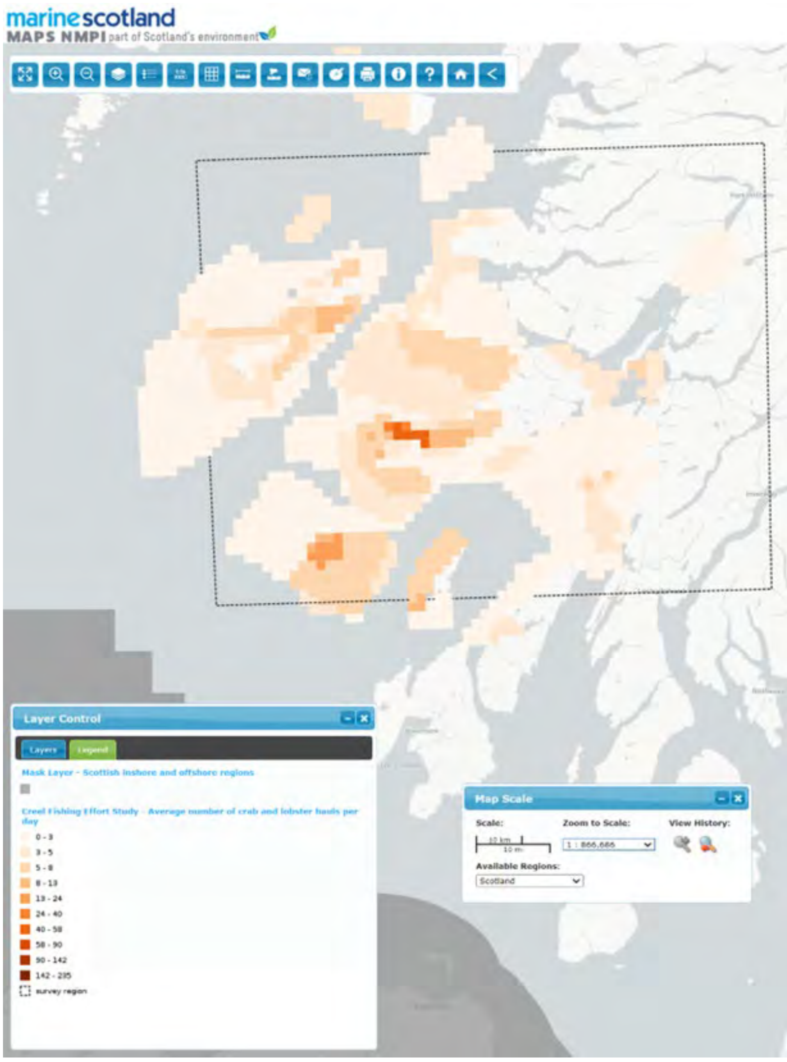
In 2014, Marine Scotland published a series of maps as part of the "ScotMap" inshore fisheries management project (Kafas et al., 2014). These maps were based on interviews with over 1,000 fishers from registered commercial fishing vessels less than 15m LOA (i.e., vessels that were not at that time and are still not legally obliged to carry AIS or VMS equipment). ScotMap considered all fishing métiers (trawling, dredging, potting, netting etc), and presents maps showing the intensity of fishing activity by these smaller vessels around the Scottish coastline as well as the monetary value associated with this activity. The broadscale pattern of activity is shown in Figure 12-9.

Figure 12-9 Maps showing number of vessels smaller than 15m fishing for crab and lobster in Scottish Waters (left) and the monetary value of catches (right) Based on interviews with over 1,000 fishers between 2007-2011 (Kafas et al., 2014).



A further study of fishing activity by smaller inshore fishing vessels was carried out by Marine Scotland in the period 2015-16. This project involved interviewing 198 creel vessel skippers from two regions on the west coast and two regions on the east coast (Marine Scotland, 2017a), and presents a map of fishing effort as the number of creel hauls per day. The data are available on the Scottish National Marine Plan interactive (NMPi) website. Unfortunately, these data only extend to the most northern part of the Sound of Islay, and do not appear likely to be useful for assessing effects of this project.

Figure 12-10Maps showing results of Marine Scotland Creel Fishing Effort Study and the extent of the survey region, from the Marine Scotland National Marine Plain Interactive Website (Marine Scotland, 2017b)



A review of published literature will be carried out during the production of the EIAR to identify other sources of historical data that may information this assessment.

12.3.5 Other Tidal Energy Projects

The proposed ÒnM project is one of four tidal energy proposals located around Islay. The location of the other projects is shown in Figure 12-11. The other three proposals have all received consent from MS-LOT (Section 2.6.2 for further details).

The supporting environmental statements for these projects and the stakeholder feedback for them is a useful source of information and is relevant both to the assessment of potential effects due to ÒnM and also assessing the cumulative impact of the tidal energy projects around Islay.

Figure 12-11 Location of current and extant tidal energy projects around Islay. Location data from Marine Licences for each project, held on the Marine Scotland Marine Licence database (Marine Scotland, 2022b)

Two of the projects, Flex Marine and SPR, are located in the Sound of Islay, roughly 4km and 1.3km respectively to the south of ÒnM. The West of Islay project is located approximately 6km WSW from Rhinn Point and just over 37km from ÒnM.

The distance between the West of Islay project and ÒnM means that cumulative impacts on commercial fishing activity are unlikely to occur, and also that the character of commercial fishing activity between these two sites is likely to be quite different (these assumptions will both be validated during the EIA process). Nevertheless, both the Scoping Report prepared for this project and the Scoping Opinion from MS-LOT indicate that it was anticipated to have little or no adverse effect on commercial fishing activity (DP Marine Energy Ltd, 2009; MS-LOT, 2018).

The close proximity between ÒnM and the other two proposals for the Sound of Islay means that the character of fishing activities are likely to be similar, and that cumulative impacts might also occur. The key points that are evident from preliminary analysis of the supporting information for these projects are:

- SPR – the environmental statement for this project considered that the Sound of Islay was fished by around 10 local vessels, principally using static fishing gear (lobster pots and creels) and with little or no fishing by scallop dredgers or Nephrops trawlers (SPR, 2010). Effects were anticipated to be minor. These findings were vigorously disputed by the Clyde Fishermen's Association (Clyde Fishermen's Association, 2011) whose concerns included that the importance of fishing activity in the Sound had been underestimated; that the scallop diving fishery had been overlooked; and that the safety risks that the Project may post to fishermen had been ignored.
- Flex Marine / Islay Community Demonstration Project – the Environmental Management Plan for this project used vessel movement (AIS) data to support a conclusion that the Project will have no effect on commercial fishing activity (Aquatera, 2021). No fishing vessels were observed operating

in the Project area during two periods of two weeks in Winter 2020 (1st-15th December) and Summer 2021 (15th-29th July). These views do not appear to have been challenged.

The ÒnM Project has more similarities to the SPR proposal than the Flex Marine proposal. Thorough and early engagement with the local fishing community to inform the assessment of the effects of the Project on Commercial Fisheries in the EIA, as well as Project design will be pursued for ÒnM.

12.3.6 Baseline

Based on the information that is presently available for the wider region, study area and ÒnM Project area, the baseline conditions appear to be as follows:

Table 12-2 Summary of baseline conditions for Commercial Fishing

Item	Scale	Description
Number of operators	Wider region	Inshore fishing vessels based on Islay Larger scallop dredgers and Nephrops trawlers, some local, many from outside area.
	Study Area	~10 inshore fishing vessels based on Islay.
	the Project area	~10 inshore fishing vessels based on Islay.
Fishing methods	Wider region	Mobile gear (trawling / dredging) for Nephrops and scallops. Static gear (creels) for Nephrops, lobsters, crab species. Diving for scallops, razorfish
	Study Area	Some dredging at northern and southern end of Sound. Static gear and diving within Sound.
	the Project area	Static gear (pots)
Target species	Wider region	Crabs, lobsters, scallops, Nephrops.
	Study Area	Crabs, lobsters, scallops, Nephrops.
	the Project area	Brown crabs, velvet crabs, lobsters.
Value of catch	Wider region	£2.3M per year (all species)
	Study Area	TBC, following discussion with local fishers.
	the Project area	TBC, following discussion with local fishers.

It is anticipated that the data sources identified in this Scoping Report, and in particular local fishers and their representative bodies will enable the “TBC” descriptors to be quantified.

12.4 Early Consultation Responses

The Project details have been shared with several organisations. The pre-Christmas rush has thwarted efforts to progress discussions. Arrangements are in hand to speak to all of the organisations listed below and provide an update in early January 2023.

Table 12-3 Early consultation responses from fisheries stakeholders

Consultee	Date	Response
Islay Crab Exports	November 2022	Consultee provided contact details for 3 local fishers who may be operating in the study area / Project area.
Clyde Fishermen's Association	January 2023	CFA Executive Secretary confirmed that CFA vessels operate in the area, and that squeeze on fishing grounds from renewable energy and aquaculture projects is a significant issue. Key concerns from the CFA at this stage would be adequate mitigation for the loss of fishing opportunity.
Scottish Creelers & Divers	December 2022	No response to date.
West Coast Regional Inshore Fisheries Group	December 2022	No response to date
Local Fishers	December 2022 – January 2023	Seven local fishers (5 working commercially, 2 semi-retired) have been interviewed. All made similar comments:- ▪ Over the winter months the Sound is an important fishing area for local potting / creeling boats based in Port Askaig; ▪ The main target species are lobsters, crabs and velvet crabs; ▪ Most of the fishing activity is in shallow water along the sides of the Sound, but on neap tides some vessels fish in the more central areas right across the Sound; ▪ Fishing gear is regularly lost, and the tide may carry it some distance (several miles) through the Sound. Lost gear that has been observed includes locally deployed pots; Nephrops trawl nets; and even Spanish longline gear that has been carried into the area.

12.5 Relevant Guidance and Assessment Tools

The EIA shall be carried out in accordance with the following guidance:

- Good Practice Guidance for assessing fisheries displacement by other licensed marine activities (Scottish Government, 2022)

- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (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);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015).

It is anticipated that the Commercial Fisheries section of the EIA will be completed through a combination of analysis of existing datasets (including those summarised in Section 12.3) and interviews with stakeholders (including those listed in Table 12-3). It is not anticipated that any field survey work will be carried out for this part of the EIA.

12.6 Design Parameters

12.6.1 Key Design Parameters

The commercial and local fisheries scoping assessment is based on the key assumptions, which are set out in Chapter 5 (The Project).

12.7 Potential Project Effects

Commercial fisheries could potentially be affected in a number of ways by tidal arrays. The three main effects are likely to be: disturbance of fishing grounds, displacement of fishing vessels (as outlined in the Scottish Marine Renewables SEA (Scottish Executive, 2007)) and safety implications for the fishermen.

Other potential effects identified in the SEA that could affect commercial fishing through their effect on fish and shellfish stocks are marine noise, electromagnetic fields (EMF), changes in suspended sediment, contamination, smothering, increased turbidity and changes in hydrodynamic regime. These will each be addressed in the appropriate chapter of the EIAR and are not currently considered here.

12.7.1 Potential Effects

Table 12-4 details the potential effects of the ÒnM Project on Commercial and Local Fisheries. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. These effects reflect the issues identified in the Scottish Marine Renewables SEA (Scottish Executive, 2007) the concerns that were raised by the Clyde Fishermen's Association in connection with the SPR proposal in 2011 (Clyde Fishermen's Association, 2011) and Nova's experience of fisheries interactions at the Shetland Tidal Array.

Table 12-4 Potential Effects of the Project on Commercial Fisheries

Potential Effect	Project Phase	Rationale and Commentary
Disturbance of fishing grounds	All Phases	The Project has the potential to disturb areas that are fished, either preventing subsequent fishing activity or adversely affecting the fish / shellfish in the disturbed area. However, the Project will have a small footprint so likely disturbance of fishing grounds is low. Construction and decommissioning methods for turbines are low effect. Installation of inter-array and export cables may involve burial and / or rock protection, which could affect fishing grounds at a small scale. Disturbance of fishing grounds is likely to be proportional to the relatively small extent of the ÒnM Project area (0.64km^2) relative to the Sound of Islay study area (47km^2). **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Displacement of fishing vessels	Operation	The Project may prevent fishing vessels from fishing in areas where they currently operate. For example, any safety exclusion zone required around construction or decommissioning work may cause displacement (though safety exclusion zones have not been required around Nova's Shetland Tidal Array in Bluemull Sound). Once turbines are installed, it is anticipated that fishing will not be possible within the ÒnM Project area. There could be a safety zone around the ÒnM Project area to minimise risks to fishing vessels and also to reduce the risk of static fishing gear (pots) drifting into the array area. However, safety exclusion zones have not been required around Nova's Shetland Tidal Array in Bluemull Sound. **This potential effect will be scoped into the EIA.**
Effects on vessel safety	All Phases	Safety concerns may result in the exclusion of fishing vessels from an area around the ÒnM Project area during the construction, operation and decommissioning phases (see displacement effects above). **This potential effect will be scoped into the EIA.**
Toxic contamination through accidental chemical release from turbines.	All Phases	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. **This potential effect has been scoped out of the EIA.**
Toxic contamination through accidental hydrocarbon or chemical release from survey, installation, maintenance and decommissioning vessels.	All Phases	Control measures and oil/chemical pollution emergency plans (SOPEPs) will be in place and adhered to under MARPOL Annex I requirements for all Project vessels, and where applicable, to intertidal equipment, as discussed in Chapter 9. These best practices will ensure the likelihood of an accidental oil or chemical release significantly impacting benthic communities to be very low. Chemical pollution could occur intermittently through the lifetime of a project through re-

Potential Effect	Project Phase	Rationale and Commentary
		suspension of contaminants from sediment, release of anti-fouling substances, and vessel related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey *et al.,* 2014; Maxwell *et al.,* 2022). All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) and will follow an EMMP to reduce risk of effect. The tidal conditions at the site mean small spills will quickly disperse and therefore will have a limited interaction with Commercial and Local Fisheries. **This potential effect has been scoped out of the EIA.**
Increased suspended sediment concentrations and associated sediment deposition	All Phases	Potential risk of temporary increase in suspended sediment concentrations and associated sediment deposition from cable and foundation installation, decommissioning and maintenance. This risk is deemed to have a low effect for Commercial and Local Fisheries due to the high tidal nature of the study area and installation technique (i.e., gravity bases). **This potential effect has been scoped out of the EIA.**

This list of effects will be refined through consultation with local commercial fishing interests during the preparation of the EIA.

12.7.2 Cumulative Impacts

Cumulative impacts may occur when other activities taking place in the area could also effect on the commercial fishing activities within the study area and the Project area.

The key sources of cumulative impacts are likely to be the two other tidal energy projects located within the Sound of Islay (see Figure 12-11). The effects of each project are likely to be identical for any existing commercial fishing activity in each site.

Table 12-5 Cumulative Impact table

Cumulative Impact	Construction	Operation	Decommissioning
SPR Sound of Islay project	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.	Effects are likely to be similar to ÒnM, and cumulative.
Flex Marine	ES for this project indicates no effect on fishing activity so no cumulate effect is anticipated.	ES for this project indicates no effect on fishing activity so no cumulate effect is anticipated.	ES for this project indicates no effect on fishing activity so no cumulate effect is anticipated.
West of Islay	This project is located outside the Sound of Islay, cumulative impacts are unlikely.	This project is located outside the Sound of Islay, cumulative impacts are unlikely.	This project is located outside the Sound of Islay, cumulative impacts are unlikely.

The risk and scale of cumulative impacts from other tidal energy projects in the study area (and indeed any other infrastructure projects or human activities) will be discussed with commercial fishery stakeholders during the preparation of the EIA for the Project.

12.7.3 Transboundary Effects

Transboundary effects (i.e., effects on other jurisdictions) are not considered likely to occur for a project of this scale and nature. The risk of transboundary effects arising will be further evaluated during the EIA process.

12.8 Mitigation Measures

The key mitigation measure with respect to Commercial Fisheries is considered to be effective and proactive fishery liaison. The purpose of this liaison will be to ensure that the development is carried out, as far practicable, in a manner that minimises disruption to fishing activity in the study area and ÒnM Project area.

Effective communications between the Project and fishermen from an early stage in the Project will be very important. Taking the example of the Nova project at Bardsey Island in North Wales, the Project team met with local fishers to minimise overlap between turbines and fished areas; and for a project in Canada the Nova team ensured that construction activity was minimise during the lobster fishing season.

Appropriate liaison with relevant fishing interests will ensure that they are fully informed of development planning and any offshore activities and works. This early dialogue will help ensure that, where possible, any disruption to or conflict with fishing activity is designed out of the Project at an early stage.

Other key aspects of fishery liaison and mitigation shall include:

- Timely issue of notifications including Notice to Mariners (NtMs), Kingfisher Bulletin notifications and other navigational warnings to the fishing community to provide advance warning of project activities and associated Safety Zones and advisory safety distances; and
- Development, prior to construction, of a "Fisheries Liaison and Co-Existence Plan", setting out in detail the planned approach to fisheries liaison and means of delivering any other relevant mitigation measures. It is intended that a draft of this plan be submitted at the point of consent application.

Other mitigation measures that will be put in place, or considered if the need is identified through fisheries liaison may include:

- All turbines will be non-surface piercing, so it is not anticipated that marking or lighting will be required.
- If temporary marking or lighting is required during construction, maintenance or decommissioning activities these will be in accordance with relevant industry guidance and as advised by relevant stakeholders including MS-LOT, Civil Aviation Authority (CAA) and the Northern Lighthouse Board (NLB).
- "As deployed" positions of infrastructure will be provided to UKHO for inclusion in marine charts and other UKHO products.
- Tidal devices will be monitored remotely, and alerts triggered if there are indications of damage or potential loss of station. A response and recovery plan will be in place detailing the action to be taken in the event of loss of station of a device or a component part; and
- Cable burial will be considered in areas where the need is identified, and the method is feasible.

12.9 Proposed Approach to EIA

During the EIA full acquisition and analysis of the baseline data summarised in Section 12.3 will be undertaken.

Data analysis will be corroborated and complemented by consultation and engagement with local commercial fishers and representative organisations, most of which are listed in Table 12-3.

Consultation with stakeholders will both seek to validate the baseline and existing evidence to identify any stakeholder concerns that should inform the effect assessment for the Project.

13. SHIPPING AND NAVIGATION

13.1 Introduction

This chapter considers the potential effects on Shipping and Navigation that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It outlines the shipping and navigation users of relevance to the ÒnM Project which consist of commercial vessels including cargo vessels, tankers and passenger vessels, fishing vessels when on transit, and recreational vessels. Fishing vessels during active fishing are primarily considered within Chapter 12 Commercial Fisheries.

This chapter provides an overview of the baseline conditions at the site and the datasets which will be used to inform the Shipping and Navigation chapter of the EIA Report. It also describes the proposed methodology to be applied in the EIA to consider the potential direct and indirect effects on Shipping and Navigation that may arise from the construction, operation and decommissioning of the Project and outlines the approach to the Navigational Risk Assessment (NRA), which will be carried out as part of the EIA.

13.2 Receiving Environment

The study area for Shipping and Navigation users of relevance to the Project comprises the entire Sound of Islay, to capture the full range of the traffic which may pass close to or over the Project area. This captures the existing Crown Estate Scotland AfL area within which turbine would be deployed, and the different subsea cable corridor options being considered in the Sound of Islay.

13.3 Data Sources and Baseline

13.3.1 Data Sources

The data sources consulted during the preparation of this scoping chapter are presented in Table 13-1. It is noted that additional data sources may be considered during the EIA/NRA process in response to consultation responses or as required throughout the process of the assessment and further discussion with relevant stakeholders.

Table 13-1 Shipping and Navigation data sources

Source	Date	Summary
Winter vessel traffic data	9th – 22nd February 2022	AIS data [29]utilised in this Scoping Report
Summer vessel traffic data	18th -31st July 2022	AIS data utilised in this Scoping Report
United Kingdom Hydrographic Office (UKHO) Admiralty Charts	2022	Chart 2168 – Approaches to the Sound of Jura, Chart 2724 – North Channel to the Firth of Lorn

[29]The carriage of AIS is required on board all vessels of greater than 300 Gross Tonnage (GT) engaged on international voyages, cargo vessels of more than 500 GT not engaged on international voyages, passenger vessels irrespective of size built on or after 1st July 2002, and fishing vessels over 15m Length Overall (LOA). Smaller fishing vessels, recreational vessels and military vessels may be under-represented on AIS, although some broadcast voluntarily.

Source	Date	Summary
Marine Accident Investigation Branch (MAIB) Incident Data	2010-2019	Incident data provided by the MAIB.
Royal National Lifeboat Institution (RNLI) Incident Data	2010-2019	Incident data provided by the RNLI.
Navigational Safety Risk Assessment for Sound of Islay Demonstration Tidal Array (ScottishPower Renewables, 2013)	March 2013	Study carried out for previously planned Sound of Islay Demonstration Tidal Array located south of the AfL Area
Islay Community Demonstration Environmental Management Plan (Flex Marine Power, 2021)	November 2021	Study carried out for the planned Flex Marine Power single structure project located to the south of the AfL Area
Scottish Government Marine and Fisheries: Vessel Monitoring System (VMS)	2022	VMS[30] data showing the locations of fishing vessels within ICES rectangle 40E3

13.3.2 Baseline Environment

13.3.2.1 Navigational Features

The AfL Area lies within the Sound of Islay between the islands of Islay and Jura off the west coast of Scotland. The AfL Area lies approximately 0.7nm north of Port Askaig, about 125m off the coast of Islay at its closest point. The AfL Area encloses an area of approximately 0.19nm^2 (0.64km^2). Variousoptions are being explored for the subsea cable route to export the power generated by the turbines to shore at four landfall points on Islay and Jura, (Bunnahabhain, Ardnahoe, Caol Ila and Port Askaig) and one on Jura (Whitefarland Bay). All of the landfall options are described in more detail in Chapter 5 (The Project). The main port in the area is Port Askaig to the south, with an additional pier on Jura opposite Port Askaig at Feolin. A regular ferry operates between Port Askaig and Feolin.

There are three areas of subsea cables within the Sound of Islay, with the closest subsea cable located 0.7nm south of the AfL Area, running between Port Askaig and Feolin.

There is an anchorage located 0.9nm to the northwest of the AfL Area at Bunnahabhainn Bay, which is suitable for small vessels.

It is noted that military exercise areas are located at both ends of the Sound of Islay, with these being used for submarine and other naval exercises.

An overview of the navigational features surrounding the Sound of Jura is presented in Figure 13-1. The navigational features in proximity to the AfL Area are presented in Figure 13-2.

[30] All fishing vessels larger than 12m LOA are required to be fitted with a working VMS transponder, which transmits a signal of the vessel's location, speed and heading to a satellite once every 2 hours

Figure 13-1 Navigational overview of the Sound of Islay

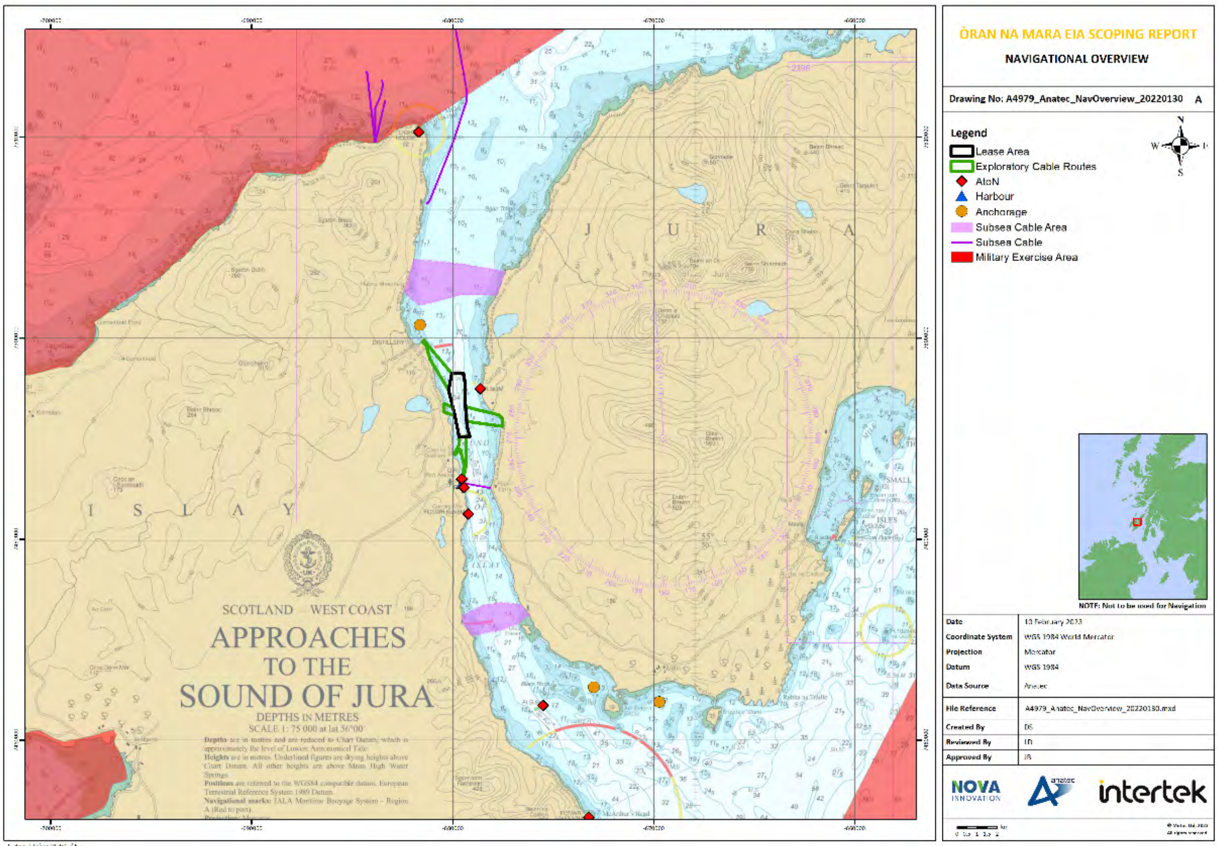
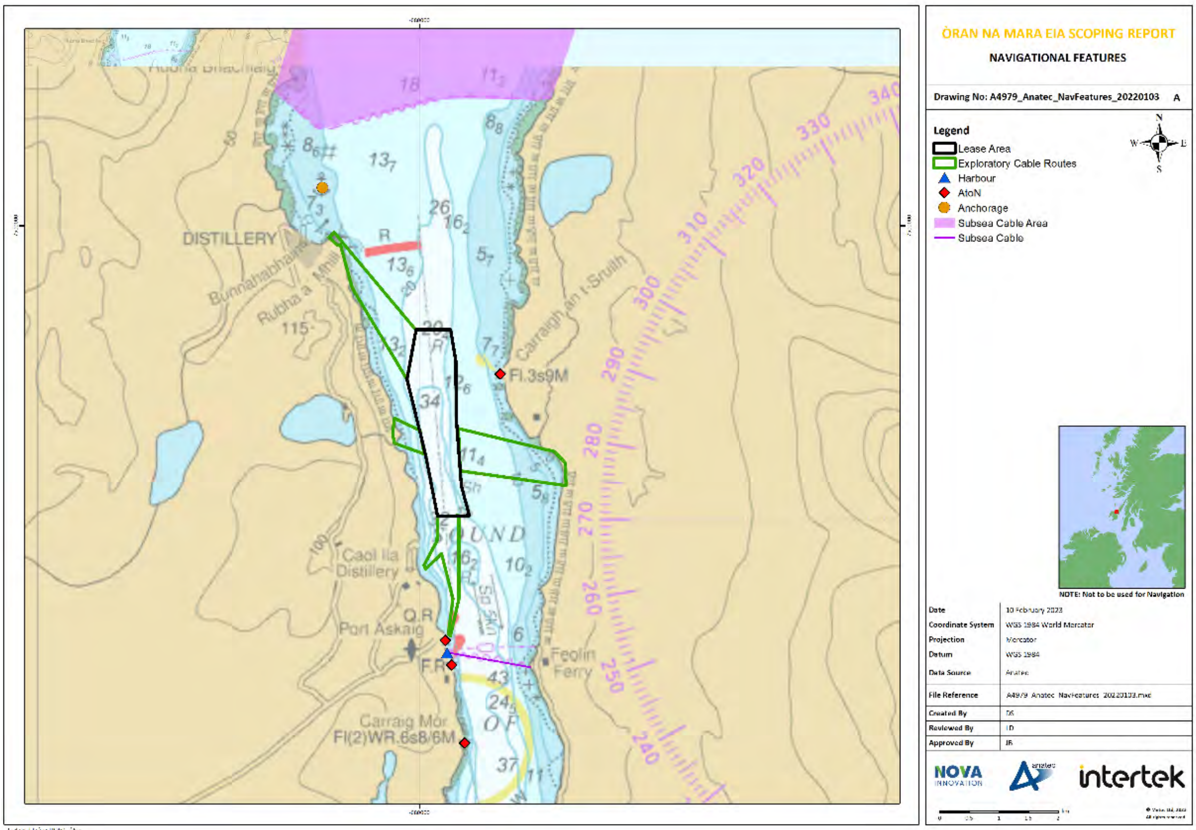


Figure 13-2 Navigational features within the Sound of Islay



13.3.2.2 Marine Traffic

This section identifies the vessel traffic baseline based on preliminary assessment of 28 days of AIS data. This comprises 14 days of winter AIS data from February 2022, and 14 days of summer AIS data from July 2022. Figure 13-3 presents the combined 28 days of AIS vessel traffic data colour-coded by vessel type within the Sound of Islay.

An overall average of seven unique vessels per day were recorded within the Sound, with a daily average of ten in summer and four in winter. The higher numbers in summer were predominantly due to recreational vessels. Just under half of all vessels recorded within the Sound were recorded passing within the AfL Area (averaging 3-4 per day).

The most common vessel types throughout the combined survey period were recreational, passenger and cargo vessels, each of which accounted for 24% of all vessels recorded in the Sound. The other vessels recorded in the Sound were fishing vessels (10%), tugs (4%), dredgers (2%) and a single military vessel. Vessels classed as "Other" made up 11% of all vessels and consisted of fish carriers, tour boats to the nearby Gulf of Corryvreckan and RNLI lifeboats.

The passenger vessels recorded within the Sound were primarily recorded heading to Port Askaig, with the majority of these vessels recorded in the southern part of the Sound. Some vessels were recorded passing north from Port Askaig, through the AfL Area.

Fishing vessels recorded on AIS within the Sound appeared to be transiting, noting that smaller fishing vessels below 15m in length are not required to carry AIS. VMS data revealed a cluster of fishing vessel positions in October and November 2022 near the anchorage at Bunnahabhain, 0.9nm to the north of the AfL Area. VMS covers fishing vessels 12m length and over.

Of vessels which broadcast a valid destination, 32% broadcast Port Askaig as their destination. Other common destinations were fishing grounds (7%), Oban (5%) and Kennacraig (4%).

The average ship length was 56m, with the longest vessel being a 129m cargo vessel. Given the nature of the Project, vessel draught will be a key consideration to ensure adequate under keel clearance. The average draught of vessels within the Sound of Islay during the survey period was 3.8m and the deepest draught was a 7.5m fish carrier. It is noted that in the north of the Sound of Islay there is shallow water of approximately 10-11m, which limits the possible draught of vessels passing through the Sound. The tracks of vessels recorded in proximity to the AfL Area are presented in Figure 13-4.

Considering only the subset of vessels that crossed the AfL Area, the most common type was cargo (41%), followed by fishing vessels (15%), "Other" vessels (15%) and passenger vessels (12%). The deepest draught vessel recorded within the AfL Area was 7.5m.

Figure 13-3 All Tracks by Vessel Types

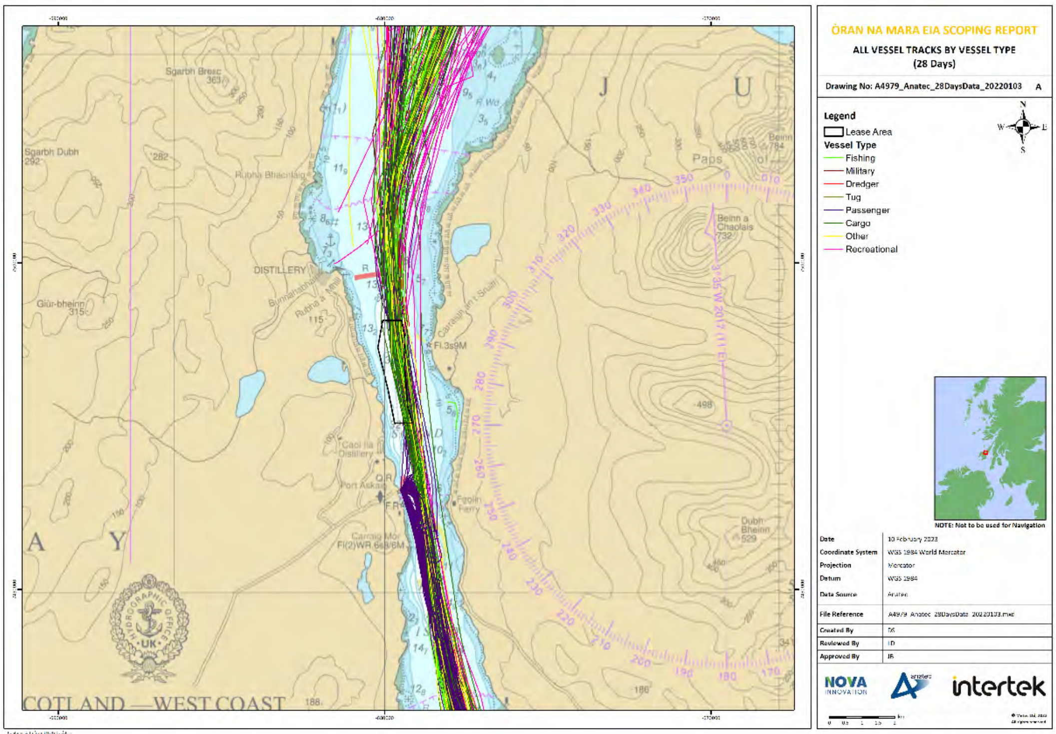
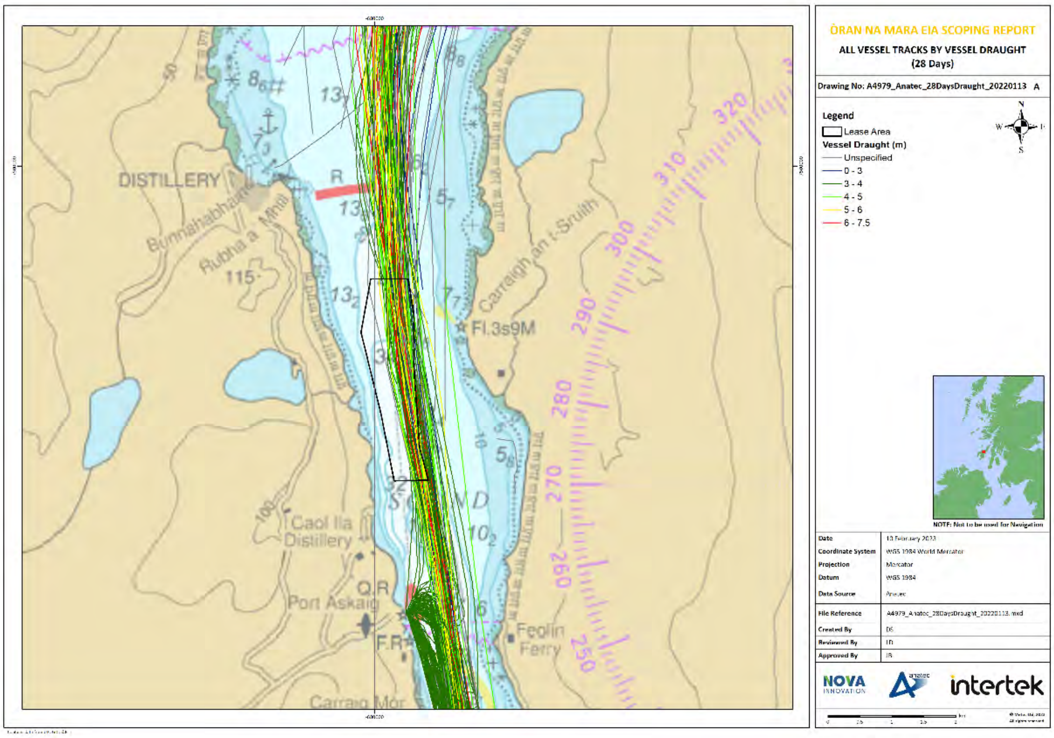


Figure 13-4 All Tracks by Vessel Draught



13.3.2.3 Maritime Incidents

MAIB data between 2010 and 2019 indicates that there were nine incidents reported within the Sound of Islay, with none of these occurring within the AfL Area. The closest incident occurred 0.6nm south of the AfL Area, off Port Askaig, and was an escape of harmful substance. The most common incident types were groundings and accidents to person, with three of each recorded during the period.

RNLI data for the same period was also investigated. The RNLI recorded 16 incidents within the Sound of Islay, none of which were within the AfL Area. The closest incidents were recorded 0.7nm to the south and were both groundings recorded at Feolin. The most common incident types were groundings, machinery failures and "person in danger" incidents, each with four incidents during the data period.

It is noted that the latest available ten-year period will be reviewed to inform the NRA.

13.3.2.4 Future Baseline

Future variations in shipping depend on a variety of complex factors, such as trading patterns, vessel design and local developments. As such, future shipping can be difficult to predict and the NRA will, therefore, consider a conservative increase which will be discussed with the relevant stakeholders during consultation.

13.4 Early Consultation Responses

A consultation meeting was held with the Maritime and Coastguard Agency (MCA) and the Northern Lighthouse Board (NLB) on 19th December 2022, to garner initial feedback on any concerns regarding the ÒnM Project and the proposed methodology to be used for the assessment. Comments made at this meeting are summarised in Table 13-2.

Table 13-2 Consultation responses from shipping and navigation stakeholders

Stakeholder	Point Raised
MCA	Consultation with the Ministry of Defence (MoD) to be considered given the presence of military vessels and exercise areas nearby.
MCA	Consultation with local clubs using personal craft (e.g., kayaks, jet-skis) to be carried out. RYA Coastal Atlas to be considered to inform understanding of recreational vessel activity.
NLB	Noted that larger vessels may be able to re-route around the Sound as a potential mitigation measure, which some already do due to the limiting water depth of around 10m within the Sound of Islay.
MCA / NLB	The streamlined approach to the assessment process utilising a full year of AIS data and covering non-AIS vessels using local data sources was approved.
MCA / NLB	No issues were raised with the proposed list of consultees, mitigation measures or effects to be assessed.

13.5 Relevant Guidance and Assessment tools

13.5.1 FSA Methodology

As required under the MCA Methodology (Annex 1 to MGN 654), and in line with international marine risk assessment standards, it is proposed that the IMO FSA approach will be applied for effect assessment. The FSA methodology is centred on risk control and assesses each effect in terms of its frequency of occurrence and severity of consequence in order that its significance can be determined as "broadly acceptable", "tolerable" or "unacceptable" via risk matrix as shown in Table 13-3.

Table 13-3 International Maritime Organisation (IMO) Formal Safety Assessment (FSA) Risk Matrix

Frequency	**Frequent**	**Tolerable**	**Tolerable**	**Unacceptable**	**Unacceptable**	**Unacceptable**
	Reasonably Probable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable	Unacceptable
	Remote	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable
	Extremely Unlikely	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable
	Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable
	Severity					

Severity and frequency will be determined via the NRA findings which will be based on various factors including:

- Quantitative modelling (via Anatec's COLLRISK software);
- Output of the baseline assessment including vessel traffic surveys;
- Consideration of embedded mitigation measures in place;
- Lessons learned from other tidal energy projects;
- Levels of stakeholder concern; and
- Outputs of consultation.

13.5.2 Legislation and Policy

The following relevant policy and legislation will inform the assessment:

- IMO (1972/77). Convention on the International Regulation for Preventing Collision at Sea (COLREGs) – Annex 3. London: IMO; and
- IMO (1974). International Convention for the Safety of Life at Sea (SOLAS). London: IMO.

13.5.3 Guidance

The following relevant guidance will inform the assessment:

- MCA (2021). MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response and its annexes. Southampton: MCA;
- MCA (2021). Annex 1 to MGN 654, Methodology for Assessing Marine Navigational Safety & Emergency Response Risks of OREI, Southampton: MCA;
- MCA (2021). Annex 5 to MGN 654. Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for SAR and Emergency Response. Southampton: MCA;
- IMO (2018). Revised Guidelines for Formal Safety Assessment (FSA). London: IMO;
- IALA (2021). R0139 and G11621: the Marking of Man-Made Offshore Structures. Edition 2. Saint Germaine en Laye, France: IALA; and
- RYA (2019). The RYA's Position on Offshore Energy Developments: Paper 3 – Tidal Energy. Southampton: RYA.

13.6 Design Parameters

13.6.1 Key Design Parameters

The Shipping and navigation scoping assessment is based on the key assumptions, which are set out in Chapter 5 (The Project).

13.6.2 Embedded Mitigation

Embedded mitigation measures are proposed to reduce the potential for effects on Shipping and Navigation. Proposed mitigation measures are listed in Section 13.8 noting that these may be added to or changed in response to the outcomes of the assessment and consultation.

13.7 Potential Project Effects

13.7.1 Potential Effects

Table 13-4 details the potential effects of the ÒnM Project on Shipping and Navigation. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA and NRA.

Table 13-4 Potential Effects of the Project on Shipping and Navigation

Potential Effect	Project Phase	Rationale and Commentary
Displacement of vessels leading to increased voyage distance or time.	All Phases	The Project may cause some localised vessel displacement caused by surface vessel activity during construction, maintenance and decommissioning. Notices to Mariners and Kingfisher Bulletins would be issued in advance of works and an ERCOP produced for approval by the MCA. It is not currently anticipated that any formal safety zone around the ÒnM Project area during offshore works will be required. Once turbines are installed, it is anticipated that there will be no need for vessel restrictions since the entire turbine structure is non-surface piercing, with no requirement for surface markers. This is similar to Nova's turbines in Bluemull Sound that have a minimum surface clearance of 15m at Lowest Astronomical Tide (LAT), with no navigational restrictions, allowing local traffic to pass directly over the array. The minimum clearance of turbines in the ÒnM Project will depend on the array layout and turbine size, which are to be determined, as well as assessment of the draughts of vessels using the Sound of Islay . **This potential effect will be scoped into the EIA and NRA.**
Restricted access to local ports/harbours.	All Phases	The presence of vessels on site during construction, maintenance and decommissioning activities may reduce access to local ports/harbours. However, the modular nature of Nova's turbines means that these and other offshore infrastructure can be installed and decommissioned quickly and easily, limiting the need for vessels to be present on site. Based on Nova's experience at the Shetland Tidal Array, it is anticipated that installation of the turbines can be achieved at the rate of one turbine per day, with the nacelle installed during a single slack water period. As such, the construction period is anticipated to be of short duration and will use primarily small 'multicat' work vessels. The minimum under water clearance of the turbines during normal operations is likely to be adequate for the vessels visiting the local ports and harbours. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA and NRA.**
Increased vessel to vessel collision risk.	All Phases	The additional vessel movements in the area and any associated vessel displacement during construction, maintenance and decommissioning activities could result in an increased hypothetical chance of vessel-to-vessel collision risk. However, Notices to Mariners and Kingfisher Bulletins would be issued in advance of works and an ERCOP produced for approval by the MCA. This, combined with the modular nature of Nova's turbines enabling quick and efficient installation and retrieval and the use of small workboats for offshore works for ÒnM all significantly mitigate this risk.

Potential Effect	Project Phase	Rationale and Commentary
		An adequate under water clearance for turbines will be determined during the NRA process to avoid significant changes in vessel routeing which could affect vessel-to-vessel encounters and hence collisions. **This potential effect will be scoped into the EIA and NRA.**
Increased vessel grounding risk due to vessel displacement.	All Phases	As stated above, the Project may cause some localised vessel displacement caused by surface vessel activity during construction, maintenance and decommissioning. Notices to Mariners and Kingfisher Bulletins would be issued in advance of works and an ERCOP produced for approval by the MCA. An adequate under water clearance for turbines will be determined during the NRA process to avoid significant changes in vessel routeing which could affect grounding risk. **This potential effect will be scoped into the EIA and NRA.**
Vessel hull interaction risk with turbines.	Operation	Once turbines are installed, it is anticipated that there will be no need for vessel restrictions since the entire turbine structure is non-surface piercing, with no requirement for surface markers. Nova's turbines in Bluemull Sound have minimum surface clearance of 15m at Lowest Astronomical Tide (LAT), with no navigational restrictions and local vessels able to pass directly over the array. The minimum clearance of turbines in the ÒnM Project will depend on the array layout and turbine size, which are to be determined, as well as assessment of the draughts of vessels using the Sound of Islay. **This potential effect will be scoped into the EIA and NRA.**
Anchor and/or fishing gear interaction with offshore Project infrastructure.	Operation	Once offshore Project infrastructure has been installed, 'as installed' coordinates will be provided to the UK Hydrographic Office (UKHO) to that Admiralty Charts can be update and information disseminated to all mariners. Safety zones have not been required around Nova's Shetland Tidal Array in Bluemull Sound but could be considered for ÒnM if deemed necessary and justified based on a risk assessment. **This potential effect will be scoped into the EIA and NRA.**
Navigational hazard caused by loss of station of offshore Project infrastructure.	All Phases	The design and configuration of offshore Project infrastructure will be robust such that it is reasonable to expect that it will hold station. In the unlikely event that there is any loss of station, any such incidents would be reported to the MCA, and appropriate measures, as instructed, would be taken. Any loss of station would be rectified as quickly as safely and reasonably possible by activating response and recovery procedures. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA and NRA.**

13.7.2 Cumulative Impacts

Cumulative effects on Shipping and Navigation resulting from the Project and other offshore developments, such as other tidal energy projects within the Sound of Islay, will be assessed within the NRA / EIA. All potential effects considered in isolation will be reassessed in terms of the potential for cumulative impacts.

- Offshore developments within an appropriate range will be screened in or out of the cumulative assessment based on a number of factors, including:
- Status of the cumulative development;
- Data confidence level;
- Proximity to cumulative developments; and
- Location relative to routeing passing the site.

Example effects from the Project which have the potential to act cumulatively with effects from other proposed developments to contribute to cumulative impacts include:

- Increased vessel-to-vessel collision risk resulting from cumulative displacement; and
- Reduced access to local ports, harbours and marinas.

13.7.3 Transboundary Effects

Transboundary effects associated with vessels transiting outside of the United Kingdom including to/from international ports will be considered within the assessment and cumulatively with the presence of other offshore developments and activities within the cumulative assessment.

13.8 Mitigation Measures

Embedded mitigation measures are proposed to reduce the potential for effects on Shipping and Navigation. These will develop as the EIA progresses including through consultation. They will feed into the assessment process. These measures typically include those that have been identified as good or standard industry practice, including actions that would be undertaken to meet existing legislation requirements.

Embedded mitigation measures proposed for the Project include:

- Appropriate marking of the Project on Admiralty Charts, including provision of the as-deployed positions and clearance depths of structures to the UKHO;
- Promulgation of information in advance of and following any offshore works including Notices to Mariners, Kingfisher Bulletins and Sailing Directions;
- Application for safety zones where appropriate and if required, including a safety zone of appropriate radius during construction, operations and maintenance, and decommissioning. Where appropriate, guard vessels will also be used to ensure adherence with safety zones or advisory passing distances;
- Minimum clearance will be dependent on array layout and turbine dimensions. Nova (and the NRA) will work to the principle that clearance will be at least the minimum required to avoid any unacceptable navigational issues, taking into consideration local traffic and bathymetry;
- Compliance with MCA MGN 654 and its annexes where applicable. MGN 654 includes the requirements to complete a Search and Rescue Checklist;

- Development of and adherence to a Development Specification and Layout Plan (DSLP), confirming the Project's layout and design parameters;
- All turbines will be non-surface piercing, so it is not anticipated that marking or lighting will be required. If temporary marking or lighting is required during construction, maintenance or decommissioning activities a Lighting and Marking Plan (LMP) will be developed, confirming compliance with legal requirements with regards to Shipping and Navigation marking and lighting;
- Cable burial will be considered in areas where the need is identified, and the method is feasible.
- A Marine Pollution Contingency Plan will be developed, outlining the procedures to protect personnel and the marine environment, and mitigation measures in the event of an accidental pollution event relating to the Project. Key emergency contact details are also included;
- Development of and adherence to a Navigation Safety and Vessel Management Plan (NSVMP). The NSVMP includes information on any required safety zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Project activity to other sea users, as well as confirming the types and numbers of vessels engaged on the Project. Vessel coordination including indicative transit route planning are also included;
- Tidal devices will be monitored remotely, and alerts triggered if there are indications of damage or potential loss of station. A response and recovery plan will be in place detailing the action to be taken in the event of loss of station of a device or a component part.
- Development of and adherence to a Cable Plan (CaP), confirming the planned cable route and any protection measures required; and
- Marine coordination and communication to manage project vessel movements.
- Additional mitigation measures may be required in addition to those listed above dependent on the findings of the NRA and in response to any consultation responses.

13.9 Proposed Approach to EIA

13.9.1 Data Sources to Inform the EIA Baseline Characterisation

13.9.1.1 Vessel Traffic Survey Data

Longer-term AIS data (at least 12 months) is likely to be required to fully capture seasonal variations in vessel traffic patterns and the range of vessel draughts recorded in the Sound. While it is recognised that AIS may not cover all smaller vessels such as small fishing vessels and recreational vessels, it is expected that any vessel with sufficient draught to be at risk of under keel interaction with the tidal devices during normal operations would broadcast on AIS. Smaller vessel activity will be identified using other data sources listed below.

13.9.1.2 Historical Incident Data

In order to ascertain the existing baseline in terms of maritime incidents in proximity to the ÒnM project area, the most recently available historical incident data from both the MAIB and the RNLI will be analysed. Other historical incident data may be included within the assessment in response to consultation or as it is discovered through the course of the assessment.

13.9.1.3 Desktop Data Sources

In addition to AIS survey data, a number of additional sources of data will inform on the existing baseline environment for the ÒnM project area. Noting that additional sources may be added in response to consultation or as the Project progresses, the proposed data sources include:

- United Kingdom Hydrographic Office (UKHO) Admiralty Charts;

- UKHO Admiralty Sailing Directions South-West Coast of Scotland Pilot NP66A, 2nd Edition;
- Navigational Safety Risk Assessment for Sound of Islay Demonstration Tidal Array (SPR, 2013);
- Islay Community Demonstration Environmental Management Plan (Flex Marine Power, 2021);
- RYA Coastal Atlas of Recreational Boating (RYA, 2019);
- Other sailing directions and almanacs, such as those published by the Clyde Cruising Club; and
- Nova's own Navigational Safety Risk Assessment for the Shetland Tidal Array in Bluemull Sound (Nova Innovation, 2019).

It is noted that the data sources to be considered include the navigational assessment work carried out for two previously consented tidal projects within the Sound of Islay.

13.9.1.4 Consultation

Consultation with key local and national stakeholders is proposed to form an accurate assessment of the baseline environment as well as to help identify and assess hazards. It is proposed that consultation will be held with the following:

- Maritime and Coastguard Agency (MCA);
- Northern Lighthouse Board (NLB);
- Royal Yachting Association (RYA) Scotland;
- Cruising Association;
- UK Chamber of Shipping;
- Regular Vessel Operators, e.g., Caledonian MacBrayne;
- Port Askaig Harbourmaster;
- RNLI (Islay Lifeboat Station);
- Argyll & Bute Council;
- Clyde Yacht Clubs Association;
- Clyde Cruising Club;
- West Highlands Anchorages and Mooring Association;
- Local Fishing Representatives (further details provided in Commercial Fisheries chapter);
- Local Water-Based Clubs, e.g., Kayak, Jetski; and
- Ministry of Defence.

As part of the consultation process, a hazard workshop may be held, if deemed appropriate, with local and national stakeholders present to guide the assessment of hazards identified throughout the NRA process.

13.9.2 Assessment Methodology

Likely significant effects (including those listed in Section 13.7) will be described and assessed in terms of their frequency and severity following the FSA methodology required under MGN 654 (as detailed in Section 13.5.1).

14. ARCHAEOLOGY AND CULTURAL HERITAGE

14.1 Introduction

This chapter considers the potential effects on Archaeology and Cultural Heritage that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It outlines the proposed approach to the assessment of these effects which will be carried out as part of the Project EIA.

The cultural heritage resource is defined as archaeological remains (known and unknown, scheduled or otherwise recorded) as well as built heritage assets (Listed buildings etc.) and some area designations such as inventoried historic landscapes and Conservation Areas.

As defined in the Marine (Scotland) Act 2010, Section 73 (5) marine cultural heritage consists of vessels, aircraft, parts of such, contents of such, buildings and other structures, caves, deposits, artefacts or any other thing or groups that evidence previous human activity.

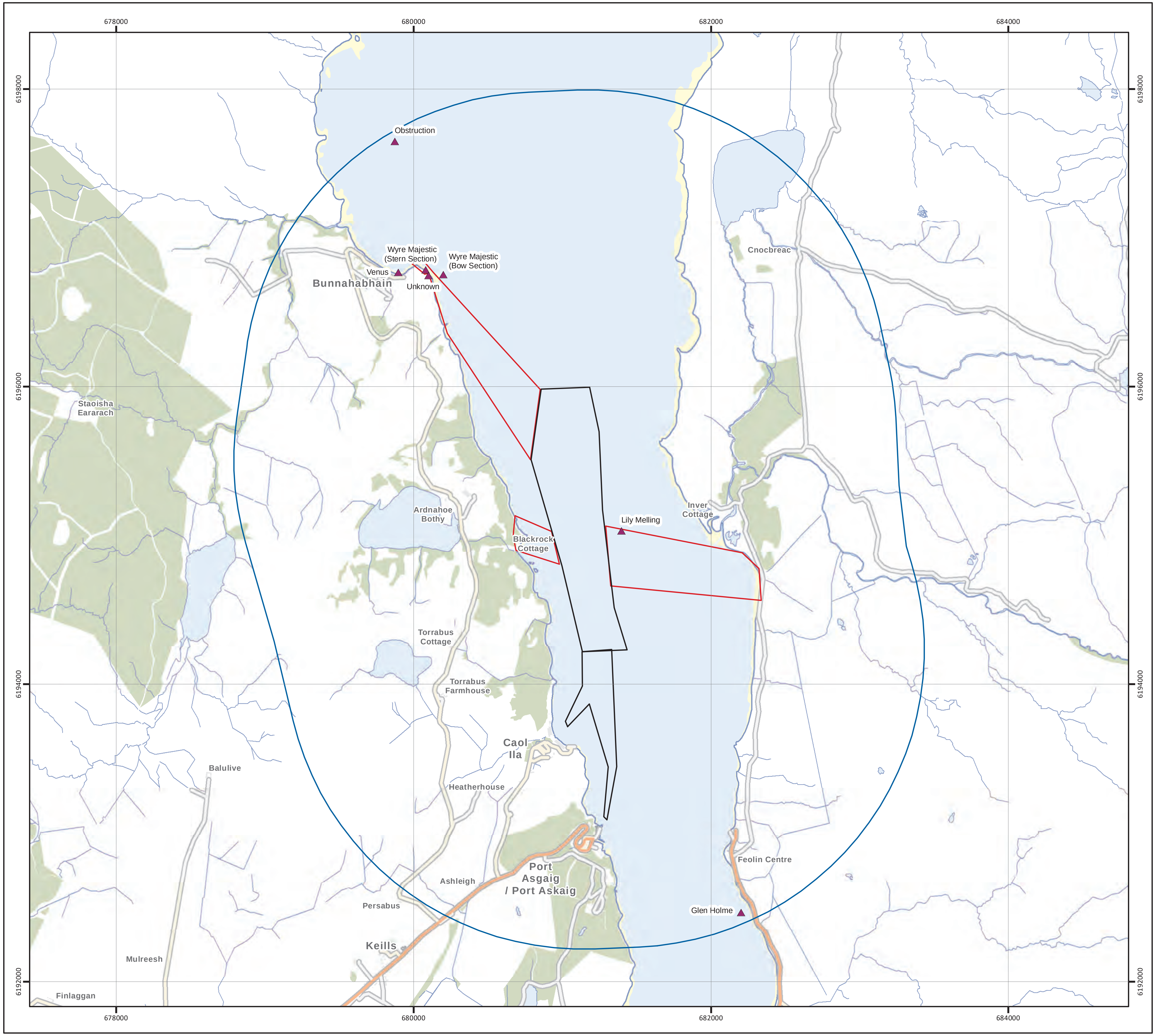
This chapter considers the potential effects of the Project on offshore and onshore cultural heritage receptors including potential scope for the effects on the setting of onshore historic environment assets. The baseline environment and data sources are described and the methodology that will be used in the EIA to assess the potential effects of the Project on cultural heritage is detailed.

14.2 Receiving Environment

The Project area comprises the existing CES AfL in which turbines will be deployed and the subsea cable corridor located in the Sound of Islay. This includes potential landfalls at Port Askaig and Caol Illa up to MHWS (Figure 14-1).

A wider 2km buffer search area around the AfL was applied for undertaking searches covering both offshore and potential onshore cable landfall areas.

For an indication of potential Setting effects, a 2km buffer zone around the turbine deployment area was assumed (Figure 14-2).



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ÒRAN NA MARA EIA SCOPING REPORT

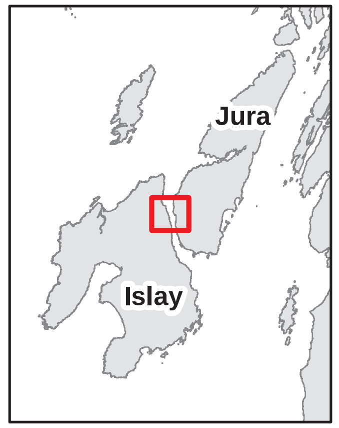
Location of vessels and other objects identified by the UKHO and HER in the wider study area

Drawing No: 269470_ScopingReport_Figure1	A

Legend

- Study Area
- Exploratory Cable Routes
- Turbine Deployment Area 2 km Buffer
- Documented Wreck Locations

N S W E



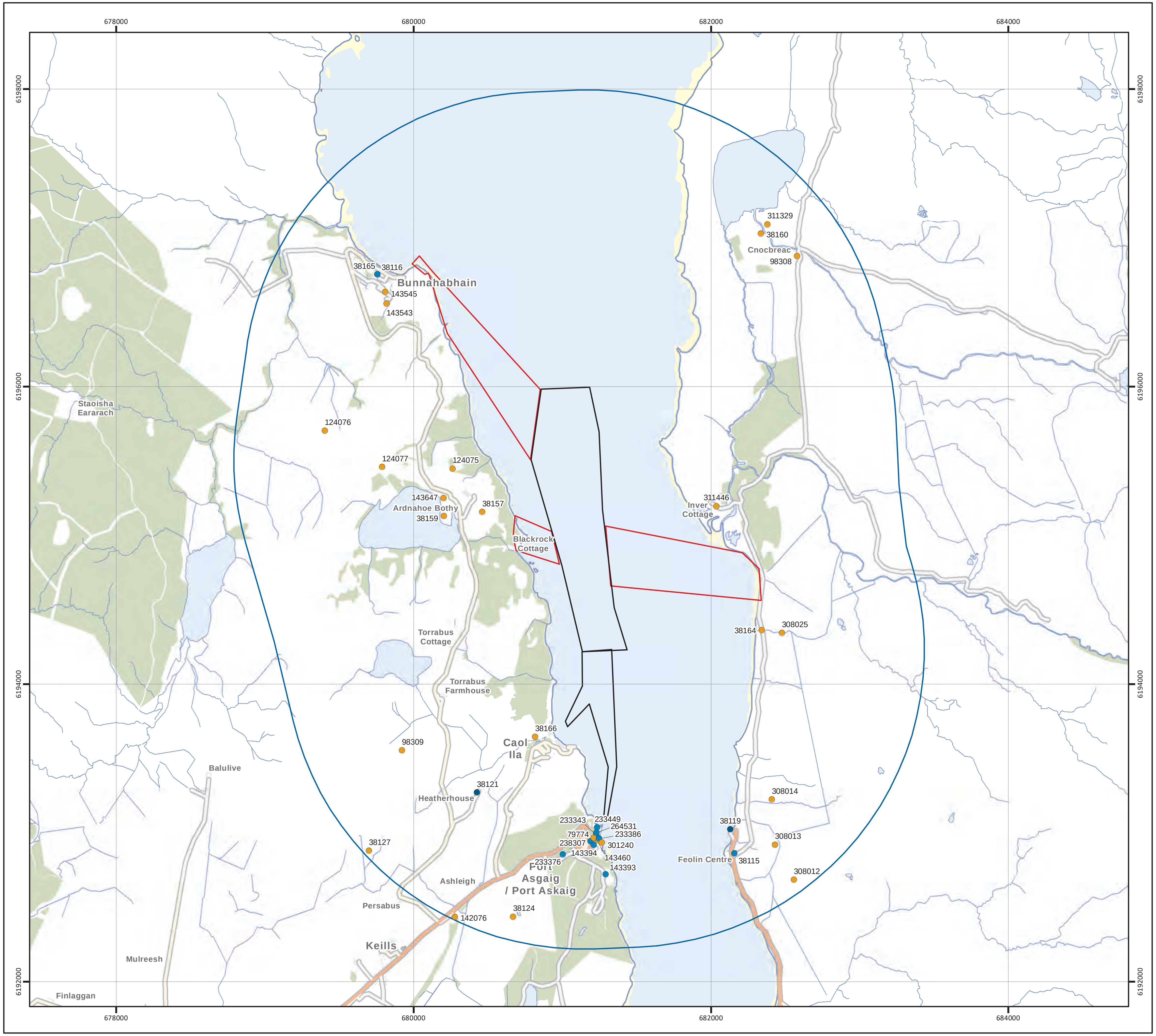
NOTE: Not to be used for Navigation

Date	16 February 2023
Coordinate System	WGS 1984 UTM Zone 29N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ESRI; OSOD
File Reference	T:\Projects\269470\GIS\FigsMXD\2022.12.09\269470_ScopingReport_Figure1.mxd
Created By	AW
Reviewed By	KJF
Approved By	SM

NOVA INNOVATION

intertek

0 0.25 0.5 0.75 1 km



ÒRAN NA MARA EIA SCOPING REPORT

Designated heritage within 2 km of the turbine deployment area

Drawing No: 269470_ScopingReport_Figure2 | **A**

Legend

- Study Area
- Exploratory Cable Routes
- Turbine Deployment Area 2 km Buffer

Listed Buildings

- B-Listed
- C-Listed
- Undesignated Assets

N
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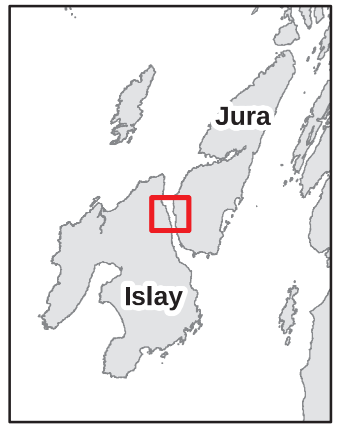

NOTE: Not to be used for Navigation

Date	16 February 2023
Coordinate System	WGS 1984 UTM Zone 29N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ESRI; OSOD
File Reference	T:\Projects\269470\GIS\FigsMXD\2022.12.09\269470_ScopingReport_Figure2.mxd
Created By	AW
Reviewed By	KJF
Approved By	SM

NOVA INNOVATION

intertek

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14.3 Data Sources and Baseline

14.3.1 Data Sources

An initial desk-based literature and data review has been undertaken to characterise the Archaeology and Cultural Heritage baseline within the study area, and the findings are presented below. Reference to Chapter 18 Cultural Heritage of the Environmental Statement (ES) for the Sound of Islay Demonstration Tidal Array, compiled by SPR (2010) was made to support this Scoping Report.

The desk-based review was completed in accordance with the relevant sections of the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for historic environment desk-based assessment* (2014, revised January 2017 and October 2020).

For this Scoping Report, only wreck sites with UKHO-verified positions were examined and cross-checked with the Canmore database to assess the potential requirement for scoping in offshore cultural heritage assets. The potential for submerged archaeological assets such as palaeolandscapes and prehistoric remains was assessed using relevant Strategic Environmental Assessment reports produced for the Government departments and other available public literature. The baseline summary for seabed prehistory has been based on a review of geological mapping of seabed sediments, solid geology, and bathymetry from published British Geological Survey (BGS) sources. The review carried out has allowed the initial identification of potential effects to Archaeology and Cultural Heritage baseline assets.

The key reference sources examined for this report were:

- The UKHO wrecks database, containing recorded wreck and obstruction data;
- Statutory lists, registers and designated areas, including Lists of Scheduled Monuments, Designated Wrecks and Historic Marine Protected Areas;
- The National Record of the Historic Environment (NRHE) of Scotland, using the Canmore database website (https://canmore. org. uk/);
- Historic Environment Records (HER) held by West of Scotland Archaeology Service (WOSAS) on behalf of Argyll and Bute Council containing a database of recorded archaeological sites, find spots, and archaeological events; and
- Other publicly available website databases and publications, where used, are cited in the text.

A preliminary heritage importance has been attributed to each identified asset, in order to assess whether to scope offshore cultural heritage assets in or out of the EIA. The level of importance assigned was based on several factors, including intrinsic, contextual and associative characteristics (HES Designation Policy and Selection Guidance 2019, Annex 5, paragraphs 15-17). In line with good practice, a precautionary level of importance has been assigned until proven otherwise. It should be noted that a site that has not been statutorily designated can still be of high importance. Assets for which further information is unavailable are recorded as of uncertain importance.

14.3.2 Overview of Offshore Baseline Environment

14.3.2.1 Statutory Designations

No marine cultural heritage statutory designations are present within the study area. However, if the aircraft (Canmore ID 301248) or any other military aircraft are discovered, they would automatically fall under the Protection of Military Remains Act 1986 (PMRA 1986).

14.3.2.2 Seabed Prehistory

Hominids and humans have occupied the UK continental shelf (UKCS) at various times, with the earliest occupation extending back to around one million years (Parfitt et al., 2010), with coastal areas clearly attracting human populations, including landscapes that are now submerged (Bailey et al., 2020). This is the case for the west coast of Scotland, which comprises a complex network of bodies of water that would have attracted prehistoric settlers along these coastal areas.

Around the coastline of this part of western Scotland, sea level changes since the end of the Pleistocene and the beginning of the Holocene period around 12,000 years ago appear to have been complex, as evidenced by the isostatic uplift, with changes in absolute sea level interacting with changes in land level due to isostatic rebound (Shennan and Horton, 2002).

The Strategic Environmental Assessment of the area around Islay has suggested that submerged landscapes and associated deposits with palaeo environmental potential may occur where there are low beach and offshore gradients, with topographic shelter and a context of cohesive deposits, such as Peat, in which archaeological remains are embedded (Wickham-Jones and Dawson, 2006). Finds of stone artefacts have been discovered across Scotland, including the thousands of lithic artefacts found in the intertidal zone of Lussa Bay, Isle of Jura (Canmore ID 38648). These mostly date to the Mesolithic with some dating to the Neolithic, and included tree fragments, hazelnut shells and a handful of artefacts (http://splashcos-viewer.eu/).

The presence of relict shorelines above current sea levels, due to the complex evidence of isostatic uplift and marine transgressions around the coastline of this part of western Scotland, may result in a low potential for submerged prehistoric remains and landscapes in the study area (BGS, 2020; Dawson et al., 2017; Wickham-Jones and Dawson, 2006). However, there is still the potential for the presence of as yet undiscovered *in situ* prehistoric sites and finds, located within the inundated nearshore palaeogeography and any discoveries will be of national importance, above or below sea level.

14.3.2.3 Maritime Archaeology

Maritime archaeological sites can be considered to comprise two broad categories; the remains of vessels that have been lost as a result of stranding, foundering, collision, enemy action and other causes, and those sites that consist of vessel-related material.

Wreck related debris includes (but is not limited to) equipment lost overboard or deliberately jettisoned such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound.

Shipwrecks on the seabed provide an insight on the types of vessels used in the past, the nature of shipping activity in the wider area and the changing usage of the marine environment through different periods. Such remains are considered more likely in sediments which promote the preservation of wreck sites (e.g.finer grained sediments that are not subject to high levels of mobility), particularly where such sediments have seen limited, recent disturbance.

Shipwreck inventories and documentary sources are usually biased towards the 18th century and later when more systematic reporting began. Therefore, there are few known historical records of wrecks from medieval or earlier periods.

However, the coastal archaeological evidence indicates prolonged exploitation of the marine environment within the study area, as attested by the seafaring communities of the Kingdom of Dál Riata (Argyll) which emerged during the 6th century AD and exploited the islands within Argyll and Bute (ScARF). These waters were a major navigation route from north to south along the Inner Hebrides and were used as trading routes and fishing grounds from prehistoric times (Wessex, 2012). The strongly maritime nature of medieval west Scotland is well-known (see Caldwell, 2015 and Martin, 2017 for example), with Islay acting as the seat of the Lords of the Isles from the mid-12th century. Port Askaig has for centuries been a gateway to Islay, serving as the ferry port for both Islay and Jura. Ships from West Loch Tarbert on Kintyre have called at this port since the 1700s and it was a destination of a steamer service from Glasgow in the early 1800s. The western isles have seen a fair share of World War activity as attested by the numerous memorials and plaques to those who lost lives during both wars, including the American Monument on the Oa commemorating the lives lost at sea during the First World War.

Not all wartime losses have been located and, therefore, there is high potential for both unknown, unrecorded vessels and reported but unlocated losses to have sunk in the study area over many centuries. A list of known historic marine assets within the study area and surrounding areas is listed in Table 14-1 and depicted on Figure 14-1.

Examples of 19th and 20th century vessels (reported losses) that could be in the study area are listed in Table 14-1. As these are recorded losses, the positional data is unreliable and serves only to provide an indication of the type of vessel that navigated around this coastline. In many cases these locations are only a set of general coordinates, a general distance and bearing from a landmark, or the location of the crew's dinghy. Nonetheless, these highlight the potential for further archaeological material to be present within the study area.

14.3.2.4 Aviation Archaeology

Marine aviation archaeology assets comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence is divided into three primary time periods based on major technological advances in aircraft design: Pre-1939; 1939-1945; and post-1945.

There are no known aircraft remains charted within the study area. However, there is one recorded loss located within the wider study area (Table 14-2). This consists of an aircraft that was lost near Port Askaig in October 1945.

Maritime aircraft crash sites can retain a significant amount of material, whilst being an ephemeral target to identify, with the potential for in situ human remains. Aircraft are protected under the PMRA 1986 and there is a significant possibility that aircraft material may be present within the study area.

Table 14-1 Known marine heritage assets located in the wider study area

Name	Other Reference	Description	Latitude (WGS84 UTM29N)	Longitude (WGS84 UTM29N)	Distance to Study Area	Importance
Wyre Majestic (Bow section)	UKHO_3754 Canmore_1166867 HER_70814	British trawler, wrecked on 18 October 1974. Ran aground during passage from Oban for Fleetwood. Listed in the UKHO record as a dangerous wreck. In 2001 this site was surveyed and confirmed to be the *Wyre Majestic* which shifted due to bad weather. The wreck lies in 8 metres of water with the mast showing at low water. The wreck is broken in two with the stern part remaining in its charted position on the rocks (see UKHO 59247), while the bow section lies further south. Site was last surveyed in 2010, however, the bow section was not located at listed position.	6196754	680198.3	Within exploratory cable route (North Islay)	Medium
Wyre Majestic (Stern section)	UKHO_59247 HER_70814	Part of UKHO 3754. British trawler, wrecked on 18 October 1974. Ran aground during passage from Oban for Fleetwood. Listed in the UKHO record as a wreck showing any portion of hull or superstructure. In 2001 this site was surveyed and confirmed to be the Wyre Majestic which shifted due to bad weather. The wreck lies in 8 metres of water with the mast showing at low water. The wreck is broken in two with the stern part remaining in its charted position on the rocks, while the bow section lies further south (see UKHO 3754).	6196785	680080.1	Outwith study area	Medium
Obstruction	UKHO_57779 Canmore_102474 HER_70846	Anchor and a shackle. This was lost by MV *Hebridean Princess* as recorded by the UKHO in 1999. Area last surveyed in 2010 and recorded as not located by multibeam, however retained as foul ground.	6197649	679873	Outwith study area	Low
Lily Melling	UKHO_3750 Canmore_102474 HER_70846	Trawler, wrecked on 08 March 1929. Listed in the UKHO record as a dangerous wreck. Later amended too dead. Was abandoned after grounding in the sound of Islay. First reported by SS *Anstruther* in 1929, but survey in 1996 stated it was possibly *Lily Melling* and may have been above water for a time after running aground and in a better position to be seen/located. It was not	6195031	681398	Within exploratory cable route (Jura)	Medium

Name	Other Reference	Description	Latitude (WGS84 UTM29N)	Longitude (WGS84 UTM29N)	Distance to Study Area	Importance
		located after survey carried out in 2010.				
Glen Holme	UKHO_3798 Canmore_119159 HER_70846	British steamship, wrecked on 28 May 1893. Listed in the UKHO record as a dangerous wreck. Later amended to dead. Built in 1870 by Denton, Gray and Co. of Hartlepool, its passage was from Windan, Russia for Ardrossan. Owned at time of wrecking by Hine Brothers, after it collided with the Danish SS G P A KOCH. Remains of one boiler, compound expansion engine and single shaft surveyed in 1996. Not located in 2010 but may lay closer ashore.	6192464	682201.6	Outwith study area	High
Venus	Canmore_115217 HER_70842	Steamship, wrecked on the 03 January 1943. The steamship master was T.C. Bryner of Amsterdam, bound from Loch Ewe to Iceland, via Oban to join a convoy, with a cargo of coal. Grounded on a rock three miles north of McArthurs Head. The cause of this was the compass being deflected by the iron on the bridge and swift currents. The vessel refloated and drifted to Bonahaven (Bunnahabhainn) and is now aground there.	6196767.067	679896.8657	Outwith study area	High
Unknown	HER_60258	18th to 20th century hulk. Site was examined in 2003 by EASE Archaeology and recorded the rusting hulk as that of a steamer lying on its side in shallow waters. The surviving section measures app. 25m long, with the wheelhouse and boilers remaining intact.	6196746.392	680098.8954	Outwith study area	High

Table 14-2 Examples of recorded losses within the wider study area

Name	HER ID	Canmore ID	Date of Loss	Description
Unknown	92471	32957	1828	Islay-Jura ferry lost near Jura on the 21 May 1828. Eight lives were lost.
Rock	86184	272181	1830	Craft; *Rock* also referred to as Portaskay; Islay; Atlantic. Date of loss cited as 26 June 1830. *Rock* was driven ashore during a heavy gale on his journey to Liverpool to Aberdeen. No location assigned and it is likely the vessel was recovered.
Swallow	86028	274621	1838	Craft; *Swallow* also referred to as Bay of Ardnahowe; Port Askaig; Atlantic. Date of loss cited as 25 February 1838. The vessel was driven ashore on its journey to London from Limerick. It masted was removed and the crew saved. No location assigned and it is likely the vessel was recovered.
British Queen	85721	274994	1840	Craft; *British Queen* also referred to as 'Near British Queen'; Islay; Atlantic. Date of loss 24 January 1840. the vessel was driven ashore near Jura, Sound of Islay on its way to Hull from Bangor. Cargo was discharged on the shore. No location assigned and it is likely the vessel was recovered.
Undine	92217	275309 326092	1842	Craft; *Undine* also referred to as Port Askaig; Islay; Atlantic. Date of loss cited as 17 March 1842. Was run on the beach near Bowmore, Isle of Islay where it lay wind bound parted two anchors. No location assigned and it is likely the vessel was recovered.
Unknown	71010	275400	1843	Craft; also referred to as Port Askaig; Islay; Atlantic. Date of loss cited as 14 January 1843, near the Port of Askaig, Sound of Islay. A vessel reported was ashore at Port Askaig and expected to become a wreck, but crew scuttled. No location assigned and it is likely the vessel was recovered.
Montcalm	92129	326111	1847	Schooner, wrecked on the 16 April 1847. Registered in Belfast. Stranded at Mull of Kinho.
Isabella	91949	327545	1856	Craft. Date of loss cited as 26 April 1856. The vessel was stranded near Port Askaig and then slipped into deep water. The vessel was recovered in July 1856.
Unknown	87112	284465	1859	Craft; also referred to as Mull of Kinshoe; Port Askaig. Date of loss cited as 22 March 1859. Reported as a large vessel strewn with logs and that it may have washed ashore. The location given is likely where the reports of wreck pieces were discovered but possible it broke up offshore.
Unknown	91900	325544	1859	Craft. Date of loss cited as 22 March 1859. Wreckage was washed ashore at Mull of Kinahoe, Islay. The location given is likely where the reports of wreck pieces were discovered but possible it broke up offshore.
Unknown	87325	286279	1866	Brig. Date of loss cited as 20 January 1866, in the Sound of Islay. Two vessels, *Isleman* and *Xantho* reported a brig ashore in the Sound of Islay. *Xantho* reported that the brig was full of paraffin oil. No location has been assigned and it is likely the vessel was recovered.
Conquest	83739	255821	1866	Craft; also referred to as Conquest; Ardnahoe; Port Askaig; Atlantic. Date of loss sited as 16 January

Name	HER ID	Canmore ID	Date of Loss	Description
				1866 went ashore near the Rua Vaal lighthouse. Departed New York for Yalmouth. Cargo of petroleum was recovered. On 16 February 1866, the vessel was seen being towed to Glasgow.
Unknown	87362	286280	1866	Craft; also referred to as Port Askaig; Islay; Atlantic. Date of loss cited as 20 January 1866. Reported by *Isleman* and *Xantho* stating there was a brig laden with timber at Colonsay. No location assigned and it is likely the vessel was recovered.
Unknown	79627	301245	1893	Craft; also referred to as Port Askaig; Islay; Atlantic; E G McIntosh. Date of loss cited as 17 November 1893. Vessel was driven from moorings and stranded at Port Askaig. This record remains unclear and is probably another vessel, *E G McIntosh*, that was lost on the same day in the same location.
A G Mackintosh	88845	220670	1893	Lugger; also referred to as Port Askaig; Ann G MacKintosh; E G McIntosh. Date of loss cited as 17 November 1893. Vessel was driven from moorings and stranded at Port Askaig. This record remains unclear and is tied in with another vessel (301245) that was lost on the same day.
Kilkerran	79628	220671	1893	Lugger; also referred to as Cn 369; Kilkeran; Caolila Bay; Atlantic; Kilkeran. Date of loss cited as 17 November 1893. The wooden fishing vessel was driven from moorings and stranded in Caol Ila Bay. There is no location assigned and it is likely the vessel was recovered.
Janet	79629	220673	1893	Date of loss cited as 17 November 1893. The wooden fishing vessel was driven from moorings and stranded in Caol Ila Bay. Owned by M & L Currie, Bowmore, Islay at time of loss. There is no location assigned and it is likely the vessel was recovered.
Maggie Ann	79630	220674	1893	Lugger; also referred to as Maggies Ann; Caol Ilay Bay; Caolila Bay; Atlantic; Maggie Ann. Date of loss cited as 18 November 1893. The wooden fishing vessel was driven from moorings and stranded in Caol Ila Bay. Owned by J. Slater and A. Slater, Hopeman at time of loss. There is no location assigned and it is likely the vessel was recovered.
Peep O'Day	82856 81287	325641	1893	Lugger; also referred to as Peep O Day; '200 yards North of Port Askaig Pier'; Atlantic. Date of loss cited as 17 November 1893. The wooden fishing lugger was owned by N. Morrison, Campbelltown, at time of loss, with a cargo of ballast. It broke free of its moorings and stranded. There is no location assigned and it is likely the vessel was recovered.
Unknown	88849	301919	1894	Ketch; also referred to as Islay; Atlantic; St Abbs. Date of loss cited as 13 November 1894. The vessel as ashore on Whitefarlane bay, Jura, with a cargo of salt. The location given is vaguelydefined.
Unknown	92063	324982	1929	Craft. Year of loss cited as 1929. No other information is available.
Unknown	88844	301244	1942	Steamship; also referred to as 'Near Port Askaig'; Islay; Atlantic; Unknown 1944. Date of loss cited as 22 November 1942. No cargo specified. There is no location assigned and it is likely the vessel was recovered.

Name	HER ID	Canmore ID	Date of Loss	Description
Unknown	88791	301248	1945	Aircraft; also referred to as 'Near Port Askaig'; Atlantic; A/c. Date of loss cited as 25 October 1945, possibly near the waters of the Sound of Islay.

14.3.3 Overview of Onshore Baseline Environment

14.3.3.1 Designated Cultural Heritage Assets

There are 12 designated cultural heritage assets within the wider onshore element of the study area (Table 19-3). There are no Scheduled Monuments within the study area; all of the designated assets are listed buildings, of which two are B-listed and ten C-listed. The majority of these are 19th and 20th century buildings and most of them are in or around the village of Port Askaig on Islay. On Jura there are only two designated sites, the B-listed Feolin Ferry Jetty and the associated C-listed Feolin Ferry cottage.

14.3.3.2 Undesignated Cultural Heritage Assets

There is potential for effects on the historic environment at landfall locations, the nature of which will depend on the method by which landfall is achieved and the onshore infrastructure required.

In the intertidal zone, there are no known archaeological remains at any of the landfall areas at Islay or Jura, but there is a low-moderate potential for these to exist. Despite isostatic uplift resulting in relict shorelines onshore, there may still be a low potential for submerged prehistoric remains and landscapes beneath beach deposits at landfalls due to relative sea level rise after the last glaciation (BGS, 2020; Dawson et al., 2017; Wickham-Jones and Dawson, 2006).

There is one recorded loss consisting of a 19th century ketch (Canmore ID 301919) within the vicinity of the potential Whitefarland Bay landfall, Jura. However, as this is a recorded loss its positional data is unreliable. There is potential for further remains to extend into the intertidal zone below the beach sands, though none is currently known.

There are a further 26 known undesignated cultural heritage assets within the onshore part of the wider study area. They represent a wide variety of site types and findspots with those that are of known date largely dating to the medieval and post medieval period.

The scope of the EIA includes consideration of the potential effects on the Setting of historic environment assets. There are a number of Listed Buildings within 2km of the boundary of the study area, which could be affected (Table 14-3 and Figure 14-2). The assets considered for assessment will be identified from the Historic Environment Records (HERs) as cultural heritage assets within the Zone of Theoretical Visibility (ZTV) of the Project that have settings that are directly related to the sea or have significance in their visual and physical interaction with the sea and in consultation with the respective Archaeological Curator(s). Effects on the Setting of some non-designated sites may also require assessment.

Table 14-3 Listed Buildings within the wider study area

Name	Category	Cramore Code	Parish
Heatherhouse Cottages	B	38121	Killarow and Kilmeny
Feolin Ferry Jetty	B	38119	Jura
House and Post Office, Port Askaig	C	233343	Killarow and Kilmeny
Post Office, shop, houses, Port Askaig	C	238307	Killarow and Kilmeny
The Dunlossit Country House Estate	C	143393	Killarow and Kilmeny
Hotel, Port Askaig	C	143394	Killarow and Kilmeny
Jetty, Port Askaig	C	233386	Killarow and Kilmeny
Storehouse, Port Askaig	C	233449	Killarow and Kilmeny
Piermaster, shipping office, Port Askaig	C	264531	Killarow and Kilmeny
Bunnahabhan Distillery	C	38165	Killarow and Kilmeny
Feolin Ferry House	C	38115	Jura
Memorial Cross at Dunlossit House	C	233376	Killarow and Kilmeny

14.4 Relevant Guidance and Assessment Tools

The cultural heritage assets of an area can be onshore such as buildings, monuments or landscapes, or maritime such as wrecks, lighthouses and drowned onshore archaeological sites. The historic environment is protected through national legislation, and through national and local planning policies.

MS-LOT is responsible for licensing, regulating and planning marine activities in the seas around the Scotland to ensure they are carried out in a sustainable way under the Marine (Scotland) Act 2010.

Historic Environment Scotland (HES) oversee the protection of designated sites of historical importance within Scotland, primarily historic Marine Protected Areas, A-listed structures and Scheduled Monuments. It is also a Consultee for marine licensing with regards the archaeological resource within Scotland’s territorial waters (to the 12 nautical miles (nm) limit).

Argyll and Bute Council are an important Consultee with regards the protection of B- and C-Listed structures, and undesignated cultural heritage assets above the Mean Low Water Mark (MLWM) and the wider Setting of the archaeological resource.

The following section summarises the main components of the national legislative framework governing the treatment of the historic environment within the planning process.

14.4.1 Cultural Heritage Policy and Legislation

The following relevant policy and legislation will underpin the assessment:

- Ancient Monuments and Archaeological Areas Act, 1979 as amended by the Historic Environment (Amendment)(Scotland) Act, 2011;

- Protection of Military Remains Act, 1986; and
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act, 1997 as amended by the Historic Environment (Amendment)(Scotland) Act, 2011.

The following policies are relevant to the cultural heritage assessment:

- Scottish Planning Policy;
- National Planning Framework (NPF) 3; and
- Argyll and Bute Local Plan.

The following Guidance will be taken into account in undertaking the assessment of potential effects on the significance and Settings of onshore designated (and non-designated) heritage assets:

- Standard and guidance for historic environment desk-based assessment (CIfA, 2017); and
- Managing Change in the Historic Environment: Setting (Historic Environment Scotland, 2016, updated 2020).

14.4.1.1 Designated Heritage Assets

Designated heritage assets in Scotland can include:

- Ancient monuments, which are designated through scheduling;
- Buildings and other structures which are designated through listing;
- Military remains;
- Conservation areas;
- Historic marine protected areas;
- Gardens and designed landscapes; and
- Historic battlefields.

Designation is a formal acknowledgement of a building, monument or site's significance, intended to make sure that the character of the receptor in question is protected through the planning system and to enable it to be passed on to future generations.

The Historic Environment Scotland Act became law in December 2014. This established the role and function of Historic Environment Scotland (Àrainneachd Eachdraidheil na h-Alba) which replaced Historic Scotland and took over the functions of the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS). It also makes amendments to the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 and the Ancient Monuments and Archaeological Areas Act 1979 as it is enacted in Scotland.

14.4.2 Marine Legislation

The AfL is within Marine Scotland's licensing area (up to 12 nm from the coast). The following legislation applies within this licensing area:

- Marine (Scotland) Act 2010 (M(S)A 2010)
- Protection of Wrecks Act 1973 (PWA 1973): section 2
- Ancient Monuments and Archaeological Areas Act 1979 (AMAA 1979) (as amended)
- Protection of Military Remains Act 1986 (PMRA 1986); and
- Merchant Shipping Act 1995 (MSA 1995)

The above legislation provides a protection for marine historic assets of national importance, as well as allowing military wrecks and aircraft remains to be protected. The Merchant Shipping Act requires that all wreck material that is recovered is reported to the Receiver of Wreck.

14.4.3 Marine Policy

UK Marine Policy Statement was adopted in 2011 by all UK Administrations in March 2011 as part of a new system of marine planning being introduced across UK seas (DEFRA, 2011). The statement was intended to facilitate and support the formulation of Marine Plans, ensuring that marine resources are used in a sustainable way in line with high level marine objectives.

The M(S)A 2010 is the primary legislation relevant to marine development plans within Scottish territorial waters. The proposed development lies within Scottish territorial waters. Under this legislation, Scottish Ministers adopted a national marine plan (Marine Scotland, 2015). This includes statements on mitigation of offshore development of interaction between developments and assets. Historic assets are considered to have a high degree of interaction with dredging, shipping and renewables construction among others.

The Scottish Marine Regions Order 2015 identifies 11 Scottish Marine Regions for the purposes of regional marine planning and establishes their boundaries. However, the National Marine Plan published in March 2015 sets out a single framework for sustainable development within Scotland's marine area. General Policy 6 for Historic Environment states "development and use of the marine environment should protect and where appropriate, enhance heritage assets in a manner proportionate to their significance" (Marine Scotland, 2015).

14.4.4 Marine Guidance

There are numerous sources of guidance relevant to maritime archaeology and the development process. Some are described below in chronological order of issue:

- Identifying and Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers (English Heritage (now Historic England), 1998);
- Military Aircraft Crash Sites: Guidance on their significance and future management (English Heritage (now Historic England), 2002);
- The Code of Practice for Seabed Developers (Joint Nautical Archaeology Policy Committee and The Crown Estate, 2006);
- Historic Environment Guidance for the Offshore Renewable Energy Sector (COWRIE, 2007);
- Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now Historic England), 2008);
- Our Seas – A shared resource: High level marine objectives (DEFRA 2009);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (COWRIE, 2011);
- Ships and Boats: Prehistory to Present: Designation Selection Guide (English Heritage (now Historic England), 2012);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (English Heritage 2013);
- Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England 2015);
- Managing Change in the Historic Environment: Setting (Historic Environment Scotland 2016, updated 2020); and

- Standard and Guidance for Historic Environment Desk-based Assessment (Chartered Institute for Archaeologists 2014, updated 2017).

14.5 Design Parameters

14.5.1 Key Design Parameters

The Archaeology and Cultural Heritage scoping assessment is based on key assumptions, which are also set out in Chapter 5.

14.5.2 Embedded mitigation

Appropriate mitigation measures will be embedded in the proposed development design to avoid or reduce effects as much as reasonably practicable. This includes the implementation of Archaeological Exclusion Zone (AEZs) around known wreck sites. In addition to this, a desk-based survey and archaeological reviews of marine geophysical surveys and geotechnical datasets is recommended so that marine and intertidal historic assets can be identified and avoided. The production of a marine archaeological Written Scheme of Investigation (WSI) and a Protocol for Archaeological Discoveries (PAD) for items of archaeological interest will be included in the Offshore EIA to manage potential effects.

14.6 Potential Project Effects

14.6.1 Potential Effects

Table 14-4 details the potential effects of the ÒnM Project on Archaeology and Cultural Heritage. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. The potential activities during the construction and decommissioning phases of the proposed development which could lead to effects on cultural heritage receptors are:

Table 14-4 Potential Effects of the Project on Archaeology and Cultural Heritage

Potential Effect	Project Phase	Rationale and Commentary
Direct physical disturbance during invasive seabed or intertidal surveys.	Pre-application (limited relevance for other Project Phases)	There is potential for effects on known and unknown assets from invasive surveys, particularly geotechnical coring (if required). However, it is anticipated that if required, any such surveys would most likely be carried out at the pre-application stage, to inform the final project design. A such, any consenting or licensing requirements would be addressed prior to the submission of the consent applications for the ÒnM project. **For reasons stated above, this potential effect is highly unlikely to be significant for the ÒnM project beyond the pre-application phase. However, on a precautionary basis it will be scoped into the EIA, to cover the unlikely scenario that invasive surveys are required after pre-application phase.**
Direct physical disturbance during installation or decommissioning of offshore and intertidal infrastructure.	Construction and Decommissioning	Potentially sensitive features including known and unknown assets could be present within the ÒnM Project area. This will be determined in the EIA, including through site survey. No drilling is required to install project infrastructure with direct long-term impacts associated with relatively small infrastructure footprints. Some pin-piling may be used on rock feet of larger turbines (refer to Chapter 5 for further details). **This potential effect will be scoped into the EIA.**
Direct physical disturbance during installation or decommissioning of onshore infrastructure.	Construction and Decommissioning	Installation and decommissioning of any onshore infrastructure associated with the landfall to the selected grid connection location could result in damage or disturbance to terrestrial known or unknown archaeological remains. Further site investigations would confirm the presence of any such artefacts and the degree to which this may be an issue for the EIA to consider. **This potential effect will be scoped into the EIA.**
Turbine presence causing changes to the hydrodynamic and sediment regime in the area potentially affecting local features.	Operation	Potential for the presence of the turbine structures to alter the movement of water, at a local level. This could lead to localised changes in scour or sedimentation, which could indirectly affect known or unknown features of marine archaeological and cultural heritage. **This potential effect will be scoped into the EIA.**
Changes to the setting of the historic environment and cultural assets due to presence of onshore Project infrastructure.	Operation	The presence of onshore infrastructure including the substation will introduce new manmade features in the study area. Onshore infrastructure will be minimal in size and footprint and sympathetic material will be used where possible to be in keeping with the local vernacular Significant effects are unlikely to arise, but there is some potential for some visual effect which may affect the settings of any onshore assets. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**

Potential Effect	Project Phase	Rationale and Commentary
Changes to the setting of the historic environment and cultural assets due to presence of offshore Project infrastructure.	Operation	All offshore infrastructure will be fully submerged, with no requirement for surface markers or lighting. There will be no visual effect and so there is not considered to be any potential for a likely significant effect upon the settings of any onshore assets, nor any effect on the contribution made by that setting to the significance of such assets, or the ability to appreciate or understand either the significance or the settings of such assets. **This potential effect has been scoped out of the EIA.**
Changes to the setting of the historic environment and cultural assets due to the presence of vessels engaged in works.	All Phases	The modular nature of Nova's turbines means that these and other offshore infrastructure can be installed and retrieved quickly and easily, limiting the need for vessels to be present on site. Based on Nova's experience at the Shetland Tidal Array, it is anticipated that installation of the turbines can be achieved at the rate of one turbine per day, with the nacelle installed during a single slack water period. As such, the construction period is anticipated to be of short duration and will use primarily small 'multicat' work vessels. Any effects on the settings of any onshore heritage assets will be temporary and short-term. **This potential effect has been scoped out of the EIA.**
Direct physical disturbance during all stages of the Project from seabed contact by anchors on vessels.	All Phases	Seabed contact by anchors on vessels during installation, scheduled and unplanned maintenance works, and decommissioning works might cause localised damage or destruction to assets lying on the seafloor and buried within the seabed sediments. However, it is anticipated that construction and maintenance activities are undertaken using a small 'multicat' work vessel using dynamic positioning. Any impacts on known or unknown features of marine archaeological and cultural heritage will be avoided. **This potential effect has been scoped out of the EIA.**

14.6.2 Cumulative Impacts

The EIA will include consideration of the potential cumulative impact (direct and indirect) of the proposed development and other developments on the marine historic environment, using Argyll and Bute Council's interactive renewables map (https://www. argyll-bute. gov. uk/planning-and-environment/renewable-energy#in_map) alongside other sources to identify relevant developments.

In terms of potential cumulative impacts on the Setting of onshore historic environment assets, there is currently no other offshore wind farm development within 10km of the proposed development and no other plan options within the West Sectoral Marine Plan Region, in which the Proposed Development sits. Other marine renewable development is small in scale, with little above-water infrastructure. Onshore wind turbines in the area are similarly limited in number and small in scale, and no large-scale onshore wind energy proposals are anticipated. As a result, significant cumulative impacts on Setting are unlikely, and therefore are scoped out of the EIA.

14.6.3 Transboundary Effects

With regards to effects on the marine archaeology, the potential effects of the proposed development in the Scottish Marine Area are unlikely to lead to any significant transboundary effects. Direct effects resulting from the proposed development are expected to be confined to the study area, and therefore are not predicted to result in transboundary effects.

With regards to indirect effects, effects to local hydrodynamic and sediment transport regime will need to be assessed within the EIA in order to assess the significance of these effects upon the known and unknown marine historic environment.

With regards to Setting of onshore historic environment assets, no transboundary effects on the marine historic environment are anticipated due to distance and have been scoped out of the EIA.

14.7 Mitigation Measures

Mitigation is likely to focus on addressing direct effects to heritage assets, including prevention of accidental damage or potential destruction to heritage assets. The approach to mitigation will be guided by industry common practice and appropriate procedures as laid out in the relevant standards and guidance documents from the Chartered Institute for Archaeologists

Where possible, potential direct effects on archaeological assets within the ÒnM Project area will be designed out. The following mitigation measures are being considered as part of the design development of the proposed development:

- Avoidance of known marine cultural heritage receptors (e.g., Archaeological Exclusion Zones);
- Geoarchaeological and Geophysical data assessment for baseline enhancement; and
- Protocol for Archaeological Discoveries.

14.7.1 Archaeological Exclusion Zones

The primary mitigation for the protection of known archaeological receptors is avoidance. This is commonly achieved through the implementation and monitoring of AEZs, which are proposed for identified high value seabed receptors of anthropogenic origin.

The Crown Estate document *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (The Crown Estate, 2021) states that AEZs are formed by establishing a buffer around the known extents of sites for which the available evidence suggests that there could be archaeological material present on the seabed. The mitigation will establish appropriately sized AEZs around assets which have been considered to be of high archaeological potential, in consultation with the

Archaeological Curators. These areas would be out of bounds to construction activities and to anchoring. Monitoring of any AEZs to ensure there is no disturbance to them will be part of this mitigation.

Although AEZs are fixed, provision should be made for them to be either refined or be removed (with agreement of the Archaeological Curators) as the Project progresses, subject to additional archaeological assessment of subsequent surveys that may be required. Surveys could include further geophysical, Remotely Operated Vehicle (ROV), or diver surveys. In addition, in order to maximise the potential benefits of any further surveys, archaeological advice should be sought during the planning stages.

14.7.2 Geoarchaeological and Geophysical Data Assessment for Baseline Enhancement

It is recommended that in order to enhance the maritime and aviation baseline an archaeological assessment of any suitable marine geophysical datasets surveyed as part of the Project design and pre-construction works is undertaken to enhance the identification of assets, enhance the EIA process and facilitate embedded mitigation.

Similarly, it is recommended that a geoarchaeological review of any future marine borehole logs obtained as part of this detailed design ground investigation is undertaken to enhance the baseline understanding of submerged palaeo landscapes.

14.7.3 Protocol for Archaeological Discoveries

If previously unknown sites or material are encountered during the different phases of the Project, measures would be taken to reduce the level of effect. In order to provide for these unexpected discoveries a PAD would be adopted. The PAD is a system for reporting and investigating unexpected archaeological discoveries encountered during construction activities, with a Retained Archaeologist providing guidance and advising on the implementation of the PAD.

The PAD also makes provision for the implementation of temporary exclusion zones around areas of possible archaeological interest, for prompt archaeological advice, and, if necessary, for archaeological inspection of important features prior to further activities in the vicinity. The PAD provides a mechanism to comply with the Merchant Shipping Act 1995, including notification of the Receiver of Wreck, and accords with the Code of Practice for Seabed Developers (Ref 15-14).

14.8 Proposed Approach to EIA

14.8.1 Data Sources to Inform The EIA Baseline Characterisation

14.8.1.1 Desktop Data Sources

The key desktop data sources that will be examined for the EIA Archaeology and Cultural Heritage baseline characterisation include those listed below:

- The National Record of the Historic Environment (NRHE) of Scotland;
- Statutory lists, registers and designated areas (including List of Scheduled Monuments, Designated Wrecks and Historic Marine Protected Areas);
- The Argyll and Bute Historic Environment Records;
- UK Hydrographic Office (UKHO) wreck register and relevant nautical charts;
- The Ship Wreck Index of Great Britain & Ireland Vol. 4 Scotland;
- Off Scotland: a comprehensive record of maritime and aviation losses in Scottish waters;
- Newspaper reports of maritime losses;

- The Strategic Environmental Assessment of North Sea Area SEA7 in regard to prehistoric and early historic archaeological remains;
- Records of the Admiralty, Naval Forces, Royal Marines, Coastguard, and related bodies;
- Submerged Landscapes of the European Continental Shelf: Quaternary Paleoenvironments;
- Aircraft Crash Sites at Sea: A Scoping Study. Archaeological Desk-based Assessment Final Report;
- Report on a Coastal Zone Assessment Survey of Islay; and,
- Chapter 18 Cultural Heritage of the ES (2010) for the Sound of Islay Demonstration Tidal Array.

14.8.1.2 Site Specific Surveys

If further primary data is obtained from geophysical and geotechnical surveys covering the proposed project, an archaeological review and analysis is recommended with a view to identify anthropogenic geophysical anomalies and the presence of submerge palaeolandscape deposits, with previously unknown or unconfirmed locations.

If required, an intertidal walkover survey will be undertaken at the proposed landfall at Whitefarland Bay, Jura and any secondary landfall options in order to ground truth previously recorded heritage assets and to identify any new assets that maybe be of relevance to the assessment.

14.8.1.3 Consultation

In order to define the scope of the environmental assets, liaison between key stakeholders and Archaeological Curators may be required. Key consultees would include:

- MS-LOT;
- Historic Environment Scotland; and
- Local Authority Archaeology advisors with responsibilities at the landfall.

14.8.2 Guidance

The data gathering, analysis, effect assessment and mitigation recommendations for the EIA will be conducted to standard professional guidelines, appropriate and proportionate to the proposed development, listed below.

- The Joint Nautical Archaeology Policy Committee and Crown Estate (2006). Maritime Cultural Heritage & Seabed Development: JNAPC Code of Practice;
- Wessex Archaeology (2007). Historic Environment Guidance for the Offshore Renewable Energy Sector, commissioned by COWRIE Ltd (project reference ARCH-11-05);
- Oxford Archaeology & George Lambrick Archaeology and Heritage (2008). Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy, commissioned by COWRIE Ltd (project reference CIARCH-11-2006);
- Gribble, J and Leather, S for EMU Ltd. (2011). Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector, commissioned by COWRIE Ltd (project reference GEOARCH-09);
- Plets, R., Dix, J., & Bates, R. (2013). Marine Geophysics Data Acquisition, Processing and Interpretation: Guidance Notes. Swindon: English Heritage Publishing;
- The Crown Estate (2021). Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects, Wessex Archaeology Ltd for The Crown Estate;
- The Crown Estate (2014). Protocol for Archaeological Discoveries: Offshore Renewables Projects, Wessex Archaeology Ltd for The Crown Estate;

- The Chartered Institute for Archaeologists (CIfA) Codes, Standards and Guidance. Available at https://www.archaeologists.net/codes/cifa;
- Historic Environment Scotland (2016, updated 2020). Managing Change in the Historic Environment: Setting; and
- Scottish Natural Heritage & Historic Environment Scotland (2018). Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. V5. Edinburgh.

As the proposed development is located within Scottish and UK Territorial Waters, there is guidance to consider in relation to the marine historic environment. These are outlined below and will also be considered in relation to the marine Archaeology and Cultural Heritage Offshore EIA:

- Scotland's National Marine Plan: A Single Framework for Managing Our Seas (March 2015) covers both Scottish inshore waters (out to 12nm) and offshore waters (12 to 200nm). It contains policies and advice concerning the marine historic environment, including that development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance and that as well as designated marine heritage assets there are likely to be a number of undesignated sites of demonstrably equivalent significance, which are yet to be fully recorded or await discovery;
- Scotland's National Marine Plan also recommends that Historic Marine Planning Partnerships and licensing authorities should seek to identify significant historic environment resources at the earliest stages of planning or development process and preserve them in situ wherever feasible. Adverse effects should be avoided, or, if not possible, minimised and mitigated. Where this is not possible licensing authorities should require developers to record and advance understanding of the significance of the heritage asset before it is lost, in a manner proportionate to that significance;
- The Historic Environment Policy Statement for Scotland (HEPS) (2019) includes policies that decisions affecting any part of the historic environment require understanding of its significance and consideration of avoiding or minimising detrimental effects;
- Historic Environment Scotland Designation Policy and Selection Guidance (2019) stands alongside HEPS 2019 and outlines the principles and criteria that underpin the designation of HMPAs; and
- Historic Environment Scotland (2016). Managing Change in the Historic Environment Guidance Note: Setting.

14.8.3 Assessment Methodology

The approach adopted for the EIA will follow that outlined within Chapter 2, will be based on the maximum design envelope approach and on relevant legislation and policy in order that the licensing authorities have sufficient and adequate information on which to base a decision.

A desk-based assessment will be conducted to identify any possible (as well as known) submerged cultural heritage within the study area. It would capture marine historic assets that have the potential to be present due to an unknown location of loss, since there could be assets of moderate and high heritage value present. The desk-based assessment would be conducted to appropriate professional standards (CIfA Standards and Guidance, 2014 and as revised). The importance of marine historic environment assets would be evaluated to inform the assessment. The level of importance assigned depends on a number of factors, including intrinsic, contextual and associative characteristics. This will be based on:

1. HES (2019). Designation Policy and Selection Guidance, including Annexes;

2. English Heritage (2012). Ships and Boats: Prehistory to Present. Designation Selection Guide. Swindon: English Heritage; and
3. Wessex Archaeology (2011). Assessing Boats and Ships 1860-1913, 1914-1938 and 1939-1950. Archaeological Desk-Based Assessments in 3 volumes. Salisbury: Wessex Archaeology.

The assessment would address the identification of any marine historic assets on the seabed, so that avoidance of effect can be embedded in the Project design, and if avoidance is not possible, then an evidence-based approach will be used to design suitable mitigation strategies in consultation with MS-LOT and HES.

For any marine archaeology effects scoped in, the assessment will be conducted based on analysis of desk-based sources (including GIS based gazetteer) and geophysical and geotechnical data collected specifically for the proposed development. The assessment of the magnitude of effect and the significance of effect on marine historic environment assets will be based on Scottish Natural Heritage & Historic Environment Scotland's Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland, V5, 2018. Specific detailed methodology for the historic environment will be agreed in consultation with statutory stakeholders.

15. UNDERWATER NOISE

15.1 Introduction

This chapter sets out the proposed approach to assessing the potential for Underwater Noise to arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. An Underwater Noise study will be undertaken to assess the level of underwater noise generated during the construction, operation, maintenance and decommissioning of the Project. This will in turn support assessments of the potential likely effects ecological receptors that may arise as a result of noise generated during the construction, operation, maintenance and decommissioning from ÒnM. This chapter describes the methodology to be used for the noise study that will inform the EIA and an overview of the potential for the Project to introduce noise int the receiving environment in the Sound of Islay. A qualitative description of likely ambient noise characteristics at the Project area is provided.

15.2 Receiving Environment

No separate study area has been outlined for Underwater Noise as this is defined by the receptors and discussed within the chapters of the relevant topics. In terms of the receiving environment, this chapter aims to:

(a) enable the site to be characterised as much as possible at this stage of the EIA process

(b) highlight any particular gaps in knowledge of the existing environment and where additional data/surveys may be required to fill those gaps

Of particular reference are Chapter 9 (Marine Mammals) and Chapter 11 (Fish and Shellfish).

15.3 Data Sources and Baseline

15.3.1 Data Sources

Seabed bathymetry data will be sourced from the online General Bathymetric chart of the Oceans (GEBCO) database[31]. GEBCO's current gridded bathymetric dataset, the GEBCO_2021 Grid, is a global terrain model for ocean and land, providing elevation data, in meters, on a 15 arc-second interval grid. Seabed sediment and geological condition data will be sourced from the Deep Sea Drilling Project (DSDP)[32].

15.3.2 Baseline

Background or "ambient" underwater sound is created by several natural sources, such as rain, breaking waves, wind at the surface, seismic sound, biological sound and thermal sound. Of particular importance in sites designated for tidal turbines is the flow noise from the strong tidal flows. The sound can be either impulsive (pulsed) such as impact piling though only pin-piling is relevant to this Project), or non-impulsive (continuous) such as ship engines, and the magnitude of the effect on marine life will depend heavily on these characteristics. Biological sources include Marine Mammals (using sound to communicate, build up an image of their environment and detect prey and predators) as well as certain fish and shrimp. Anthropogenic sources of sound in the marine environment include fishing boats, ships (non-impulsive), marine construction noise, seismic surveys and leisure activities (all could be either impulsive or non-impulsive), all of which add to ambient background sound.

[31] https://www.gebco.net/data_and_products/gridded_bathymetry_data/
[32] http://deepseadrilling.org/

Anthropogenic sound within the vicinity of ÒnM will arise primarily from shipping with contributions from subsea geophysical and geotechnical surveys.

Historically, research relating to both physiological effects and behavioural disturbance of noise on marine receptor has typically been based on determining the absolute noise level for the onset of that effect (whether presented as a single onset threshold or a dose response/probabilistic function). Consequently, the available numerical criteria for assessing the effects of noise on Marine Mammals, fish and shellfish, tend to be based on the absolute noise criteria, rather than the difference between the baseline noise level and the noise being assessed (Southall *et al*., 2019).

Baseline noise levels vary significantly depending on multiple factors, such as seasonal variations and different sea states. Lack of long term measurements/sound data is a widely recognised gap in knowledge in relation to general soundscape and potential effects of human activities on marine life. Understanding the baseline sound level could therefore be valuable in enabling future studies to assess long term effects related to continuous sound levels over time in addition to activity specific effects such as masking effects. Nevertheless, the value of establishing the precise baseline noise level is also somewhat diminished in relation to the current study due to the lack of available evidence-based studies on the effects of noise relative to background on marine receptors.

15.4 Relevant Guidance and Assessment Tools

Specific to the Underwater Noise assessment, the following guidance documents will be considered:

- Good practice guide to Underwater Noise measurement (NPL, 2014);
- Review of underwater acoustic propagation models (NPL) (Wang *et al*., 2014);
- National Oceanic and Atmospheric Administration (NOAA) technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (NMFS, 2016);
- Underwater acoustic thresholds for onset of permanent and temporary threshold shifts (NMFS, 2018);
- Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects (Southall *et al.,* 2019);
- Sound exposure guidelines for Fishes and Sea Turtles (Popper *et al*., 2014);
- JNCC guidelines for minimising the risk of injury to Marine Mammals from geophysical surveys (JNCC, 2017).;
- Guidance on noise management in harbour porpoise SACs (JNCC, 2020); and
- The European Union (EU) Marine Strategy Framework Directive (Directive 2008/56/EC). This seeks to achieve good environmental status (GES) in Europe’s seas by 2020. The qualitative descriptors for determining GES include "Introduction of energy, including Underwater Noise, is at levels that do not adversely affect the marine environment." This Directive was transposed into United Kingdom (UK) law by the Marine Strategy Regulations 2010.

15.5 Design Parameters

15.5.1 Key Design Parameters

The Underwater Noise scoping assessment is based on the key assumptions, which are set out in Chapter 5 (The Project).

15.5.2 Embedded Mitigation

Measures adopted as part of the development are discussed within each of the relevant chapters of the EIA Scoping Report for which subsea noise is considered relevant (for example Marine Mammals). The requirement and feasibility of any further measures will be dependent on the significance of the effects of Underwater Noise on the receptors associated with each topic and will be consulted upon with statutory consultees through the EIA process. Any approach to noise mitigation will be informed by best available evidence and latest guidance, including any lessons learnt within the industry.

15.6 Potential Project Effects

15.6.1 Potential Effects

Table 15-1 details the potential for the ÒnM Project to generate Underwater Noise and its subsequent possible environmental effects. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. below.

Table 15-1 Potential Effects of the ÒnM Project from Underwater Noise

Potential Effect	Project Phase	Rationale and Commentary
Generation of underwater noise from vessel movements and effects on marine life.	All Phases	Although noise from these sources will be relatively low in level and continuous in nature (rather than impulsive) there is still some residual potential for disturbance due to long term increased vessel traffic. Based on Nova's experience at the Shetland Tidal Array, it is anticipated that installation of the turbines can be achieved at the rate of one turbine per day, with the nacelle installed during a single slack water period. As such, the construction period is anticipated to be of short duration and will use primarily small 'multicat' work vessels. Vessel movements will be even more limited during the operational phase. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Generation of underwater noise from cable laying and effects on marine life.	Construction	There is potential for effects on marine life from noise generated during cable laying activities, including from trenching (if required). Cables are expected to be surface laid, but this will be confirmed following site surveys. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Generation of underwater noise from acoustic site surveys and effects on marine life.	Pre-application (limited relevance for other Project Phases)	There is potential for effects on marine life from site surveys, particularly geotechnical or geophysical surveys (if required). However, it is anticipated that if required, any such surveys would most likely be carried out at the pre-application stage, to inform the final project design. A such, any consenting or licensing requirements would be addressed prior to the submission of the consent applications for the ÒnM project **For reasons stated above, this potential effect is highly unlikely to be significant for the ÒnM project beyond the pre-application phase. However, on a precautionary basis it will be scoped into the EIA, to cover the unlikely scenario that acoustic surveys are required after pre-application phase.**
Generation of underwater noise from operational turbines and effects on marine life.	Operation	Noise levels from operating devices are not predicted to be significantly greater than the ambient noise in the Sound or at levels likely to cause injury or significant behavioural changes to marine life. No disturbance effects on marine life have been observed from Nova's environmental monitoring programme at the Shetland Tidal Array, but it is acknowledged that this is different site and species may have different sensitivities to disturbance. **This potential effect will be scoped into the EIA.**

15.6.2 Cumulative Impacts

The assessment of cumulative impacts will be covered within the Marine Mammals Marine Mammals and Fish and Shellfish Ecology chapters.

15.7 Mitigation Measures

No additional mitigation measures are proposed at this stage for Underwater Noise, over and above those proposed in Section 15.5.2.

15.8 Proposed Approach to EIA

The tidal turbine proposed is gravity-based, therefore no subsea drilling is required during installation. Pin-piling may be considered to replace concrete ballast depending on site conditions and turbine size, but quantitative noise modelling of piling is not considered proportionate. Subsea cables will be surface-laid. There is therefore very limited potential for the creation of subsea noise leading to species disturbance during offshore construction works.

Based on Nova's experience at the Shetland Tidal Array, it is anticipated that installation of the turbines can be achieved at the rate of one turbine per day, with the nacelle installed during a single slack water period. As such, the construction period is anticipated to be of short duration, and will use primarily small 'multicat' work vessels.

Given the existing vessel activity in proximity of the Project location, vessel presence and any noise generated as a result of offshore works is highly unlikely to exceed background levels. Offshore works are therefore highly unlikely to present any greater disturbance to species at the Project location than the vessel presence and noise to which they are already exposed through regular transit of the Jura/Islay ferry and other existing marine traffic.

An Underwater Noise assessment will be undertaken to determine the effect of construction and operational noise, and a robust, peer reviewed model will be employed if any potentially significant risk from underwater noise is identified. The noise source level for operational turbines will be determined from operational measurements to be taken by Seiche Ltd of Nova's turbines in Bluemull Sound in 2023. The requirement for modelling will be reviewed based on that data but it is anticipated that a qualitative, desk-based assessment of the effects of operational noise will be sufficient, with no modelling or measurements of ambient noise in the Sound of Islay required.

The effect criteria will be based on the most recent and up-to-date scientific research and guidance, while utilising a precautionary approach. Potential effects arising from underwater noise on marine mammals and fish will be assessed with respect to the potential for injury and behavioural disturbance. Noise source data will be based on the measured data from Nova's turbines in Bluemull Sound, Shetland. Detailed source level modelling will only be undertaken where reasonable and proportionate. The associated source levels of other types of underwater noise associated with ÒnM will be based on published data and established prediction methodologies.

On the basis of guidance and previous underwater noise modelling for other recent offshore renewables projects, the assessment will consider the bathymetry and other characteristics of the area, including the geo-acoustic properties of the seabed, as well as other factors such as the sound source characteristics and frequency range of interest. It is anticipated that the underwater noise assessment will likely include:

- A review of the publicly available literature and studies on the effect of impulsive underwater noise on marine mammal and fish species, including an assessment of the sensitivity of fish and marine mammals to underwater noise, and derivation of criteria for estimating the effect, to be agreed with Marine Scotland and its consultees including NatureScot.

- Estimation of the maximum scenario for effect during the construction, operation and decommissioning phases.
- Qualitative assessment of underwater noise sources during the construction and operation and maintenance phases to predict the effect of Marine Mammals and fish.
- Noise propagation modelling, where appropriate and proportionate, to asses the potential effect ranges for injury and behaviour to marine mammals and fish as a result of the construction, and operation and maintenance phases.

Whilst it is anticipated that all noise sources will be assessed qualitatively, the following information is provided in the unexpected case that modelling is required. The need for noise modelling will be discussed with Marine Scotland and its consultees, including NatureScot, pending results of the analysis of noise measurements from Nova's operational turbines in Bluemull Sound, Shetland.

The model will be used to estimate the unweighted and hearing group weighted Sound Exposure Level (SEL), Root Mean Square (rms) (T90) sound pressure level and peak (peak-to-peak) pressure level parameters, as recommended by Southall et al., 2019, National Marine Fisheries Service (NMFS) 2018, Southall et al., 2007, Acoustic Society of America (ASA) Sound Exposure Guidelines for Fishes and Sea Turtles (Popper et al., 2014) and other guidance. The model will also incorporate swim speeds of Marine Mammals and Fish and Shellfish Ecology to calculate cumulative SELs (for example see Table 15-2)

Table 15-2 Assessment swim speeds for marine mammals and fish that are likely to occur within the vicinity of ÒnM, for the purpose of exposure modelling

Species	Hearing Group	Swim Speed (m/s)	Source Reference
Harbour seal *Phoca vitulina*	Phocid Carnivores in Water (PCW)	1.8	Thompson, 2015
Grey seal *Halichoerus grypus*	PCW	1.8	Thompson, 2015
Harbour porpoise *Phocoena phocoena*	Very High Frequency (VHF)	1.5	Otani *et al.,* 2001
Minke whale *Balaenoptera acutorostrata*	Low Frequency (LF)	2.3	Boisseau *et al.,* 2001
Bottlenose dolphin *Tursiops truncatus*	High Frequency (HF)	1.52	Bailey and Thompson, 2010
White-beaked dolphin *Lagenorhynchus albirostris*	HF	1.52	Bailey and Thompson, 2010
Short beaked common dolphin *Delphinus delphis*	HF	1.52	Bailey and Thompson, 2010
Risso's dolphin *Grampus griseus*	HF	1.52	Bailey and Thompson, 2010
Basking shark *Cetorhinus maximus*	Group 1 fish	1.0	Sims, 2000
All fish hearing groups (excluding basking sharks)	Group 1 to 4 fish	0.5	Popper *et al*., 2014

If deemed necessary and proportionate, the results of the noise modelling would be presented in an Underwater Noise Technical Report.

Nova recently worked with the Offshore Renewable Energy Catapult and Seiche Ltd to carry out measurements of the noise generated by its operational array of turbines in Bluemull Sound, Shetland. The data have not been fully analysed, but the results will be available for use in the EIA for ÒnM. The noise signature of Nova's operational turbines presented alone and in the context of ambient background noise in Bluemull Sound will be an important part of the baseline for the assessment of underwater noise resulting from the operational phase of ÒnM.

16. ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS FOR ONSHORE TOPICS

16.1 Terrestrial and Onshore Ecology

16.1.1 Introduction

This chapter sets out the proposed approach to the assessment of potential effects on terrestrial ecology and terrestrial ornithology that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It provides an overview of terrestrial ecology and ornithology interests within the scoping area for the different locations for onshore infrastructure currently under consideration for the Project and included in the project design envelope described in Chapter 5 (The Project).

The proposed methodology to be applied in the EIA to consider the potential direct and indirect effects on terrestrial ecology that may arise from the construction, operation and decommissioning of the Project are presented Indicative Receiving Environment

16.1.2 Indicative Receiving Environment

As outlined in Chapter 5 (The Project) five landfall options are currently being explored for the ÒnM Project, on Islay and Jura (see Figure 5-8 for details). All of these have been included in the initial assessment of LSE on Terrestrial Ecology for the purposes of EIA scoping. It is expected that some of the five options will be excluded from the final project design envelope, resulting in a corresponding reduction in the final scope of the EIA.

The study area for terrestrial ecology and ornithology will be defined as the onshore cable landfall and potential grid connection corridors for each of the landfall options, as well as the following buffer zones, which are informed by best practice guidance published by CIEEM[33] and NatureScot[34]:

16.1.2.1 Desk Study Guidelines

- Internationally designated areas: 5km;
- Nationally designated areas and non-statutory designated sites: 1km;
- Records of extant protected species/species of conservation interest records from 2002 onwards (i.e., those species protected by nature conservation legislation or identified as priority species by national and local policy): 2km; and
- Areas of potentially nationally important peatland and habitats of conservation concern within the proposed locations of the onshore infrastructure, and a buffer of up to 250m.

16.1.2.2 Field Study Guidelines

Following further exploration of the different landfall options and receipt of the Scoping Opinion, the need for, and extent of, onshore field surveys will be confirmed. The following will be considered:

[33] CIEEM (May 2021). Good Practice Guidance for Habitats and Species. Available at: https://cieem.net/resource/good-practice-guidance-for-habitats-and-species/ (Accessed 23/01/23)
[34] NatureScot. Planning and Development: Standing Advice and Guidance Documents. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents (Accessed 23/01/23)

- Habitats of conservation concern: (i.e., Annex 1 habitats, Groundwater Dependent Terrestrial Ecosystems (GWDTE), Scottish Biodiversity List, Local Biodiversity Action Plan Priority Habitats) up to 250m;
- Protected species/species of conservation interest: up to 200m.

A review of internationally designated areas for nature conservation purposes within 5km, relevant to terrestrial ecology and ornithology has identified that Jura, Scarba and the Garvellachs SPA is located within the Study Area for the possible landfall on Jura near Whitefarland Bay Option 1 (Figure 5-8). The SPA is designated for its breeding population of Golden Eagle *Aquila chrysaetos*. No further internationally or nationally designated sites for nature conservation were identified within 1km of landfall Options 1-5.

16.1.3 Data Sources and Baseline

A more detailed desk study will be undertaken to inform field surveys and identify existing terrestrial ecological features of potential importance within defined buffers around the landfall options once confirmed. The desk study will include searches of the following sources to identify existing records for designated sites, habitats and protected species:

- NatureScot Site Link Website[35]
- Scotland Environment Mapping Service[36]
- Argyll and Bute Proposed Local Development Plan 2 2019
- Argyll and Bute Local Biodiversity Duty Action Plan 2016 - 2021
- National Biodiversity Network Atlas Scotland under a CC-BY licence[37]
- Multi-Agency Geographic Information for the Countryside (MAGIC)[38]
- Ancient Woodland Inventory[39]
- The Carbon and Peatland Map[40]
- If appropriate, records will also be requested from the Islay Natural History Centre (INHC).

Desk study data will be used to inform the scope and extent of field surveys required to establish the terrestrial ecological baseline.

Any required field studies will be undertaken within the defined study areas in line with best practice guidelines endorsed by NatureScot[41] and CIEEM[42] and may include the following:

[35] NatureScot SiteLink. Available At: https://sitelink.nature.scot/home
[36] Scottish Environment Protection Agency (n.d.) Scotland's Environment Map [online]. Available at: https://map.environment.gov.scot/sewebmap/
[37] NBN Atlas Scotland. Available at: www.nbnatlas.org
[38] Department for Environment, Food and Rural Affairs *et al* (n.d.) Multi-Agency Geographic Information for the Countryside [online]. Available at: http://magic.defra.gov.uk
[39] Ancient Woodland Inventory. Available at: https://map.environment.gov.scot/sewebmap/
[40] NatureScot. Carbon and Peatland Map. Available at: Carbon and Peatland 2016 map | NatureScot
[41] NatureScot. Planning and Development: Standing Advice and Guidance Documents. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents
[42] CIEEM (May 2021). Good Practice Guidance for Habitats and Species. Available at: https://cieem.net/resource/good-practice-guidance-for-habitats-and-species/

16.1.3.1 Habitat Surveys

An Extended Phase 1 Habitat Survey[43] will be undertaken within the final study area(s) once confirmed, in line with best practice guidelines, to record broad habitat types and their suitability to support protected species.

If habitats of conservation concern (including GWDTEs[44]) are identified during the Phase 1 Habitat Survey, National Vegetation Classification (NVC)[45] survey will be undertaken within the chosen Option Study Area to categorise the plant communities present.

16.1.3.2 Protected Species Surveys

Requirements for protected species surveys will be confirmed by the Phase 1 Habitat Survey of the study area in due course; however, these may include the following receptors:

- Badger Meles meles[46]
- Otter Lutra lutra[47]
- Water vole Arvicola amphibius[48]
- Bats: a Preliminary Bat Roost Assessment of trees and structures potentially impacted by the onshore Project components
- Pine marten Martes martes and Red squirrel Sciurus Vulgaris[49] (should Option 5 be chosen)

Assessments presented within the EIAR will be undertaken in accordance with CIEEM guidance (2019).

[43] JNCC. Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (2010). Available at:https://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf
[44] SEPA Guidance note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.
[45] Rodwell *et al.* National Vegetation Classification (vols 1 – 5). 1991 – 2002. Accessed 23/01/23)
[46] Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1. Available at: https://www.scottishbadgers.org.uk/wp-content/uploads/2020/12/Surveying-for-Badgers-Good-Practice-Guidelines_V1-2020-2455979.pdf (Accessed 23/01/23)
[47] Scottish Natural Heritage (2016). Protected Species Advice for Developers Otters. [Online]. Available at:https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20otter.pdf (Accessed 23/01/23)
[48] Strachan, R. & Moorhouse, T. (2006). Water Vole Conservation Handbook 2nd Edition. Wildlife Conservation Research Unit, University of Oxford, Oxford.
[49] Gurnell, J & Pepper, H (1994). Red Squirrel Conservation: Field Study Methods. Research Information Note 255. Forestry Commission, Edinburgh.[Online]. Available at: Red squirrel conservation: field study methods (windows.net)(Accessed 23/01/23).

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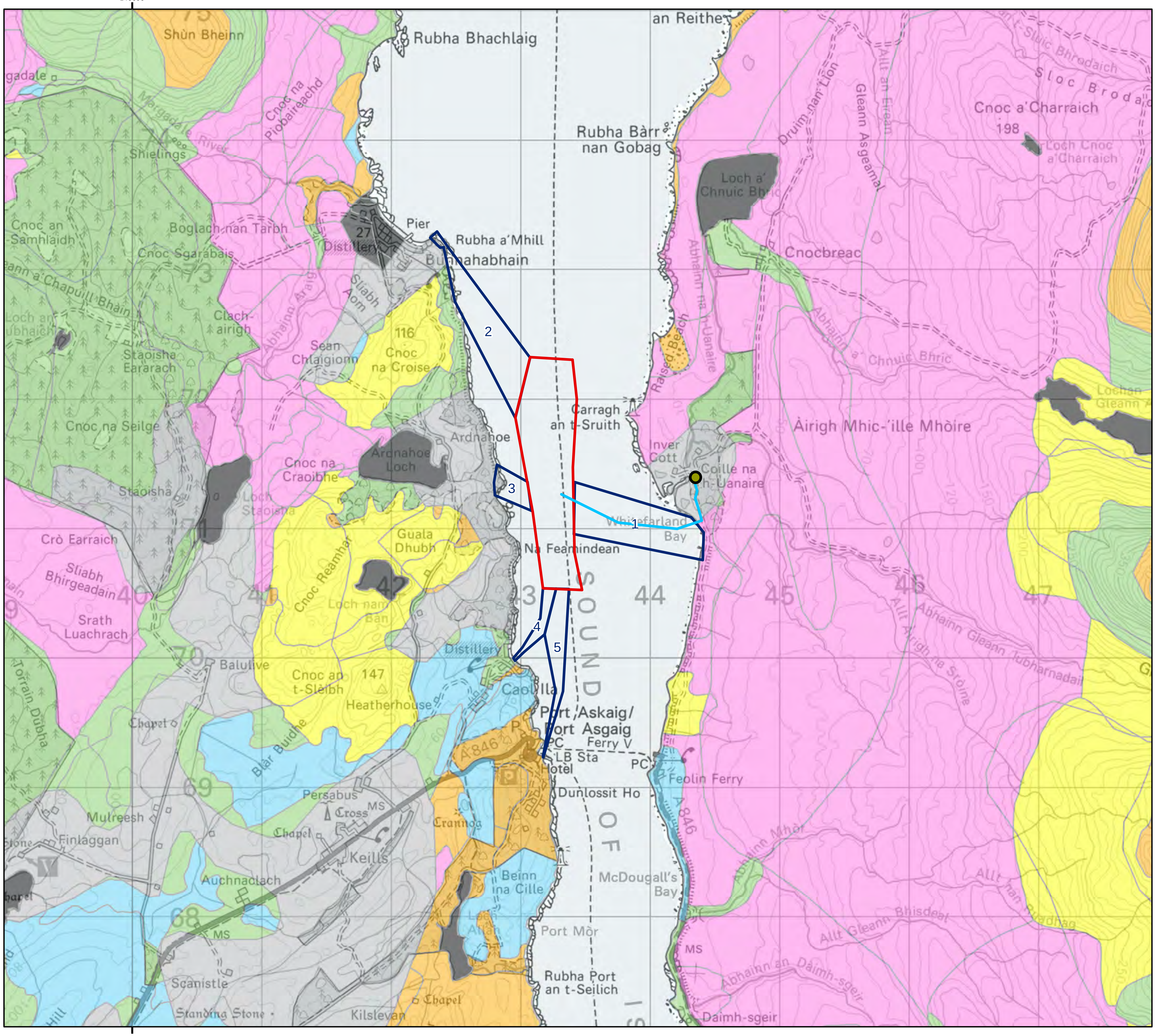

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NatureScot Carbon and Peatland Map

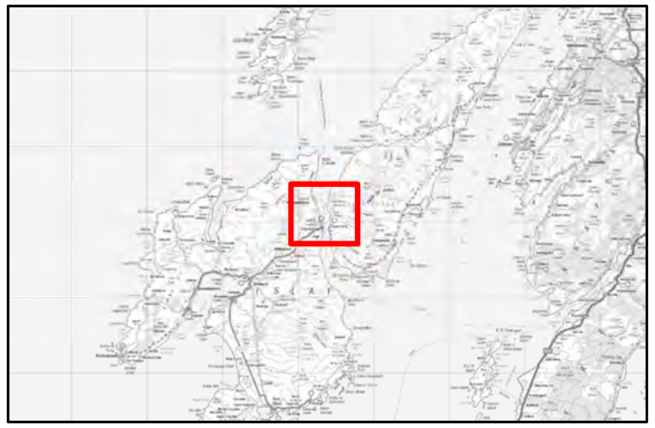
5-1	A

- Offshore Lease Area
- Indicative Cable Corridors
- Indicative Grid Cable Route (Jura)
- Indicative Substation (Jura)

Carbon and Peatland (NatureScot)

- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Mineral Soil (Class 0)
- Non-soil (Class -2)

N W E S



NOTE: Not to be used for Navigation

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Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; OSOD, LUC, Scot Gov, NatureScot
File Reference	Fig_5-1_12237_r0_CarbonPeatland.mxd
Created By	Henry Wingfield, LUC
Reviewed By	Lewis Castle, Intertek
Approved By	Aodhfin Coyle, Intertek

km 0 0.25 0.5

16.1.3.3 Landfall Option(s) Baseline

As indicated on NatureScot's Carbon and Peat 2016 map[50], and shown on Figure 16-1, landfall Option 1 (the Whitefarland Bay area on Jura) is in an area dominated by mineral soils, while its wider surrounds are dominated by Class 1 peat. Class 1 peatlands are areas that are likely to be of high conservation value and are considered to be nationally important carbon-rich soils, deep peat and priority peatland habitat. There are also several watercourses, drainage channels and water bodies within the vicinity of the landfall Option 1.

Landfall Option 2 (Bunnahabhain Bay on Islay) is in an area dominated by scrub and acid grassland/heath habitats, with several watercourses in the vicinity. NatureScot's Carbon and Peat 2016 map indicates that the landfall area comprises mineral soils, with Class 1 and 4 peat approximately 325m to the north and west and Class 2 and 5 peat soils to the south (Figure 16-1).

Landfall Option 3 (near Ardnahoe on Islay) is dominated by scrub and acid grassland/heath habitats. Eas Carriage Duibhe river and Ardnahoe Loch are located to the west of the landfall location. The Carbon and Peat 2016 map indicates that mineral soils are present in this area.

Landfall Option 4 (near Caol lla on Islay) is in an area dominated by scrub and acid grassland/heath habitats, with several watercourses nearby. The Carbon and Peat 2016 map indicates that the area to the north of the landfall is dominated by Class 5 peat and Class 3 peat soils. The area to the south of the landfall is dominated by Class 3 and 4 soils.

Landfall Option 5 is in proximity to Port Askaig ferry terminal. The area to the south is dominated by commercial plantation forestry, with areas to the west and north dominated by scrub and acid grassland/heath habitats. The Carbon and Peat 2016 map indicates that the land is classified as Class 4 peat, although it is likely that any peat in the area has been modified due to the construction of the ferry terminal. In addition, this area has potential to support Pine marten *Martes martes* and Red squirrel *Sciurus Vulgaris*[51]. Further survey for these species would be undertaken should this landfall option be pursued.

For the most part it is likely that any peat in the vicinity of landfall Options 2 to 5 on Islay have been modified due to the construction of the distilleries and the port, but this would be confirmed in surveys.

16.1.4 Relevant Guidance and Assessment Tools

The ecological assessment will be carried out with cognisance of the following relevant guidance and standards:

- Chartered Institute of Ecology and Environmental Management (CIEEM), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine[52].
- NatureScot, standing advice and guidance series for Planning and Development[53].

[50] NatureScot (2016) Carbon and Peat Map, Available at: https://map.environment.gov.scot/Soil_maps/?layer=10&layer=10
[51] Gurnell, J & Pepper, H (1994). Red Squirrel Conservation: Field Study Methods. Research Information Note 255. Forestry Commission, Edinburgh. [Online]. Available at: Red squirrel conservation: field study methods (windows.net)
[52] Chartered Institute of Ecology and Environmental Management (CIEEM), (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine (Version 1.2 Updated April 2022). Available at: https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/
[53] NatureScot (2023) Planning and development: standing advice and guidance documents, Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents

- Species survey guidelines as identified by CIEEM[54].
- Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[55].

16.1.5 Potential Project Effects

Table 16-1 provides a summary of the potential effects of the ÒnM project on terrestrial ecology and ornithology. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all five landfall options on Islay and Jura currently being explored have been considered. .

[54] CIEEM (2021) Good Practice Guidance for Habitats and Species, Available at:https://cieem.net/wp-content/uploads/2021/05/Good-Practice-Guide-April-2021-v6.pdf

[55] Chartered Institute of Ecology and Environmental Management (CIEEM), (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine (Version 1.2 Updated April 2022. Available at: https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/ (Accessed 23/01/23)

Table 16-1 Potential Effects of the Project on Terrestrial Ecology and Ornithology

Potential Effect	Project Phase	Rationale and Commentary
Direct and indirect effects on habitats of conservation concern.	Construction and Decommissioning	Habitats of conservation concern could be present within the onshore ÒnM Project area and be subject to direct and indirect effects including habitat loss, fragmentation and severance. This will be determined in the EIA, including through site survey. **This potential effect will be scoped into the EIA.**
Direct effects on non-avian protected species.	Construction and Decommissioning	Non-avian protected species could be present within the onshore ÒnM Project area and be subject to disturbance/ dispersal and mortality. This will be determined in the EIA, including through site survey. **This potential effect will be scoped into the EIA.**
Direct effects on terrestrial avian species.	All Phases	The small-scale of the onshore infrastructure for the Project and very limited land-take minimise the potential for any disturbance, dispersal or mortality to birds. **This potential effect has been scoped out of the EIA.**
Direct and indirect effects on Statutory Designated Areas (Jura, Scarba and the Garvellachs SPA)	All Phases	The small-scale of the onshore infrastructure for the Project and very limited land-take minimise the potential for any direct or indirect effects on the SPA. **This potential effect has been scoped out of the EIA.**

16.1.6 Mitigation Measures

The identification and adoption of embedded mitigation measures to avoid or minimise adverse effects upon terrestrial ecological and ornithological features will form part of the iterative design process for ÒnM that will be carried out in parallel to the EIA. Ecological baseline data will be used to inform this design process.

Full details of the scheme's design evolution and embedded mitigation measures in relation to terrestrial ecology and ornithology will be detailed within the EIAR. Where LSE are identified, within the context of the EIA Regulations, mitigation measures will be identified and agreed in consultation with relevant stakeholders. All mitigation measures will be developed on the basis of robust science, drawing on current and emerging good practice and its likely efficacy and success will be considered. For completeness, mitigation to safeguard legal compliance will also be included in this section.

The following embedded good practice mitigation measures will be assumed to be in place for the purpose of the assessment:

- Design iteration to avoid or reduce impacts on ecological features;
- Design iteration to avoid encroachment of infrastructure into designated sites and Category 1 and 2 peat habitats;
- Reinstatement of habitats to pre-construction conditions, or better, where possible;
- Careful timing of activities and other construction measures such as ramping of trenches to avoid effects on protected species;
- The production of Species Protection Plans (SPP) where appropriate, which may include the requirements of the species licencing process. The species licensing process requires detailed and targeted mitigation, and if necessary, biodiversity compensation;
- The production of a Bird Management Plan if required, including pre-construction nesting bird checks, timing restrictions on activities that may affect terrestrial birds and incorporation of relevant buffer zones in relation to nesting birds as appropriate. This may be required to ensure compliance with the Wildlife and Countryside Act 1981 (as amended);
- The development and application of a CEMP, which will set out guidance on compliance with nature conservation legislation and policy;
- Production of a Pollution Prevention Plan (PPP) and adherence to Guidelines on Pollution Prevention (GPPs), which will significantly reduce the likelihood and severity of pollution events and associated impact to water ecology;
- The updating of protected species surveys pre-construction to confirm the status of protected species prior to works commencing; and
- The appointment of an Advisory Environmental Clerk of Works (ECoW) to advise, monitor and report on compliance with relevant legislation, policy and project specific mitigation during construction.

16.1.7 Proposed Approach to EIA

16.1.7.1 Approach to Assessment

The assessment will be undertaken in accordance with and take account of relevant guidance (including from NatureScot [56] and CIEEM guidance[57]).

The approach to assessment will take account of existing guidance and published scientific literature, together with professional judgement and relevant experience.

The EIAR will provide a detailed description of the existing baseline for terrestrial ecology within the confirmed study area(s), along with the assessment of the potential effects of the Project on the identified important terrestrial ecological features, taking account of mitigating measures to avoid and reduce significant effects where appropriate.

16.1.7.2 Determining Importance and Significant Effects

The assessment within the EIAR will only assess in detail effects upon important terrestrial ecological features i.e., those that are considered important and potentially significantly affected by The Project. A detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project effects will not be undertaken and justification for 'scoping out' these features will be provided within the EIAR.

Relevant international, national and local legislation, policy and guidance will be referenced to determine the importance (or 'sensitivity') of terrestrial ecological features. In addition, importance will also be determined using professional judgement, specialist consultation advice as appropriate and the results of baseline surveys and the importance of features within the context of the geographical area.

Importance will not necessarily relate solely to the level of legal protection that a feature receives, and terrestrial ecological and ornithological features may be important for a variety of reasons, such as their connectivity to a designated site and the rarity of species or the geographical location of species relative to their known range.

The importance of ecological features will be defined in a geographical context from 'Local' to 'International' in line with CIEEM guidelines. A significant effect in EIA terms is determined to be any effect which is assessed to be of greater than local importance.

16.1.7.3 Identification and Characterisation of Effects

The identification and characterisation of effects on important terrestrial ecological and ornithological features will be undertaken in accordance with the CIEEM guidelines[58] with reference made to magnitude (e.g., area or number of individuals to be impacted), extent, duration and reversibility as appropriate.

Effects will be considered during the construction, operational and decommissioning phases and will be assessed on the basis that a clearly defined range of avoidance and standard good practice measures are implemented.

[56] NatureScot. Carbon and Peatland Map. Available at: Carbon and Peatland 2016 map | NatureScot (Accessed 23/01/23)
[57] Chartered Institute of Ecology and Environmental Management (CIEEM), (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine (Version 1.2 Updated April 2022. Available at: https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/ (Accessed 23/01/23)
[58] Chartered Institute of Ecology and Environmental Management (CIEEM), (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine (Version 1.2 Updated April 2022). Available at: https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/

16.1.7.4 Cumulative Assessment

The effects of the Project will be assessed in isolation and in combination with predicted effects of other relevant large-scale developments within 5km of the Project, in accordance with the approach set out in Chapter 2.

16.2 Landscape, Seascape and Visual Amenity

16.2.1 Introduction

This section considers the potential likely effects on Landscapes, seascapes and visual amenity that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It provides an overview of the baseline conditions within the Project area including the locations currently under consideration for the onshore Project infrastructure described in Chapter 5 (The Project).

The Seascape, Landscape and Visual Impact Assessment (SLVIA) which will be carried out as part of the EIA will consider direct and indirect effects of the ÒnM Project on landscape and seascape resources, landscape and seascape character and designated landscapes and seascapes. It will examine the nature and extent of effects on views and visual amenity experienced by people. The effects will be assessed for the construction, operational and maintenance and decommissioning phases of the Project.

Given that the design of the onshore substation is yet to be finalised, this EIA Scoping Report bases the onshore substation and energy storage scheme on the following broad parameters, further detail of which is provided in Chapter 5 of this Scoping Report:

- Small modular designs deployed for control, LV switchgear, grid interface equipment and transformers;
- A single storey system based on pre-commissioned transportable containers, or a permanent building;
- Potential inclusion of a small modular energy storage (battery or H2) system; and
- Associated undergrounded cables.

The SLVIA will be undertaken following the approach set out in Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3)[59]. The assessment will also draw upon current good practice guidance issued by NatureScot (formerly SNH) and the Landscape Institute (section 16.2.4).

16.2.2 Indicative Receiving Environment

The receiving environment for the ÒnM Project includes the offshore area, the coastal edge and its immediate hinterland and areas in which the onshore infrastructure will be located.

The Sound of Islay is a narrow channel (approximately 1.5km) contained by the upland landform of Jura and Islay. A number of small islands occur close to the southern coast of Jura, although in general, the Sound forms a clear, open stretch of water separating the two islands. The general area has been categorised by NatureScot as Regional Coastal Character Type 9 (Sound, Narrows and Island).

A 2km study area boundary will be adopted for the final landfall option(s). Based on professional judgement and experience, a 2km study area is considered proportional to the size and scale of the onshore infrastructure, which is likely to be similar across the five options currently under

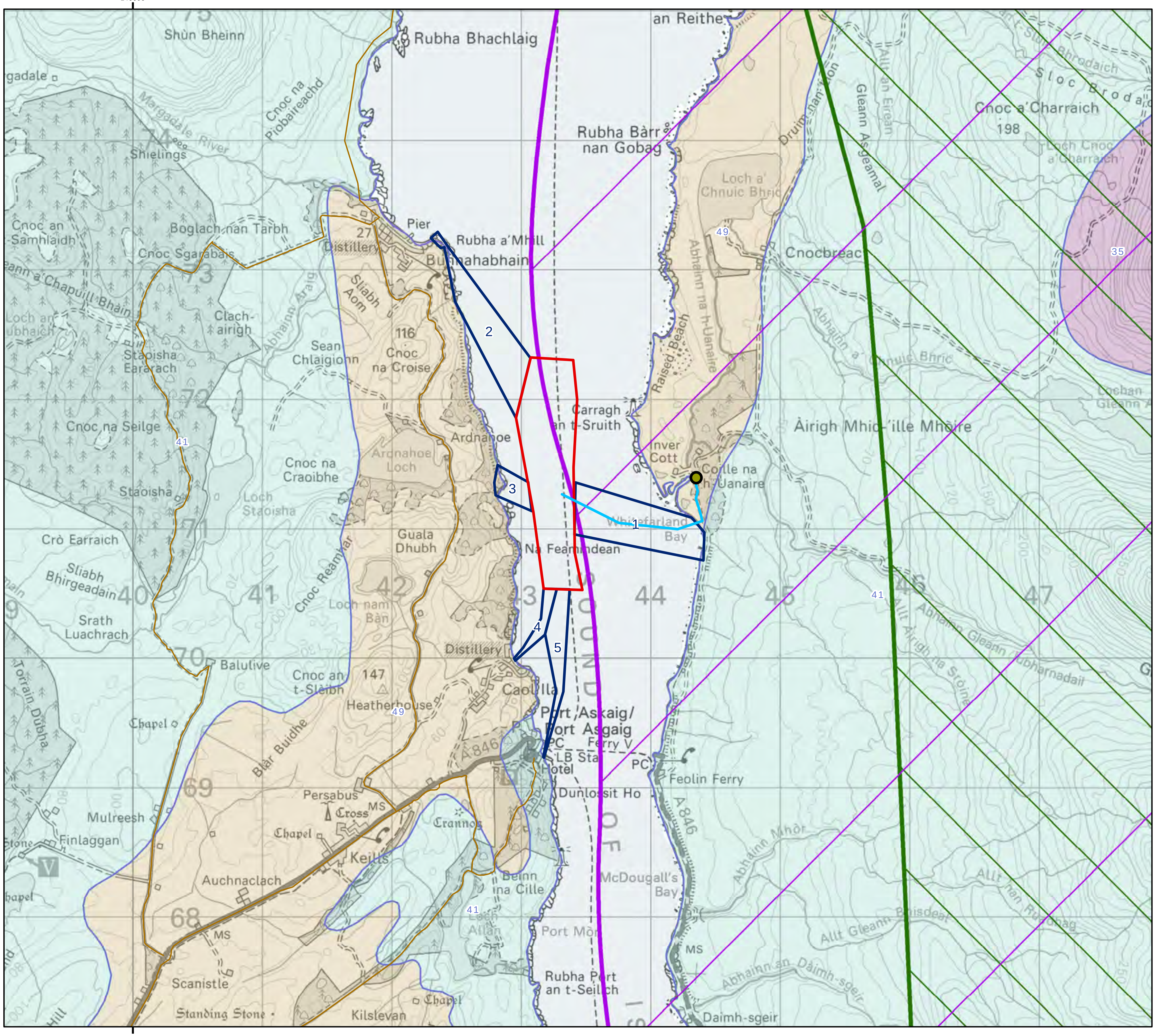
[59] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment. Third Edition (GLVIA3).

consideration. The study area will be reviewed once full details of the landfall option(s) and onshore infrastructure have been finalised, to ensure that all likely significant effects are addressed.

Landfall Option 1 in the Whitefarland Bay area is within the Jura National Scenic Area (NSA). The eastern part of the study area would cover part of the western coast of Jura and the undulating moorland uplands which forms the hinterland. This eastern edge of the study area overlaps with the western edge of the Jura, Scarba, Lunga and Garvellachs Wild Land Area (WLA). To the north, the study area reaches the southern edge of Loch a' Chnuic Bhric and to the south extends to the Feolin Ferry pier, both points located on the western coast of Jura. The western part of the study area covers the Sound of Islay and a small part of the eastern coast of Islay including Ardnahoe and the Caol Ila Distillery.

The study area for all four landfall options on Islay currently being considered would cover a part of Islay's eastern coast, extending inland to the undulating uplands which form the island's hinterland. Part of the study area for all four Islay landfall options would also include scattered dwellings and settlement along the road which connects Port Askaig, Caol Ila and Bunnahabhain. Depending on the final landfall option(s), the study area would extend no further north than Bubha Bhachlaig, and no further south than Rubha Port an t-Seilich. It would include a small area on the west coast of Jura, within the Jura NSA.

The offshore and onshore study area and receptors would be informed by the production of a Zone of Theoretical Visibility (ZTV) plan, and through consultation with Argyll and Bute Council during the preparation of the SLVIA.



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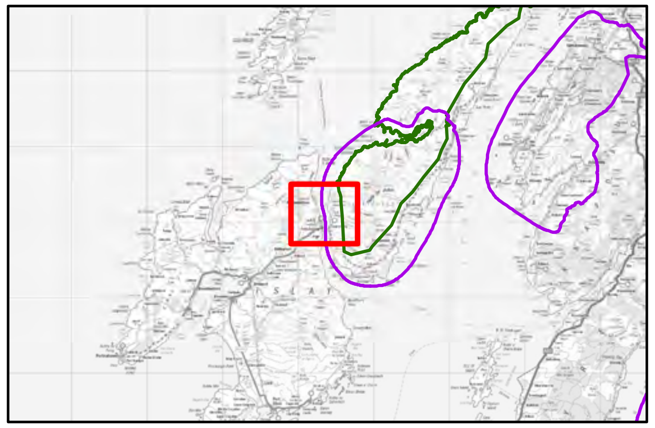
Landscape Context

5-2	A

- Offshore Lease Area
- Indicative Cable Corridors
- Indicative Grid Cable Route (Jura)
- Indicative Substation (Jura)
- Core path
- **National Scenic Area**
  - Jura
- **Area of Wild Land**
  - Jura, Scarba Lunga and Garvellachs

Landscape Character Type

- 35: Rugged Mountains
- 41: Plateau Moorland - Argyll
- 49: Island Mixed Farmland



NOTE: Not to be used for Navigation

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Projection	Transverse Mercator
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Data Source	ESRI; OSOD, LUC, Scot Gov, NatureScot
File Reference	Fig_5-3-1_12237_r0_LandscapeContext.mxd
Created By	Henry Wingfield, LUC
Reviewed By	Lewis Castle, Intertek
Approved By	Aodhfin Coyle, Intertek

NOVA INNOVATION LUC intertek

0 0.5 1 km

16.2.3 Data Sources and Baseline Environment

16.2.3.1 Data Sources

The following data sources have been used to inform this chapter:

- NatureScot (2019) National Landscape Character Assessment;
- Ordnance Survey mapping; and
- Aerial and street-level photography available online.

16.2.3.2 Landfall Option(s) Baseline

Landfall Option 1 on the Whitefarland Bay area on the west coast of Jura. Landcover in this area largely comprises rough grassland and immediately to the east of the indicative grid cable route is an area of deciduous woodland. An access track passes the indicative grid cable route, before splitting to provide access to the north and to the west where it leads to Inver Cottage, located approximately 150m to the west. This option is located within the Island Mixed Farmland (49) Landscape Character Type (LCT).

Option 2 is on the east coast of Islay in the Bunnahabhain Bay area. This option is also located within LCT (49) and is outside of the Jura NSA, approximately 600m to the west. Visitors to the Bunnahabhain distillery are key visual receptors to be considered for this option.

Option 3 is on the east coast of Islay, in the vicinity of the boathouse at Ardnahoe and the Ardnahoe distillery is also located within LCT (49 Island Mixed Farmland) and is outside of the Jura NSA, approximately 500m to the west. Visitors to the Ardnahoe distillery are key visual receptors to be considered for this option.

Option 4 is on the east coast of Islay, near the Caol Ila Distillery. Option 4 is also located within LCT 49(Island Mixed Farmland), and is outside of the Jura NSA, approximately 600m to the west. Visitors to the Caol lla distillery are key visual receptors to be considered for this option.

Option 5 is on the east coast of Islay in the Port Askaig area. This option is located within the Plateau Moorland – Argyll LCT (41) (Plateau Moorland – Argyll) and is outside of the Jura NSA, approximately 500m to the west. Visual receptors at Port Askaig, including those at the ferry port, are key visual receptors to be considered for this option.

16.2.3.3 Landscape Character(s)

Landscape character for the wider areas around the landfall options is described in the National Landscape Character Assessment of Scotland, published online by NatureScot (SNH, 2019). The LCTs within the likely LVIA study area(s) reflect the coastal and remote and upland nature of the area. The onshore substation at Options 1-4 would be located within the Island Mixed Farmland LCT (49) which is characterised by an *"indented rocky coastline with some small sandy bays"* and a *"patchy mix of moorland, grassland, peaty marsh and woodland"* as well as scattered farms and *"geometric fields"*[60]. The Plateau Moorland - Argyll LCT (41) within which the onshore substation for Option 5 would be located, while also being within the likely study area for Option 1 and is characterised as remote upland plateau with *"open moorland, broken by rock outcrops and upland lochs"*[61].

The study areas for Options 2-4 are located entirely within LCT (49). Option 5 is located within LCT (41).

[60] NatureScot (1996) Island Mixed Farmland LCT(49), Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20049%20-%20Island%20Mixed%20Farmland%20-%20Final%20pdf.pdf

[61] https://www.nature.scot/sites/default/files/LCA/LCT%20041%20-%20Plateau%20Moorland%20-%20Argyll%20-%20Final%20pdf.pdf

16.2.3.4 Protected Landscapes

As illustrated in Figure 16-2, the onshore infrastructure at Option 1 would be located within the Jura National Scenic Area (NSA), which would cover most of the study area. The Jura NSA would also form part of the study area for the other four landfall options. The Jura, Scarba, Lunga and Garvellachs WLA is located approximately 1.4km to the east of Option 1 and does not fall within 2km of landfall options 2-5. There are no locally designated landscapes within the study areas for Options 1-5.

16.2.3.5 Visual Receptors

Visual receptors are the people who will experience views of the Project from their homes and communities, their places of work, or the places they visit for recreation. The types and general locations of key receptors within the study area include:

- People visiting beaches and engaging in water activities along the coasts of Islay and Jura;
- People travelling along the unclassified roads on western Jura and eastern Islay;
- Residents and people working along and near the western coast of Jura, and the eastern coast of Islay, including the settlements of Bunnahabhain, Caol Ila and Port Askaig;
- People travelling on ferries and recreational boats along the Sound of Islay, including ferries from Port Askaig to Jura and Colonsay; and
- People visiting the Bunnahabhain, Ardnahoe, and Caol Ila Distilleries on the eastern coast of Islay.

Viewpoints will be established through the production of a ZTV plan and in consultation with Argyll and Bute Council during the preparation of the SLVIA.

16.2.4 Relevant Guidance and Assessment Tools

The following assessment guidance and tools will be used in undertaking the assessment:

- Landscape Institute and the Institute of Environmental Management and Assessment (2013), Guidelines for Landscape and Visual Impact Assessment. Third Edition. (GLVIA3);
- Landscape Institute (2019). Visual Representation of Development Proposals. Technical Guidance Note 06/19;
- Scottish Natural Heritage (2018). A Handbook on Environmental Impact Assessment, Appendix 2: Landscape and Visual Impact Assessment, Version 5;
- Scottish Natural Heritage (unpublished, 2018) Guidance for Assessing the Effects on Special Landscape Qualities. Working draft 11;
- Argyll and Bute Council (2015). The Argyll and Bute Local Development Plan (and LDP2 as applicable).

16.2.5 Potential Project Effects

Table 16-2 sets out the potential seascape, landscape and visual effects that may arise from the construction, operational and decommissioning phases of the ÒnM Project. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all Landfall Options currently being considered on Islay and Jura are included.

Effects on landscape character would arise from the visible presence of the onshore substation, supporting electrical infrastructure and energy storage scheme, as well as the temporary works to accommodate construction of the underground infrastructure. Views of these elements may affect the visual amenity of people in the surrounding area. It is considered that overall, significant effects are not likely to arise, and suitable mitigation will assist in ensuring effects are minimised as best as is reasonably practicable. However, while Project details, including the location of inshore infrastructure have not been finalised, a precautionary approach has been taken to identifying potential significant effects on Landscape and Seascape. These effects will be assessed within the EIA through a proportionate SLVIA and other supporting assessments.

Table 16-2 Potential Effects of the Project on Landscape, Seascape and Visual Amenity

Potential Effect	Project Phase	Rationale and Commentary
Changes to landscape character.	All Phases	Construction and decommissioning of the onshore substation compound and cabling will be temporary and localised. The presence of the onshore substation will alter the landscape. Significant effects are unlikely to arise but will be assessed further through proportionate LVIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Changes to seascape character.	All Phases	All offshore infrastructure is fully submerged, with no need for surface marking or artificial lighting. Construction and decommissioning of the offshore project components will be temporary and localised. Temporary visual impacts will arise from routine and unplanned maintenance throughout the operational phase of the Project. Significant effects are unlikely to arise but will be assessed further through proportionate SLVIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Changes to the Jura NSA.	All Phases	Construction and decommissioning of the onshore substation compound and cabling will be temporary and localised. The presence of the onshore substation may affect the special qualities of the NSA. Significant effects are unlikely to arise but will be assessed further through proportionate LVIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Changes to the Jura, Scarba Lunga and Garvellachs WLA.	All Phases	Construction and decommissioning of the onshore substation compound and cabling will be temporary and localised. The presence of the onshore substation will alter the landscape. Significant effects are unlikely to arise due to the minimum distance between the WLA and the Project but will be assessed further through proportionate LVIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Changes to visual amenity	All Phases	Construction and decommissioning of the onshore substation compound and cabling will be temporary and localised. The presence of the onshore substation will introduce new manmade features in views across the study area. Significant effects are unlikely to arise but will be assessed further through proportionate SLVIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Cumulative effects arising in combination with other similar unbuilt onshore developments	All Phases	There are currently no other known developments of a similar nature proposed within the study area, but this will be re-checked during the EIA. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**

Potential Effect	Project Phase	Rationale and Commentary
Impact on visual amenity experienced at night	All Phases	All offshore structures are fully submerged with no requirement for lights or other marking. Onshore lighting of onshore infrastructure is not anticipated to be necessary. Neither offshore nor onshore works will be carried out during hours of darkness. **This potential effect has been scoped out of the EIA.**

16.2.6 Mitigation Measures

The following mitigation measures relevant to seascape, landscape and visual effects will be considered during the EIA:

- All offshore infrastructure will be fully submerged with no surface marking or artificial lighting.
- Careful siting and design of the substation to minimise landscape and visual effects as far as is practicable, and consideration of existing landscape features to minimise wider visibility;
- The use of muted colours and / or cladding sympathetic to the local vernacular to allow components to appear less striking in the landscape;
- If artificial lighting is included as part of the onshore substation, the manual operation of lighting, which is downward directional where practicable, with use of artificial lighting limited to periods of maintenance required at night;
- Planting that is appropriate to the landscape context to soften/screen the onshore substation.

16.2.7 Proposed Approach to EIA

Seascape landscape and visual effects are not likely to be significant. However, these potential effects and visual effects will be assessed through the provision of a proportionate SLVIA.

The approach to the SLVIA will be based on the principles set out in GLVIA3. Preparation of the SLVIA will involve the following key steps:

- The location and design for the onshore substation will be confirmed, and a study area will be determined and agreed through consultation; proposed to be a 2km radius from the onshore substation;
- Zones of theoretical visibility (ZTV) will be generated for the offshore and onshore Projects areas. The ZTV for onshore area(s) will be, based on the maximum height and extent of the onshore substation, and taking account of existing screening;
- The seascapes and landscapes of the study area will be analysed to identify landscape receptors, drawing on published landscape character assessments as set out in Section 16.2.2;
- The visual baseline will be recorded in terms of the different groups of people who may experience views of the Project, including onshore and offshore works, the onshore substation, the places where they will be affected and the nature of their views and visual amenity;
- A series of assessment viewpoints will be selected in consultation with NatureScot and Argyll and Bute Council, and taking note of scoping comments;
- Indicative visualisations will be generated based on 3D modelling of the onshore substation. Visualisations will be produced to standards agreed with NatureScot and Argyll and Bute Council;
- Potentially significant effects on landscape character will be identified;
- Potentially significant effects on visual amenity will be identified;
- Measures that could potentially be taken to mitigate significant effects will be identified; and
- The level and significance of residual landscape and visual effects will be judged with reference to the sensitivity of the resource / receptor (its susceptibility and value) and magnitude of change (a combination of the scale of change, geographical extent and duration / reversibility).

ZTV mapping will be used to identify whether LCTs and protected landscapes could be affected by the onshore substation if this is proportionate to risk. Visual receptors at locations within the ZTV will be considered, focusing on locations within the study area. The list of landscape receptors (LCTs and protected landscapes) and visual receptors to be assessed will be agreed with consultees at a later stage, informed by the ZTV for the finalised onshore substation design.

Site visits will be carried out to obtain photography and to undertake survey work, which will include visits to the assessment viewpoints and travel around the study area to consider potential effects on landscape character and on experiences of views seen from specific viewpoints, settlements and routes.

Consultation with NatureScot and Argyll and Bute Council will take place to ensure that the scope of the LVIA assessment is proportionate to the specifics of the offshore and onshore works and onshore substation. As such, the best practice assessment approach outlined above may, in consultation with NatureScot and Argyll and Bute Council, be amended to some degree as the EIA progresses.

16.3 Geology, Hydrology, Hydrogeology, Coastal Geomorphology, Soils and Peat

16.3.1 Introduction

This section considers the potential effects on geology, hydrology, hydrogeology, coastal geomorphology soils and peat that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It provides an overview of baseline conditions and interest features within the scoping area for the five landfall options currently being considered, as described in Chapter 5 (The Project). Potential effects on peat are covered in more detail in section 16.1 (Terrestrial and Onshore Ecology).

16.3.2 Indicative Receiving Environment

The study area for the assessment of landfall Option 1 comprises Whitefarland Bay and a 250m buffer of the proposed onshore infrastructure location including the cable corridor.

The study area for the assessment of landfall Option 2 comprises Bunnahabhain Port and Distillery and a 250m buffer of the proposed onshore infrastructure location including the cable corridor.

The study area for the assessment of landfall Option 3 comprises Ardhnahoe beach and Distillery and a 250m buffer of the proposed onshore infrastructure location including the cable corridor.

The study area for the assessment of landfall Option 4 comprises Caol Ila Port and Distillery and a 250m buffer of the proposed onshore infrastructure location including the cable corridor.

The study area for the assessment of landfall Option 5 comprises Port Askaig and a 250m buffer of the proposed onshore infrastructure location including the cable corridor.

16.3.3 Data Sources and Baseline Environment

A desk-based review of 1:25,000 scale Ordnance Survey maps, 1:50,000 scale British Geological Survey (BGS) Geology maps, 1:250,000 scale Soils Maps of Scotland, Scotland Environment Protection Agency (SEPA) Flood Maps and the 1:250,000 SNH (now NatureScot) Carbon and Peatland 2016 Map have been undertaken to identify conditions within the vicinity of the potential landfall locations of the Project.

The solid and drift geological conditions of the indicative landfall locations were established following review of the following information:

- British Geological Survey Soil and Drift Sheet 27 North Islay Scale 1:50,000.[62]
- Soil Maps of Scotland[63], online resource published by Scotland's Soils (part of SEPA) 2023
- NatureScot Site link services for designations and protected features[64]

Landfall Option(s) Baseline

Landfall Option 1 (Whitefarland Bay) comprises a relatively low-lying area of coastline and includes the landfall for the offshore cable, the proposed onshore cable route and the proposed substation location.

[62] Geological Survey of Scotland, 1:63,360/1:50,000 geological map series| BGS maps portal | OpenGeoscience | Our data | British Geological Survey (BGS)
[63] Scotland's Soils (part of SEPA) (2023) National Scale Land Capability for Agriculture Map, Available at: https://map.environment.gov.scot/Soil_maps/?layer=5
[64] National designations | NatureScot

The cable landfall is anticipated on the beach at Whitefarland Bay, approximately 230m south-east of the mouth of the Abhainn Gleann Lubharnadail watercourse. The coastal features at the mouth of the river include an interesting delta and coastal spit formation as the watercourse enters the Sound of Islay.

The onshore cable connection would run north from the landfall along the eastern side of an existing track. The proposed connection point is approximately 50m east of the Abhainn Gleann Lubharnadail watercourse, on the east side of the access track, at an elevation of approximately 5m Above Ordnance Datum (m AOD).

With respect to soil types, the soils around Whitefarland Bay and the wider surrounds are a mix of mineral podzols and peaty gleys, according to the SEPA's National Soils Map.

Landfall Option 2 (Bunnahabhain) would likely comprise landfall on the shoreline just south of the existing infrastructure associated with the Bunnahabhain distillery. There is a small watercourse at the south-east side of the distillery, which may have to be crossed by the onshore cable route. The coastal topography is very steep with a rocky foreshore at the proposed landfall location in this area and soils are mainly mineral soils (i.e., no peat). The Soils Map of Scotland provides general soil information based on type. The online Soils map indicated the areas around Port Askaig to Bunnahabhain to be peaty gleys and brown soils, which are predominantly urban in classification.

Landfall Option 3 (Ardnahoe) would likely comprise landfall on the shoreline south-east of the Ardnahoe distillery. There is a small watercourse flowing east from Ardnahoe Loch into the Sound of Islay, but this can be easily avoided with careful siting of infrastructure. The soils in this area are classed as mineral soils (i.e., no peat), and the soil types in this area are brown soils.

Landfall Option 4 (Caol Ila) would likely comprise landfall appears to be on land classified as Class 4 and 5 peat according to the Carbon and Peatland Map (2016), although it is likely that any peat in the area has been modified due to the construction of the distillery. The existing distillery infrastructure may provide a connection route without disturbing peat, and the coastal area at this Option has most likely already been modified by the distillery. The soil type around Caol Ila appears to consist of peaty gleys.

Landfall Option 5 (Port Askaig) would likely comprise landfall near to the Port Askaig distillery. The land here is classed as Class 4 peat, according to the Carbon and Peatland Map (2016), although it is likely that any peat in the area has been modified due to the construction of the distillery. It is likely that a route to connection without disturbing peat is possible. There is potential coastal flood risk highlighted by the SEPA Flood maps along the lower areas of Port Askaig distillery and the lower ground around the ferry terminal. The soil type around Port Askaig also comprises peaty gleys according to SEPA's online Soils Map.

16.3.4 Hydrology and Flood Risk

A review of SEPA flood maps[65] indicates that Option 1 is an area at risk of fluvial flooding from Abhain Gleann Lubharnadail. Flood risk is estimated as medium likelihood (0.5% annual probability, 200-year return period flood event) at the proposed connection point. However, SEPA flood maps are indicative only and further assessment is required for the onshore infrastructure within or close to the predicted flood extent. A Flood Risk Assessment (FRA) for the onshore infrastructure will be carried out to accompany any future consent application as required.

SEPA flood maps indicate that the proposed Option 1 grid connection is close to (within approximately 25m) of the 200-year predicted coastal floodplain. The grid connection location is outside the predicted floodplain. Coastal flood risk will be considered further in any required FRA.

[65] SEPA (2023) Flood Maps, Available at: https://www.sepa.org.uk/environment/water/flooding/flood-maps/

The SEPA Flood maps do not indicate that Options 2 and 3 are at risk of flooding from any source, although the coastal floodplain is very close to the landfall options.

The SEPA Flood maps indicate that there is a potential coastal flood risk at the existing distillery for Option 4, which may impact the cable route. This will be considered further in any required FRA.

There is potential coastal flood risk at Option 5, highlighted by the SEPA Flood maps along the lower areas of Port Askaig distillery and the lower ground around the ferry terminal.

Based on an initial review, the onshore infrastructure is not anticipated to cross any watercourses, and the design of the onshore infrastructure should be informed by their location to avoid crossing watercourses as best practicable.

16.3.5 Water Quality

SEPA has characterised surface water quality status under the terms of the WFD. Classification by SEPA considers water quality, hydromorphology, biological elements including fish, plant life and invertebrates, and specific pollutants known to be problematic. The classification grades through High, Good, Moderate, Poor, and Bad status. This provides a holistic assessment of ecological health. Water quality around the five options will be considered within the design of the onshore infrastructure to ensure that the infrastructure does not result in significant impacts on water quality.

16.3.6 Geology and Hydrogeology

The bedrock geology of the study area around Option 1 comprises sedimentary rocks of the Jura Quartz Formation. These are of a shallow-marine origin, which have since undergone metamorphism.

The bedrock geology of the study area around Options 2, 3, 4 and 5 on Islay is more complex. The bedrock geology from north (Option 2) to south (Option 5) on the coast comprises outcrops of:

- Sedimentary rocks of the Jura Quartz Formation;
- Dolomitic Metalimestone, which are sedimentary rocks which have undergone metamorphism;
- Ruadh-Phort Beag Member – Metadiamictite, which are sedimentary in origin, possibly in a glaciogenic environment, but have subsequently undergone metamorphism; and
- Con Tom Member Quartzite which are sedimentary in origin, possibly shallow, which have undergone metamorphism.

The superficial drift deposits of the study area around Option 1 on Jura are composed of raised marine sedimentary deposits of Holocene age, forming raised beaches and bars in a coastal setting. The Whitefarland Bay area is composed of marine deposits and alluvium drift fluvial deposits at the mouth of the river. There are no mapped superficial drift deposits along the coast of Islay at the landfall locations for Options 2-5, however, there are till/morainic and deposits and raised marine sedimentary deposits further inland.

The aquifer all Options is classified as 2C, a low productivity aquifer, with small amounts of groundwater in the near surface weathered zone and fractures. Flow is virtually all through fractures and other discontinuities. SEPA has classified the groundwater body at the study area as 'Good'. SEPA flood mapping does not highlight the area as at risk from groundwater flooding or as a Potentially Vulnerable Area. The risk of groundwater flooding is therefore considered low.

16.3.7 Peat

A review of the NatureScot (2016) Carbon and Peatland Map (Figure 16-1) indicates the landfall location on Jura (Option 1) is close to an area of Class 1 peat, with the area to the north classes as mineral soils (i.e. no peat). Class 1 peatlands are areas that are likely to be of high conservation value and are considered to be nationally important carbon-rich soils, deep peat and priority peatland habitat. This will be avoided as far as is possible during the detailed design stage.

Options 2-5 landfall locations may comprise of some areas of Class 4 or 5 peat or area classed as mineral soils (i.e. no peat), however for the most part it is likely that any peat in these areas have been modified due to the construction of the distilleries and the port.

Potential effects on peat are also considered in section 16.1 (Terrestrial and Onshore Ecology).

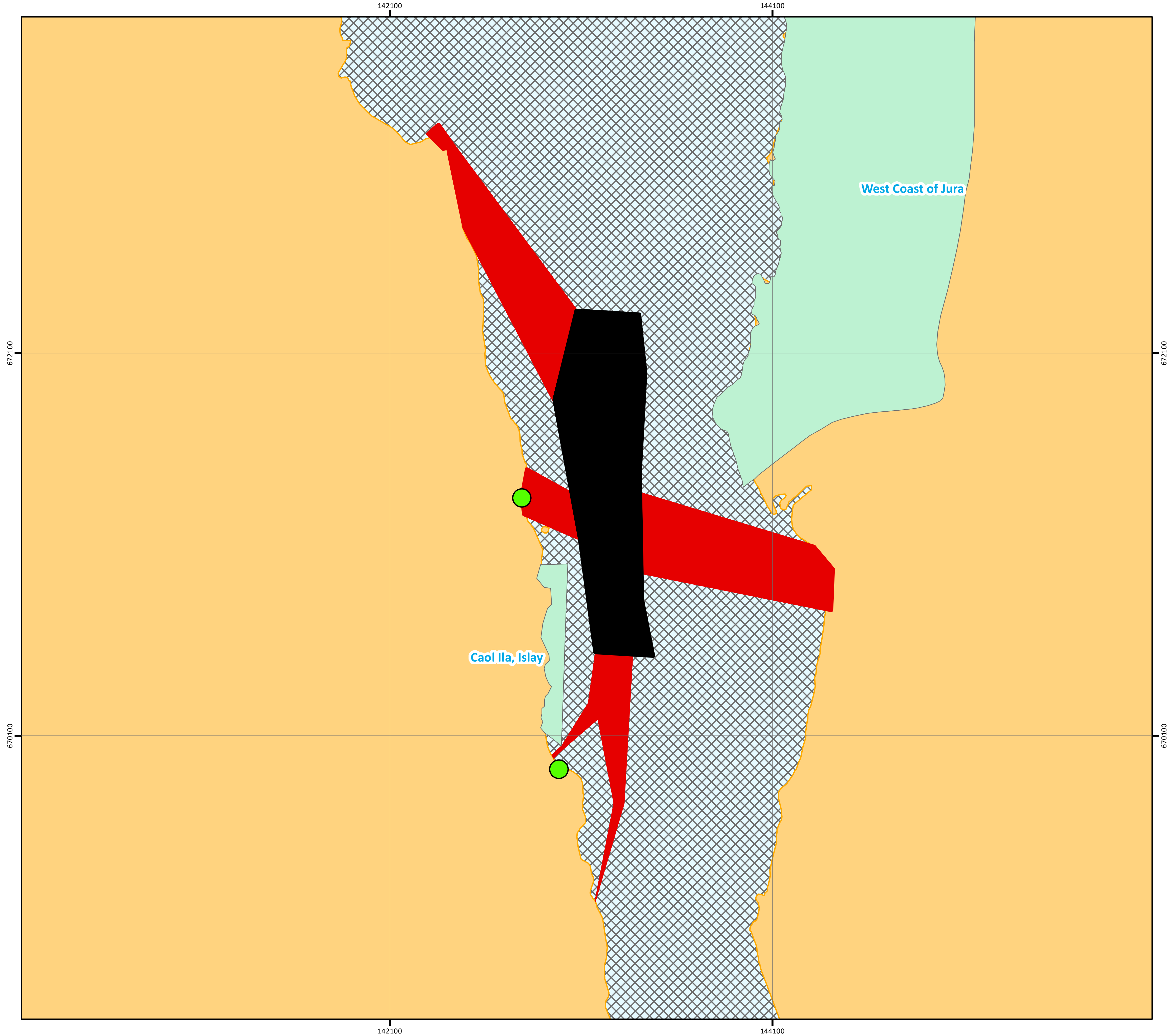
16.3.8 Private Water Supplies

Private Water Supply (PWS) data for the study area was not available at the time of writing but will be obtained from ABC for the EIA Report. However, based on an initial review of Ordnance Survey maps and aerial imagery, it is considered unlikely that there will be any PWS nearby that could be affected by the construction of onshore infrastructure.

16.3.9 Designations

The NatureScot Site link services on their website was searched for designations and protected areas relating to geological features of special interest.

The website did not identify any Sites of Special Scientific Interest (SSSI) within the immediate or adjoining area of the proposed development. The site did however note the Caol Ila Geological Conservation Review (GCR) area (Figure 16-3; Drawing no. P2578-LOC-005-C) which falls to the north of Port Askaig and runs north along the coast. These features are identified and selected by the JNCC based on the very best geological and geomorphological features that are of national and international importance. All GCR areas are considered to qualify for designation as a SSSI, although in Scotland more than 200 have not been given this level of statutory protection . While this would appear to be the case for the Caol Ila GCR site, in terms of this EIA Scoping study, any potential effects will be assessed as if this feature was a SSSI to provide the 'worst case scenario'.



ÒRAN NA MARA EIA SCOPING REPORT

LOCATION OVERVIEW

Geological Conservation Review Areas

Drawing No: P2585-LOC-005 | **C**

Legend

- Vantage Point Survey
- Geological Conservation Review Area
- AfL Area
- Exploratory Cable Routes & Cable Corridor
- Study Area - Sound of Islay

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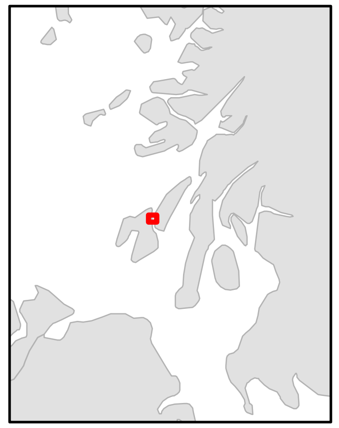

NOTE: Not to be used for Navigation

Date	22 March 2023
Coordinate System	British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	ESRI; Nova Innovation; OSOD; NS
File Reference	J:\P2585\Mxd_QGZ\01_LOC\ P2585-LOC-005.mxd
Created By	Lewis Castle
Reviewed By	Oliver Bula
Approved By	Lesley Harris

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16.3.10 Relevant Guidance and Assessment Tools

Relevant guidance will be followed throughout the assessment, including guidance from the Scottish Government, SEPA, Construction Industry Research and Information Association (CIRIA) and ABC. Key guidance is listed below; however, this list is not exhaustive.

- SEPA's Guidance for Pollution Prevention (GPPs) and Pollution Prevention Guidelines (PPGs);
- SEPA (2017) Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Land Use Planning System SEPA Guidance Note 31;
- Scottish Government, Scottish Natural Heritage and SEPA (2017) Peatland Survey. Guidance on Developments on Peatland;
- CIRIA (2015) The SuDS Manual (C753) 2015;
- CIRIA (2001) Control of Water Pollution from Construction Sites: Guidance for consultants and contractors (C532); and
- Argyll and Bute Council: Argyll and Bute Local Development Plan Supplementary Guidance (Adopted March 2016).

16.3.11 Potential Project Effects

Potential effects on hydrology, hydrogeology, coastal geomorphology and peat and soils will be assessed as part of the EIA process. This will include the identification of effects of construction of the proposed landfall location, substation and grid connection on the receiving environment (e.g., sediment release, pollution, fuel spills etc.) and effects on specific locations or sensitive habitats (i.e., GWDTEs, private water supplies (PWS), peatland habitats), which are sensitive to pollution risk and/or disturbance from engineering works.

Adopting a precautionary approach at scoping stage, potential effects associated with the onshore infrastructure are summarised in Table 16-3. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all Landfall Options currently being considered on Islay and Jura are included.

Table 16-3 Potential Effects of the Project on Onshore Geology, Hydrology, Hydrogeology, Coastal Geomorphology, Peat and Soils

Potential Effect	Project Phase	Rationale and Commentary
Effects on surface and groundwater quality from sediment/silt run-off.	Construction and Decommissioning	Releases of sediment or silt run-off have the potential to affect surface and groundwater quality during construction and decommissioning works from excavated/stockpiled material during construction, or because of works near watercourses. Controls and best practice measures will be in place and adhered to throughout any works to minimise any potential for releases of sediment or silt run-off. However, uncertainty over the location of landfall and onshore infrastructure mean it is too early to scope out this potential effect. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Contamination of surface and groundwater quality from chemical or fuel spills.	Construction and Decommissioning	Releases of chemicals or fuel spills through operation of machinery (e.g., spillage of fuels, oils etc.) during site preparation, construction and decommissioning have the potential to affect surface and groundwater quality. Controls and best practice measures will be in place and adhered to throughout any works to minimise any potential for releases or spills. However, uncertainty over the location of landfall and onshore infrastructure mean it is too early to scope out this potential effect. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Effects on drainage and flood risk.	All Phases	Modifications to natural drainage patterns, changes to runoff rates and volumes and consequent increase in flood risk could occur during construction and decommissioning work, and throughout operation of the Project due to the presence of onshore infrastructure. Any such changes and resulting effects are likely to be minor, but uncertainty over the location of landfall and onshore infrastructure mean it is too early to scope out this potential effect. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Effects on surface and groundwater quantity.	Construction and Decommissioning	Changes to surface and groundwater quantity could occur locally during any excavations during construction and decommissioning of onshore infrastructure. This could affect nearby Groundwater Terrestrial Ecosystems and/or Private Water Supplies. Any such changes and resulting effects are likely to be minor, but uncertainty over the location of landfall and onshore infrastructure mean it is too early to scope out this potential effect. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Direct and indirect impacts on soils.	Construction and Decommissioning	Onshore construction and decommissioning works could result in minor direct and indirect disturbance to soils, for example during and excavations or cable trenching.

Potential Effect	Project Phase	Rationale and Commentary
		Any such effects are likely to be minor, but uncertainty over the location of landfall and onshore infrastructure mean it is too early to scope out this potential effect. **This potential effect is highly unlikely to be significant but on a precautionary basis will be scoped into the EIA.**
Effects on Caol Ila Geological Conservation Review site	All Phases	No landfalls or routings are planned to cross this area or enter into the designated area or immediately adjacent to it. **This potential effect has been scoped out of the EIA.**

16.3.12 Mitigation Measures

In addition to the careful siting of the onshore infrastructure, together with the current regulatory context, many potential effects on the water and peat environment can be avoided or reduced. Where possible, Class 1 peatland, shown in Figure 16-1, will be avoided in early design stages.

Good practice pollution prevention and control measures will be put in place during construction. These will be embedded into the project design and will reflect best practice guidance and recognised industry standards (e.g., SEPA guidance, including their Guidance for Pollution Prevention (GPPs), CIRIA SUDS Manual and CIRIA Control of Water Pollution from Construction Sites Guidance amongst others). These would be outlined within the CEMP which would accompany the EIAR in due course, or which would be provided through condition.

Therefore, a number of measures are not considered to be mitigation as such, but rather an integral part of the design/construction process as part of good practice; and it is proposed that these will be considered prior to assessing the likely effects of the onshore infrastructure. However, where appropriate, more tailored mitigation measures will be identified prior to determining the likely significance of residual effects.

16.3.13 Proposed Approach to EIA

In addition to the desk-based surveys undertaken to date, consultation with ABC, Scottish Water, SEPA and NatureScot will be undertaken to obtain relevant flood, water supply and peat information, including abstractions and PWS data. Relevant flow and water quality data will also be obtained from SEPA.

Baseline information on coastal processes (i.e., waves, winds, tides, coastal change) and a review of the Dynamic Coast Project's results and research (https://www.dynamiccoast.com/) will be collated to inform the coastal geomorphology assessment.

A walkover hydrological survey of the proposed landfall locations will be carried out to supplement the desk-based work and data collection to identify the existing baseline conditions, including identifying and documenting watercourse crossings (if any); identifying other water features such as wetlands, springs and lochs; undertaking an assessment of areas identified as floodplain within the SEPA Flood Maps; undertaking an assessment of coastal geomorphology and providing a general overview of landscape and land cover of importance to hydrology and peat.

If there are any PWS sources or properties within 250m of the proposed landfall options, site visits will also be undertaken to verify the source location. Potential GWDTEs will be identified based on habitat mapping and ecology surveys (Section 16.1) and reviewed by hydrologists during the hydrology survey to assess groundwater dependence.

If the Class 1 peatland area cannot be fully avoided, peat depth surveys will be carried out delineate the spatial coverage and depth of peat with the aim to micro-site the infrastructure to avoid deep peat. The proposed frequency for peat probing and coring will follow relevant guidance (Scottish Government, Scottish Natural Heritage, SEPA (2017)[66] Peatland Survey. Guidance on Developments on Peatland). However, it is considered likely that peat areas can be avoided.

A proportionate Flood Risk Assessment (FRA) will be carried out due to the proximity of the onshore infrastructure to areas of predicted fluvial and coastal flood risk. The coastal geomorphology

[66] SEPA (2017) Guidance on Developments on Peatland, Peatland Survey, Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot%3Adocument/Guidance%2Bon%2Bdevelopments%2Bon%2Bpeatland%2B-%2Bpeatland%2Bsurvey%2B-%2B2017.pdf

assessment will be written up within any required FRAs. The FRA and coastal assessment will then be used to inform the EIA.

The findings of the survey work and baseline assessment will contribute to environmental constraints mapping and will provide input and feedback into design iterations and subsequent environmental assessment.

17. ASSESSMENT OF FURTHER EFFECTS FOR ONSHORE TOPICS

17.1 Noise and Vibration

17.1.1 Introduction

This section sets out the proposed approach to assessing the potential for Onshore Noise and Vibration to be introduced to the receiving environment as a result of the construction, operation and maintenance, and decommissioning of the ÒnM Project. It describes the methodology to be used for the noise study that will inform the EIA and an overview of the potential for the Project to generate Onshore Noise and Vibration. A qualitative description of likely ambient noise characteristics at the Project area is provided.

The assessment will consider the following potential impacts:

- Noise and vibration from construction and decommissioning;
- Changes to noise and vibration levels from road traffic flows directly associated with the operational development and construction; and
- Noise originating from any plant during the operational phase of The Project.

The potential for the ÒnM Project to generate subsea noise and the resulting potential effects are considered in Chapter 15 (Underwater Noise and Vibration).

17.1.2 Indicative Receiving Environment

The study area the location and direct environs of the potential landfalls and corresponding routes to the onshore substations and onward grid or private wire connections for each.

17.1.3 Data Sources and Baseline Environment

No specific information on noise levels at the five different landfall options has been obtained as part of this EIA scoping study. That noted, the landfall sites are in generally rural locations with few houses or businesses located in the vicinity and as such background noise levels are likely to be low.

17.1.4 Relevant Guidance and Assessment Tools

No specific all-encompassing legislation exists in order to assess the overall impacts from the noise and vibration sources from this development type. As such, consideration of Planning Advice Note (PAN) 1/2011 and the accompanying Technical Advice Note (TAN) has been made.

17.1.5 Potential Project Effects

Table 17-1 details the potential for the ÒnM Project to generate Onshore Noise and Vibration and its subsequent possible environmental effects. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all Landfall Options currently being considered on Islay and Jura are included.

Table 17-1 Potential Effects of the Project on Onshore Noise and Vibration

Potential Effect	Project Phase	Rationale and Commentary
Noise and vibration resulting from construction traffic associated with the development of any landfall infrastructure.	All phases	The Project is likely to lead to increased vehicle movements in the area surrounding onshore infrastructure, particularly during construction and decommissioning phases, which could lead to some noise and vibration. However, these are likely to be limited and temporary in nature due to the small nature of any onshore works and are not expected to affect any sensitive receptors. Increased vehicle movements in the area during normal Project operations are not expected to be noticeable in comparison with existing traffic movements in the area. **This potential effect has been scoped out of the EIA.**
Noise and vibration resulting from construction and decommissioning of the Project.	Construction and Decommissioning	Construction and decommissioning of onshore Project infrastructure may generate some noise and vibration. However, the extent of these works is limited, and the lack of sensitive receptors would result in there being little impact. **This potential effect has been scoped out of the EIA.**

17.1.6 Mitigation Measures

Based on the lack of potential receptors and the limited potential for effects, no likely significant effects are identified for the Project and as such land-based noise and vibration is considered to be 'Scoped Out' of the future EIA. As such, there is unlikely to be a requirement for specific mitigation measures to be developed within the Project. A CEMP will however be submitted as part of the EIAR for the Project and this would include specifics on hours of operations for construction, methods to be employed and transport routes etc. This is considered a suitable level of mitigation based on the likely effects associated with the Project.

17.2 Traffic and Transport

17.2.1 Introduction

This section considers the potential likely effects on onshore Traffic and Transport that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It outlines the key Traffic and Transport features of relevance to the ÒnM Project and baseline conditions. It outlines the approach that will be used in the EIA to assess onshore traffic and transport impacts resulting from the Project.

The potential effects of the ÒnM Project on offshore Traffic and Transport are considered separately in Chapters 12 (Commercial and Local Fisheries) and 13 (Shipping and Navigation).

17.2.2 Indicative Receiving Environment

The study area is considered to be the location and direct environs of the potential landfalls and associated routes to either the substations or the distilleries.

17.2.3 Data Sources and Baseline Environment

No specific information on current traffic numbers in the vicinity of the landfalls has been obtained as part of this EIA scoping study. In addition, no information is currently available on the number of vehicles numbers likely to arise as a result of construction/decommissioning works, however, considering that the onshore works are limited in extent, it is considered unlikely that significant traffic will be generated during these development phases.

17.2.4 Relevant Guidance and Assessment Tools

Reference has been made to PAN 75 Planning for Transport and the associated guidance given in Scottish Planning Policy 17 Planning for Transport.

17.2.5 Potential Project Effects

Table 17-2 details the potential effects of the ÒnM Project on onshore Traffic and Transport. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all Landfall Options currently being considered on Islay and Jura are included.

Table 17-2 Potential Effects of the Project on Traffic and Transport

Potential Effect	Project Phase	Rationale and Commentary
Increased transport movements associated with traffic during construction and decommissioning	Construction and Decommissioning	Construction and decommissioning of onshore and offshore Project infrastructure may lead to some increased traffic and transport movements in the area. However, these are likely to be limited and temporary in nature due to the small nature of any onshore works and are not expected to affect any sensitive receptors. **This potential effect has been scoped out of the EIA.**
Increased transport movements associated with traffic during Project operations and maintenance	Operation	Increased vehicle movements in the area during normal Project operations are not expected to be noticeable in comparison with existing traffic movements in the area. Nova's turbines are controlled remotely and there will be no need for a permanent onsite personnel presence. Nova anticipates that once the array is fully operational, each turbine will require routine maintenance approximately once every 24 months. **This potential effect has been scoped out of the EIA.**

17.2.6 Mitigation Measures

Based on the lack of potential receptors and the limited potential for effects, significant effects are considered unlikely for the Project. As no detail on traffic numbers or types, however, are known at this time, these cannot be fully scoped out at this time and a basic level of Transport Assessment may be included within the EIA. This could include specific information on routings and access requirements for any vehicle access to the remote landfall areas and, if required, would include assessment of the construction volume.

17.3 Air Quality

17.3.1 Introduction

This section considers the potential likely effects on Air Quality that may arise from the construction, operation and maintenance, and decommissioning of the ÒnM Project. It considers the baseline environment and how potential dust and particulates, as well as exhaust emissions from construction traffic and maintenance, may result in potential impacts on air quality, and in turn on human health and potential ecological receptors.

17.3.2 Indicative Receiving Environment

The study area for scoping encompasses all areas of potential construction and decommissioning activities relating to the onshore infrastructure. The study area would also include the following, once known, in accordance with the Institute of Air Quality Management (IAQM) guidance[67]:

- Ecologically sensitive receptors within 50m of possible construction activities; and
- Human receptors (e.g., residential properties and public amenity areas) within 350m of possible construction activities.

17.3.3 Data Sources and Baseline Environment

There are currently no Air Quality Management Areas (AQMAs) located within the boundary of Argyll and Bute Council. There are no dwellings located within 50m of the indicative landfall options. The core path network, the visitor centres associated with the distilleries on Islay, and the Port Askaig ferry terminal are noted as sensitive air quality receptors on Islay.

Baseline concentrations of $PM_{2.5}$ and PM_{10} should be taken from the Scottish Government and Department for Environment, Food and Rural Affairs (DEFRA)[68], and consideration of the results of the 2022 Argyll and Bute Council Air Quality Annual Progress Report[69] (APR) should also inform the baseline concentrations of nitrogen dioxide (NO_2). Argyll and Bute Council’s APR demonstrated on average lower results than the annual objective.

17.3.4 Relevant Guidance and Assessment Tools

There is no specific legislation or guidance available on the methods that should be used to assess the air quality effects of the Project. The proposed approach is therefore based on established good

[67] IAQM (2014) Guidance on the assessment of dust from demolition and construction. V1.1.
[68] DEFRA (2012) Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom, Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1212141150_AQEG_Fine_Particulate_Matter_in_the_UK.pdf and DEFRA (2020) Background Concentration Maps for NO_2 and PM_{10}, Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018
[69] ABC (2022) Air Quality Annual Progress Report (APR), Available at: https://www.argyll-bute.gov.uk/sites/default/files/2022_apr_ac.pdf

practice including that used in government and industry reports on the sector, and guidance will be set out in the CEMP that will accompany the EIAR in due course.

17.3.5 Potential Project Effects

Table 17-3 details the potential effects of the ÒnM Project on Air Quality. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all Landfall Options currently being considered on Islay and Jura are included.

Table 17-3 Potential Effects of the Project on Air Quality

Potential Effect	Project Phase	Rationale and Commentary
Increased dust during construction and decommissioning	Construction and Decommissioning	Construction and decommissioning of onshore Project infrastructure may lead to some increased localised dust. However, these are likely to be limited and temporary in nature due to the small nature of any onshore works and are not expected to affect any sensitive receptors (e.g. sensitive species, ecological receptors, residential areas or human health). **This potential effect has been scoped out of the EIA.**
Increased emissions from onshore and offshore traffic	All Phases	Increased onshore and offshore vehicle movements in the area during construction decommissioning will be limited and temporary in nature due to the small nature of any onshore works and the modular nature of Nova's turbines which can be installed quickly and easily by small work vessels. Traffic during normal Project operations is not expected to be noticeable in comparison with existing traffic movements in the area. Any traffic emissions in the area resulting from the Project will be minimal. **This potential effect has been scoped out of the EIA.**

17.4 Socioeconomics, Tourism and Recreation

17.4.1 Introduction

This section considers the potential likely effects on Socioeconomics, Tourism and Recreation that may arise from the ÒnM Project. It outlines the baseline conditions and the approach that will be used in the EIA to assess the direct and indirect employment, economic, tourism and recreation effects of the onshore components of the Project. Effects are likely to be localised, and mostly limited to the construction and decommissioning stages of onshore infrastructure.

17.4.2 Indicative Receiving Environment

The general study area for the assessment will be defined as the Argyll and Bute Council administrative area; focussing on the Isles of Islay and Jura specifically where possible. With regards to tourism effects and recreational (formal and informal) effects, this section will focus on the direct and indirect effects on tourism and recreation located within approximately 5km of the proposed landfall options.

17.4.3 Data Sources and Baseline Environment

Whitefarland Bay is located approximately 2km north of Feolin Ferry, on the Isle of Jura. The isle of Jura is inhabited by approximately 210 residents, forming less than 0.25% of the overall Argyll and Bute population of 86,220 (according to the National Records of Scotland's 2021 Mid-Year Population Estimates). In comparison, Islay has a population of 3228 residents[70]; just short of 3.75% of Argyll and Bute Council population. In 2018, approximately 73.3% of people in Argyll and Bute of working age were economically active, which is lower than the Scottish average (77.9%)[71]; 14.3% of jobs were in skilled trades which is driven mostly by the agricultural sector.

On Jura, the indicative substation, energy storage and associated electrical infrastructure may be located on an unnamed access track running north from the A846. There are no formal recreational activities that take place within landfall Option 1, or within the immediate vicinity. There are also no nearby Core Paths within 5km of landfall Option 1 on the Isle of Jura. The unnamed access track from the Ferry Terminal runs north towards Whitefarland Bay and the uplands more broadly but does not connect to any formal tourist routes or recreational activities.

The nearest recreational amenity to Option 1 is the Feolin Ferry Port terminal at Port Askaig, more than 2km to the south of the proposed landfall location. Otherwise, the nearest tourist and recreational activities to Option 1, including Core Paths networks, are located on Islay. These are unlikely to be directly impacted by the construction or operation of the onshore infrastructure due to the physical separation between the Islay and Jura and the localised scale of the onshore infrastructure on Jura.

On Islay, proposed onshore infrastructure including the substation, energy storage and connection infrastructure would likely be located in the context of the existing ports and docks, including where the existing distilleries are located. The landfall options on Islay would connect the energy generated from the Project to local business(es) and visitors centre(s), providing clean energy and positive promotional opportunities. The Core Path C407 runs from Bunnahabhain to Keills to the south, and then connects onto a core path to Port Askaig. It is anticipated that the proposed onshore infrastructure would be sympathetically located to minimise visual disturbance to the nearby surrounds and would not be located near the Core Path network. Potential effects of constructing the onshore infrastructure, which may be experienced from the Core Path network, would be temporary,

[70] ABC (September 2020) Population: Where we live
[71] NOMIS, Labour Market Profile – Argyll and Bute 2018

and measures to mitigate any potential construction effects would be assessed and addressed as part of a CEMP which would accompany the application for consent.

The indicative landfall locations are not located on prime agricultural land, with options on Islay expected to connect close to existing urban infrastructure. On the basis of information available at this stage, the onshore infrastructure would not materially impact the existing land use of the indicative study areas.

17.4.4 Relevant Guidance and Assessment Tools

There is no specific legislation or guidance available on the methods that should be used to assess the socio-economic, tourism and recreation effects of the onshore infrastructure. The proposed approach is therefore based on established good practice including that used in government and Industry reports on the sector. Census data and other sources will also be utilised to obtain up-to-date population information on population numbers and distribution.

17.4.5 Potential Project Effects

Table 17-4 details the potential effects of the ÒnM Project on Socioeconomics, Tourism and Recreation. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA. Potential effects applicable to all Landfall Options currently being considered on Islay and Jura are included.

Table 17-4 Potential Effects of the Project on Socioeconomic, Tourism and Recreation

Potential Effect	Project Phase	Rationale and Commentary
Direct, indirect and induced employment and economic opportunities.	All Phases	The Project will create opportunities for skilled jobs and multiplier effects, including through supply chain, manufacturing and local support services. Nova always seeks to use local supply chain where possible for its tidal energy projects. **This potential effect will be scoped into the EIA.**
Potential effects on local tourism or recreational amenities.	All Phases	There is potential for minor short-term effects on marine recreation or users of the Core Path network in the area, during construction and decommissioning works. Whether such effects are positive or negative is a subjective judgement. Nova has found at its operational Shetland Tidal Array visitors and onlookers are generally very interested in any works. The Project may become a source of local interest, attracting visitors to the area. Any such interest is likely to be enhanced by any partnership or arrangement with local distilleries to decarbonise the whisky industry. **This potential effect will be scoped into the EIA.**

17.4.6 Mitigation Measures

Certain measures will be adopted as part of the Project to reduce the potential for effects. These include the proposed CEMP and Construction Traffic Management Plan (CTMP).

17.4.7 Proposed Approach to EIA

The assessment will seek to assess the likely direct employment and economic benefits during construction and operation (and cumulatively) of the Project and associated indirect employment and economic benefits, such as effects on local commerce.

Direct construction employment effects will largely be based on the anticipated full time equivalent (FTE) jobs likely to be generated. Both leakage and displacement factors will be applied to this figure using commuting pattern statistics to determine the net direct FTEs generated in the economy. For indirect employment, Scottish Government 'Type II Multipliers' will be used to assess the likely scale of indirect employment effects generated by the purchase of goods and services by businesses associated with construction of the Project and induced employment generated by the expenditure of those directly and indirectly employed by the businesses involved with the Project. These induced and indirect multipliers will identify the net direct, indirect, and induced FTEs. Indirect economic benefits will be assessed quantitatively using wage statistics and local spend rate assumptions.

For direct employment during operation, again both leakage and displacement factors will be applied to the estimated FTEs to be generated in relation to repair and maintenance to give a net FTE figure. The indirect and induced multipliers relating to construction activity will also be applied to this figure to determine the operational direct, indirect, and induced FTEs likely to be generated.

No site-specific surveys are proposed to inform the socio-economic, tourism and recreation assessment. This is because sufficient secondary data is available for the development of a baseline from which the potential effects can be assessed.

17.5 Major Accidents and Disasters

17.5.1 Introduction

The EIA Regulations 2017 (as amended), require EIA to consider 'expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.' The potential direct and indirect on human health must also be identified, described and discussed. This section sets out an initial assessment of the potential for such effects arising from the ÒnM Project.

17.5.2 Data Sources and Baseline Environment

Definitions and Data Sources

Although 'accident' 'risk' and 'disaster' are well known terms and used in everyday language, there is potential for their meaning to be interpreted differently. IEMA's Major Accidents and Disasters in EIA: A Primer (2020, 'the Primer') provides definitions for these in an EIA context. The Primer defines 'major accidents' 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.".

The Primer's definition of 'disaster' is:

"May be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident".

Risk is defined in this Primer as:

"The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur...".

Baseline Environment

Whilst there is a possibility that major accidents or disasters could take place, and which could result in significant adverse effects, the Project location mean it is reasonable to expect that this likelihood is very low. As such, potential risks are highly unlikely. For example, the likelihood of incidents such as natural disasters arising from extreme weather events (e.g., hurricanes) and geological events (e.g. earthquakes, volcanic eruptions) is considered to be very low. This is due to the existing climatic conditions within the UK and the absence of the necessary geological conditions required to facilitate these geological events. Whilst earthquakes have occurred within the UK, the magnitude of such events have been minor.

17.5.3 Potential Project Effects

The design of the Project, including its small size, fully submerged offshore infrastructure and avoidance of the use of any hazardous materials minimise the risk of any major accident. The Project location means the risk of any major natural disasters is extremely low and the corresponding potential for significant effects highly unlikely.

Hand safety regulations will also be complied with fully, including those relating to higher risk live electrical sites. The potential for sea level rises and storm surges will also be considered in the climate change assessment if necessary (subject to confirmation of infrastructure locations).

All construction activities will adhere to the CEMP and related measures. This will reduce the risk of a major pollution related accident/disaster occurring. The implementation of a Construction Traffic Management Plan will reduce the risk of transport accidents occurring during construction. Low levels of traffic are required for operation and maintenance with a resultant low risk of accidents.

With respect to the potential for electrical system failures or a fire within the substation or battery energy storage scheme, there will be several response measures in place (such as emergency contact numbers) as a wider regulatory requirement for the project.

Therefore, it is proposed that an assessment of the risk of major accidents and/or disasters is scoped out of further assessment in the EIA.

18. CLIMATE CHANGE AND OTHER EIA MATTERS

18.1 Climate Change

18.1.1 Introduction

Amendments to the EIA Regulations[72] in 2017 mean that the likely (positive and negative) significant effects of the Project with respect to climate change, both in terms of emissions reduction and climate change adaptation must now be considered.

The assessment of climate change adaptation will consider the vulnerability of the onshore and offshore infrastructure to climate change, in particular the potential effects of sea level rise. Measures will be identified to include within the overall Project to ensure resilience to climate change. In accordance with the relevant guidance detailed in Section 17.1.4 below. This assessment will also consider whether the scale of projected climate change identified will fundamentally alter any baseline conditions or effect judgements included elsewhere in the EIAR and if so, whether further mitigation is required ('in combination climate effects').

18.1.2 Indicative Receiving Environment

In relation to the Project Area for emissions reduction, the assessment will consider the effects of the Project on global climate.

In relation to adaptation, the effects of a changing climate on project resilience will largely be assessed in relation to the Project as defined by the indicative landfall locations and their immediate surrounds. In relation to 'in combination climate effects', the Study Area(s) for the onshore infrastructure will align with those identified for the EIA topic area in question.

18.1.3 Data Sources and Baseline Environment

Data from the National Atmospheric Emissions Inventory will be referred to as context (both by relevant sector/local authority).

In considering future climate change scenarios, relevant guidance recommends that the assessment be informed by the UK Climate Change Projections Website [73]. 'Probabilistic' projections are provided for a range of variables including temperature, precipitation, and sea level rise. Wind speeds and storm frequency/ intensity are presented separately as global modelling information is currently more limited. The current projections, UCKP18, released in November 2018, provide the most up to date climate change projections available and are presented for the UK as a whole and on a regional basis.

The baseline information for other receptors will be as identified in the respective EIAR chapters, with this assessment highlighting any cases where projected climate change could alter the baseline conditions identified.

18.1.4 Relevant Guidance and Assessment Tools

The specific guidance documents prepared by the Institute of Environmental Management and Assessment (IEMA) and outlined below will be considered in relation to the climate change assessment:

[72] Schedule 4 part 5(f) of the EIA Regulations
[73] https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/key-results

- The Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (updated 2020)[74], and;
- The Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (updated 2021)[75].

18.1.5 Potential Project Effects

Table 18-1 details the potential effects of the ÒnM Project on Climate Change. Additional comments are provided for each potential effect, detailing evidence to support initial judgement of the likely significance. All the effects identified as potentially significant will be considered further in the EIA.

The positive effects on reducing GHG emissions of powering nearby distilleries and local amenity with renewable energy should also be considered.

[74] IEMA (2020) The Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation
[75] IEMA (2021) The Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance

Table 18-1 Potential Effects of the Project on Climate Change

Potential Effect	Project Phase	Rationale and Commentary
Generation of low carbon electricity.	Operation	The ÒnM Project will supply predictable and reliable low carbon energy to the National Grid. Nova is also exploring a number of 'private wire' options whereby power will be supplied direct to local consumers, thus presenting an opportunity to decarbonise the whisky distilling industry. **This potential effect will be scoped into the EIA.**
Contribution to the commercialisation of tidal power.	All Phases	Unlike other sources of renewable electricity, tidal energy is predictable and reliable, months, years and decades in advance. It could play a key role in forming part of the solution to reducing carbon emissions. The ÒnM Project is a key step in the road to commercialisation of tidal energy. Deploying turbines at scale will bring down the cost of tidal energy through economies of scale and accelerate the contribution tidal can make to achieving Net Zero. **This potential effect will be scoped into the EIA.**
Emissions of embodied greenhouse gases present in Project materials or resulting manufacturing.	Construction	The Project is likely to utilise a number of materials (e.g., steel and concrete) which in themselves have a high carbon footprint. This potential source of GHG emissions, and the scope to use alternative materials with a lower carbon footprint will be explored in the EIA and project design process. **This potential effect will be scoped into the EIA.**
Project resilience to climate change effects.	Operation	The Project is expected to have a lifetime of around 20 years, after which it will be fully decommissioned, or infrastructure replaced and upgraded to extend its operational lifetime (subject to gaining the necessary consents and permissions). The resilience of the Project to predicted climate change effects over this timeframe will be considered in the EIA. It will also be factored into key decisions about the final project design. Critical design components that may be particularly influenced by the effects of climate change include the location and design of onshore infrastructure. **This potential effect will be scoped into the EIA.**
Greenhouse gas emissions from onshore and offshore traffic	All Phases	Offshore and onshore traffic related to the Project will generate emissions of greenhouse gases, carbon dioxide, nitrogen oxides and aerosol emissions such as particulates (PM[76]) which will contribute to climate change. However, any increased onshore and offshore vehicle movements in the area during construction decommissioning will be limited and temporary in nature due to the small nature of any onshore works and the modular nature of Nova's turbines which can be installed quickly and easily by small work vessels.

[76] Whilst not a GHG, it is important to consider emissions of particulate matter (PM) as these are light-absorbing and consequently contribute to the rise in global temperatures, but conversely also reflect a portion of the sunlight and so play a role in increasing the albedo, which moderates the temperature increase.

Potential Effect	Project Phase	Rationale and Commentary
		Traffic during normal Project operations is not expected to be noticeable in comparison with existing traffic movements in the area. Resulting increases in GHG and other emissions are expected to be negligible in comparison with existing traffic emissions in the area. **This potential effect has been scoped out of the EIA.**

18.1.6 Mitigation Measures

Certain measures will be adopted within the Project design process as a matter of course which will reduce the potential for effects. For example, the CEMP will include specific sections on air quality and resource management and on emissions reduction. The CTMP will also be of relevance. The requirement for additional mitigation measures will be dependent on the significance of likely effects relating to climate change and will be consulted upon as required throughout the EIA process.

18.2 Other EIA Matters

18.2.1 Human Health

The EIA Regulations 2017 ((as amended, require that the direct and indirect potentially significant effects of a proposed development on several aspects (including human health) should be identified, described and discussed.

ÓnM comprises both onshore and offshore works during construction, operation and decommissioning. Potential impacts to human health are likely to be mostly related to air quality, noise, visual impact, and traffic and transport. There is also the risk associated with exposure to electrical currents and electromagnetic fields (EMF). However, all aspects of ÓnM will be designed in accordance with health and safety requirements and industry codes, so these risks will be negligible.

The potential for significant effects on human health to arise as a result of the ÓnM Project is considered highly unlikely and, therefore, it is proposed that an assessment of human health is scoped out of the EIA.

19. INFORMATION TO INFORM HABITATS REGULATIONS ASSESSMENT

19.1 Legislative Context

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) require European Union (EU) Member States to establish a network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. This network of sites is known as the Natura 2000 network and comprises Special Areas of Conservation (SACs), Special Protected Areas (SPA's) and Ramsar Sites .In the UK Natura 2000 network includes SACs, SPAs, candidate SACs (cSACs) and proposed SPAs (pSPAs). cSACs and pSPAs, which are treated as though fully designated.

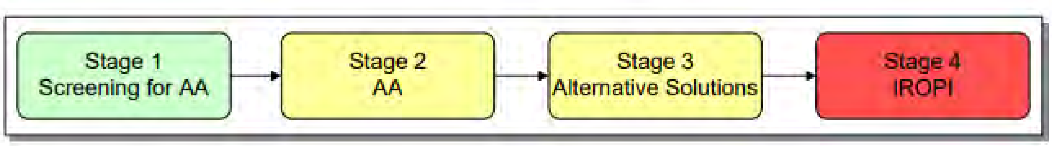
SACs are designated for the protection of Annex I habitats and Annex II species. SPAs are established for the protection of endangered species of wild birds listed under Annex I of the Birds Directive. Ramsar sites are Wetlands of International Importance, designated under the Ramsar Convention. The vast majority of Ramsar sites are also classified as SPAs.

The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2019 transpose the Habitats and Birds Directives into Scottish law. These 'Conservation Regulations' require.

That an applicant for, consent, permission or other authorisation for a project must provide information to enable the competent authority to of carry out Habitats Regulations Assessment (HRA) to determine whether the project will have a likely significant effect on any Natura 2000 site(s), either alone or in combination with other plans and projects. The applicant must provide the competent authority with sufficient information to enable the HRA to be carried out, in the form of a 'shadow HRA'.

NatureScot (NatureScot, 2023) provides guidance on the HRA process, while the European Commission's methodological guidance (EC 2001) outlines a four-stage approach. The outcome at each successive stage determines whether a further stage in the process is required. The results at each step must be documented so there is transparency of the decisions made. The four stages are shown in Figure 19-1 and described below.

Figure 19-1 Stages of AA



19.1.2 Stage 1 - Screening for Appropriate Assessment

Stage 1 of the HRAA process is referred to as screening for Appropriate Assessment (AA), or the Test of Likely Significant Effect (TLSE). It identifies whether the proposed plan or project, either on its own or in combination with other plans or projects, would be "likely to have a significant effect" upon any Natura site. A likely effect is one that cannot be ruled out on the basis of objective information. The TLSE is a 'possibility' of effects rather than a 'certainty' of effects. The test of significance is whether a plan or project could undermine the site's conservation objectives.

19.1.3 Stage 2 - Appropriate Assessment

If an LSE cannot be ruled out, the process must proceed to Stage 2: Appropriate Assessment conducted by the competent authority.

If an AA is deemed necessary for ÒnM, the competent authority (Marine Scotland on behalf of Scottish Ministers in this case) must assess the effects of the ÒnM Project, alone, or in combination with other plans or projects, on the European site network, before any decision is made to allow the Project to proceed. The AA must take into account the possible effects the ÒnM Project may have in combination with other plans and projects.

The European Court of Justice (EJC) has also made a relevant ruling on what should be contained within an Appropriate Assessment:

"[The Appropriate Assessment] cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned".

19.1.4 Stage 3 – Alternative Solutions

This stage examines any alternative solutions or options that could enable the plan or project to proceed without adverse effects on the integrity of a Natura Site. Demonstrating that all reasonable alternatives have been considered and assessed, and that the least damaging option has been selected, is necessary to progress to Stage 4.

19.1.5 Stage 4 - Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

Stage 4 is the derogation process which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a Natura site to proceed in cases where it has been established that no less damaging alternative solution exists.

Additional protection measures for Annex I priority habitats come into effect when making the IROPI case. IROPI reasons that may be raised for sites hosting priority habitats are those relating to human health, public safety or beneficial consequences of primary importance to the environment. In the case of other IROPI for Annex I priority habitats, the opinion of the European Commission is necessary and should be included in the AA. Compensatory measures must be proposed and assessed. The European Commission must be informed of the compensatory measures. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the Marine Scotland on behalf of Scottish Ministers.

20. CUMULATIVE IMPACT ASSESSMENT

Section 2.10 details the approach which will be undertaken for the CIA of the Project and relevant neighbouring developments. The potential cumulative impact of ÒnM Project will be assessed in line with Annex IV of the EIA Directive 2014/52/EU which provides that the EIAR must contain a description of the likely significant effects of the Project on the environment resulting from the cumulation of potential effects with other existing and/or approved plans or projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.

The assessment of the Project in combination with other plans, projects and activities has four principal aims:

- To establish the range and nature of receiving projects and plans within the Project area.
- To summarise the relevant projects and plans which have a potential to create cumulative impacts.
- To establish anticipated cumulative impact findings from expert opinions within each relevant field. This will be addressed in each chapter of the EIAR.
- To identify the projects and plans that hold the potential for cumulative or in combination effects and screen out projects and plans that will neither directly or indirectly contribute to cumulative or in combination effects.

The geographic range of the cumulative assessment is considered on a case-by-case basis, in line with the Guidelines for the Assessment of Indirect and Cumulative Impact as well as Impact Interactions (European Commission, 1999) and the UK's PINS guidance (Advice Note 7, Cumulative Effect Assessment, PINS 2015). The Zone of Influence will change based on each discipline and each component of the Project. The EIA will include consideration of the potential cumulative impact (direct and indirect) of the proposed development and other developments on the marine historic environment, using Argyll and Bute Council's interactive renewables map (https://www. argyll-bute. gov. uk/planning-and-environment/renewable-energy#in_map) alongside other sources to identify relevant developments.

Marine Scotland is currently working with partners including the Centre for the Environment and Hydrology (CEH), RSPB, the Sea Mammal Research Unit and the Sea Watch Foundation to develop a Cumulative Effects Framework (CEF) for offshore renewable developments. The key outputs of this initiative will be a tool for the assessment of cumulative effects for key ecological receptors. This tool is currently expected to be released in May 2023. While the focus of the CEF is on the application to assess the cumulative effects of large-scale offshore wind in Scottish waters, elements of the CEF may be of relevance to ÒnM. This will be reviewed during the EIA and once the CEF has been released.

The projects that have been identified for inclusion within the CIA include: other planned and/or operational tide, wave, and wind projects within and surrounding the Inner Hebrides such as, MachairWind (SPR), West of Islay Tidal array (DP Marine Energy), coastal development at Port Askaig, SSE Jura Hydro Scheme, and Flex Marine Tidal array. AT the time of writing, it was established that QED Naval has, in partnership with Islay Energy Trust, applied for a seabed lease in the Sound of Islay, for up to 10MW of tidal energy (Garanovic, 2022).

Each chapter of the EIAR will address cumulative and inter-related effects and a CIA chapter will also be provided summarising the projects considered and any likely cumulative and/or inter-related effects

21. SUMMARY OF EIA SCOPING AND NEXT STEPS

21.1 Overview

This EIA Scoping Report identifies the potential effects of Nova's proposed 10MW Òran na Mara Project. Up to 30 tidal stream turbines will be installed on the seabed in the Sound of Islay between Islay and Jura. The turbines are likely to be a combination of Nova's existing M100-D turbine (100-200kW capacity) currently operating in the Shetland Tidal Array in Bluemull Sound, Shetland, and its upscaled 'next-generation' turbine (up to 500kW capacity). When installed, the turbines will be fully submerged with nothing visible on the surface.

The power generated by the turbines will be brought to shore via cable, with four 'landfall' options on Islay and one on Jura currently being explored. A small onshore substation close to the landfall point will export the power to the National Grid network, or via a 'private wire' to a local end-user or users.

The Project will be developed incrementally, with turbines and associated offshore and onshore infrastructure installed gradually in phases. Each Project phase will be carefully monitored to gather environmental evidence to ensure sustainable progression through sequential phases.

Nova intends to apply to Marine Scotland Licencing Operations Team (MS-LOT) and Argyll and Bute Council for the offshore and onshore consents to construct and operate an array of up to tidal stream turbines of up to 10MW capacity, comprising up to 30 tidal turbines.

This EIA Scoping Report, submitted to MS-LOT in support of a request for an EIA 'scoping opinion', supports two key purposes:

1. To seek the views and opinions of stakeholders, consultees and the local community on the potential environmental effects of the Òran na Mara Project. These views will help determine the scope of the EIA, the approach to assessing the identified potential effects and any measures needed to reduce or remove the potential for adverse effects.
2. To enable Nova to gather information to gain a better understanding of key local issues or constraints and information on environmental factors that will inform and influence the final design of the Project. This will help Nova 'design out' any potential adverse environmental effects and enhance the Project's sustainability at the project design stage. Areas of project design where Nova thinks local knowledge and information will play a critical role include decisions on the landfall options, turbine layout and Project phasing.

Some of the key design features of the ÒnM Project cannot be finalised until local knowledge and evidence have been obtained and further site investigations and surveys carried out. A relatively broad 'design envelope' has been defined in this Scoping Report which in some cases includes a range of options (such as landfall points). As a consequence, the scope of the EIA also remains broad at this stage, with few potential effects having been fully 'scoped out' of the need for further assessment. Many of the effects have been 'scoped in' to the EIA on a precautionary basis but are very unlikely to be significant or result in adverse impacts.

When all Project details are confirmed, it is expected that many of the identified potential effects will not require a detailed assessment and can be addressed proportionately in the EIA, for example through a desk-based assessment with no need for site surveys. Other potential effects will require a more in-depth assessment, supported by detailed site data and surveys. This approach is key in taking practical steps towards a proportionate EIA, while making sure that Nova provides the local community, regulatory bodies and their advisors, and other stakeholders with a comprehensive understanding for the likely significant effects of the Project, so that any measures to avoid or reduce such effects can be agreed.

21.2 Non-Significant Effects

This Scoping Report has identified some potential effects of the ÒnM Project which are not expected to be significant and therefore which are proposed to be 'scoped out' of the EIA. It is proposed that these effects, detailed in the table below, will not be assessed in any further detail in the EIA Report. A brief supporting rationale for scoping out these effects is provided, with further details provided in the corresponding topic chapters.

Table 21-1 Potential effects proposed to be scoped out of the EIA for ÒnM

EIA Topic	Potential effects	Rationale for scoping out of the EIA
Marine Water and Sediment Quality Benthic Ecology Marine Mammals Marine Ornithology Fish and Shellfish Ecology Commercial and Local Fisheries	Toxic contamination through accidental chemical release from turbines.	No toxic or active chemicals are used in Nova's turbines. The turbines are fully sealed and watertight. NB: Corresponding potential effects of accidental releases on all other receptors have also been scoped out of the EIA.
Marine Water and Sediment Quality Benthic Ecology Marine Mammals Marine Ornithology Fish and Shellfish Ecology Commercial and Local Fisheries	Toxic contamination through accidental hydrocarbon or chemical release from vessels engaged in works.	Embedded mitigation measures including use of responsible vessels operators only, compliance with statutory requirements and application of best practice standards will avoid accidental release from vessels engaged in works. The tidal conditions at the site mean small spills will quickly disperse. NB: Corresponding potential effects of accidental releases on all other receptors have also been scoped out of the EIA.
Marine Mammals	Disturbance from electromagnetic field (EMF) from export cables.	Low-power Alternating Currents (AC) will be used which produce much lower EMF than high-power subsea Direct Current (DC) systems. Nova's systems are balanced so no external electrical field should be present. The EMF in the sea around the cable(s) will be negligible.
Marine Mammals Marine Ornithology Commercial and Local Fisheries	Increased suspended sediment concentrations and associated sediment deposition	Potential risk of temporary increase in suspended sediment concentrations and associated sediment deposition during construction and decommissioning. However, the lack of seabed drilling and tidal conditions at the site mean any sediment will quickly disperse so the risk of effects on Marine Mammals is negligible.
Archaeology and Cultural Heritage	Changes to the setting of the historic environment and cultural assets due	All offshore infrastructure will be fully submerged, with no requirement for surface markers or lighting.

EIA Topic	Potential effects	Rationale for scoping out of the EIA
	to presence of offshore Project infrastructure	
Archaeology and Cultural Heritage	Changes to the setting of the historic environment and cultural assets due to the presence of vessels engaged in works.	The modular nature of Nova's turbines means that these and other offshore infrastructure can be installed and retrieved quickly and easily, limiting the need for vessels to be present on site. Any visual effects will be limited in scale and duration.
Archaeology and Cultural Heritage	Direct physical disturbance from seabed contact by anchors on vessels.	Construction and maintenance activities will be undertaken using a small 'multicat' work vessel using dynamic positioning. Any impacts on known or unknown features of marine archaeological and cultural heritage will be avoided
Terrestrial Ecology	Direct effects on terrestrial avian species	The small-scale of the onshore infrastructure for the Project and very limited land-take minimise the potential for any disturbance, dispersal or mortality to birds.
Terrestrial Ecology	Direct and indirect effects on Jura, Scarba and the Garvellachs SPA	The small-scale of the onshore infrastructure for the Project and very limited land-take minimise the potential for any direct or indirect effects on the SPA.
Landscape and Seascape	Impact on visual amenity experienced at night	All offshore structures are fully submerged with no requirement for lights or other marking. Onshore lighting of onshore infrastructure is not anticipated to be necessary. Neither offshore nor onshore works will be carried out during hours of darkness.
Onshore Geology and Physical Processes	Effects on Caol Ila Geological Conservation Review site	No landfalls or routings are planned to cross this area or enter into the designated area or immediately adjacent to it.
Onshore Noise and Vibration	All effects	Onshore Project infrastructure is limited in scale. Construction and decommissioning works will be temporary and short-term.
Traffic and Transport	All effects	Onshore Project infrastructure is limited in scale. Any increase in traffic and transport will be temporary, short-term and very minimal compared to background levels.
Air Quality	All effects	Onshore Project infrastructure is limited in scale. Any increase in dust or traffic emissions will be temporary, short-term and very minimal compared to background levels. Any emission from offshore vessels will be minimal.
Major accidents, Disasters and Human Health	All effects	Project design, including small size, fully submerged offshore infrastructure and avoidance of the use of any hazardous materials minimise the risk of any major accidents. Project location makes the risk of any major natural disasters

EIA Topic	Potential effects	Rationale for scoping out of the EIA
		extremely low. The potential for significant adverse effects on the environment or human health are highly unlikely.
Climate Change	Greenhouse gas emissions from onshore and offshore traffic	Any increase in traffic will be temporary, short-term and minimal compared to background levels. Resulting increases in GHG and other emissions are expected to be negligible in comparison with existing traffic emissions in the area.

21.3 Potentially significant effects

The remaining potential effects of the ÒnM Project identified in this Scoping Report cannot at this stage be 'scoped out'. These 'scoped in' effects, detailed in the table below, will be assessed in further detail in the EIA Report.

Table 21-2 Potential effects proposed to be scoped into the EIA for ÒnM

Topic	Potential Effects
Marine Physical Processes	▪ Changes in suspended sediment (all Project Phases). ▪ Changes to tidal regime (turbulence, scour, mixing) during turbine operations (Operational Phase). ▪ Changes in coastal erosion (Operational Phase). ▪ Changes in offshore sediment pathways and effects on morphological features (Operational Phase). ▪ Changes in shoreline sediment pathways and effects on coastline (Construction and Decommissioning Phases).
Marine Water and Sediment Quality	▪ Deterioration in Marine Water Quality due to re-suspension of sediments (all Project Phases).
Benthic Ecology	▪ Physical disturbance or change (substratum type) to habitats and species and habitat loss (all Project Phases). ▪ Abrasion/disturbance at the surface of the substratum causing habitat loss and disturbance (all Project Phases). ▪ Smothering of benthos and siltation rate changes (Construction and Decommissioning Phases). ▪ Introduction of Invasive Non-Native Species (all Project Phases). ▪ Turbine presence causing changes to the hydrodynamic regime, in the area potentially affecting the mechanisms within the local benthic ecology (Operational Phase).
Marine Mammals	▪ Mortality, injury and/or disturbance from unexploded ordnance (UXO) clearance (Construction Phase). ▪ Disturbance (noise and visual presence) from vessel traffic (all Project Phases). ▪ Disturbance from operational noise generated by the devices (Operational Phase).

Topic	Potential Effects
	▪ Indirect effects of underwater noise or barrier effects on marine mammal prey species (Operational Phase). ▪ Disturbance and/or injury from pin-piling (Construction Phase). ▪ Disturbance from noise above the sea surface (all Project Phases). ▪ Barrier to movement or displacement due to presence of turbines (Operational Phase). ▪ Risk of collision with vessels (all Project Phases). ▪ Risk of collision with tidal turbines (Operational Phase).
Marine Ornithology	▪ Disturbance and displacement by vessel activity (all Project Phases). ▪ Disturbance and displacement from vicinity of turbines (Operational Phase). ▪ Effects on foraging from changes in turbulence (Operational Phase). ▪ Seabed feeding habitat loss/change, due to presence of devices and offshore infrastructure (Operational Phase). ▪ Risk of collision with tidal turbines (Operational Phase).
Fish and Shellfish	▪ Changes to or loss of fish or shellfish habitat (all Project Phases). ▪ Effects of Electromagnetic Fields (Operational Phase). ▪ Effects of underwater noise to hearing and pressure sensitive species (all Project Phases). ▪ Effects of siltation and smothering (Construction and Decommissioning Phases). ▪ Risk of fish collision with tidal turbines (Operational Phase). ▪ Introduction of Invasive Non-Native Species (all Project Phases).
Commercial and Local Fisheries	▪ Disturbance of fishing grounds (all Project Phases). ▪ Displacement of fishing vessels (Operational Phase). ▪ Effects on vessel safety (all Project Phases).
Shipping and Navigation	▪ Displacement of vessels leading to increased voyage distance or time (all Project Phases). ▪ Restricted access to local ports/harbours (all Project Phases). ▪ Increased vessel to vessel collision risk (all Project Phases). ▪ Increased vessel grounding risk due to vessel displacement (all Project Phases). ▪ Vessel hull interaction risk with turbines (Operational Phase). ▪ Anchor and/or fishing gear interaction with offshore Project infrastructure (Operational Phase). ▪ Navigational hazard caused by loss of station of offshore Project infrastructure (all Phases).
Archaeology and Cultural Heritage	▪ Direct physical disturbance during invasive seabed or intertidal surveys (all Phases).

Topic	Potential Effects
	▪ Direct physical disturbance during installation or decommissioning of offshore and intertidal infrastructure (Construction and Decommissioning Phases). ▪ Direct physical disturbance during installation or decommissioning of onshore infrastructure (Construction and Decommissioning Phases). ▪ Turbine presence causing changes to the hydrodynamic regime in the area potentially affecting local features (Operational Phase). ▪ Changes to the setting of the historic environment and cultural assets due to presence of onshore Project infrastructure (Operational Phase).
Underwater Noise	▪ Generation of underwater noise from vessel movements and effects on marine life (all Phases). ▪ Generation of underwater noise from cable laying and effects on marine life (Construction). ▪ Generation of underwater noise from acoustic site surveys and effects on marine life (all Phases). ▪ Generation of underwater noise from operational turbines and effects on marine life (all Phases).
Terrestrial Ecology	▪ Direct and indirect effects on habitats of conservation concern (Construction and Decommissioning). ▪ Direct effects on non-avian protected species (Construction and Decommissioning).
Landscape and Seascape	▪ Changes to landscape character (all Phases). ▪ Changes to seascape character (all Phases). ▪ Changes to the Jura NSA (all Phases). ▪ Changes to the Jura, Scarba Lunga and Garvellachs WLA (all Phases) ▪ Changes to visual amenity (all Phases). ▪ Cumulative effects arising in combination with other similar unbuilt onshore developments (all Phases).
Onshore Geology and Physical Processes	▪ Effects on surface and groundwater quality from sediment/silt run-off (Construction and Decommissioning). ▪ Contamination of surface and groundwater quality from chemical or fuel spills (Construction and Decommissioning). ▪ Effects on drainage and flood risk (all Phases). ▪ Effects on surface and groundwater quantity (Construction and Decommissioning). ▪ Direct and indirect impacts on soils (Construction and Decommissioning).
Socioeconomics, Tourism and Recreation	▪ Direct, indirect and induced employment and economic opportunities (all Phases). ▪ Potential effects on local tourism or recreational amenities (all Phases).
Climate Change	▪ Generation of low carbon electricity (Operational Phase).

Topic	Potential Effects
	▪ Contribution to the commercialisation of tidal power (all Phases). ▪ Emissions of embodied greenhouse gases present in Project materials or resulting manufacturing (Construction). ▪ Project resilience to climate change effects (Construction).

The likely significant effects of ÒnM will be assessed and reviewed further within the EIA and mitigation measures proposed will be updated where appropriate. Following receipt of the scoping opinion a full 'EIA Scoping Impacts Register' will be compiled and maintained, documenting the potential environmental effects during construction, operation and maintenance and decommissioning of the Project.

21.3.2 Survey and Evidence Strategy

There is considered to be sufficient baseline data to provide a general overview and site characterisation for the ÒnM Project area within the Sound of Islay. However, site-specific information is likely to be lacking to support a full and detailed impact assessment for ÒnM. At the time of writing, 1 year's marine mammal and bird surveys have been undertaken in the Project site. These surveys have been extended to July 2023 to capture a further breeding season. It is hoped that this, combined with the considerable existing information already available for the area will be adequate for the EIA and a full 2 years of data may not be required.

Following receipt of the EIA scoping opinion, a survey and evidence strategy for the ÒnM Project will be developed. This will take account of advice in the Scoping Opinion and the necessity and proportionality of any additional site surveys to inform the assessment process and refinement of the project design envelope. Any survey work will be undertaken on an "necessary and proportionate" basis. An overview of the potential surveys and evidence sources that may form part of this strategy is provided below.

Geophysical survey: The array area and export cable route would be surveyed to provide information about local bathymetry (multibeam) and key seabed sediments, bedforms and textures (side-scan sonar). Geophysical survey datasets will also be used to help with the identification of anomalies of archaeological potential on/beneath the seabed. Further **ground truthing** (RoV/Diver surveys), if required, could be done at a later stage. However, the process of reviewing any geophysical datasets, would help de-risk avoidable but unknown sites and navigational hazards, early in the design phase.

Subtidal benthic survey: Seabed locations across ÒnM Project area (including cable corridors) would be sampled using drop-down video and stills photography to ground-truth identified features and delineate the extent of potential sensitive habitats. The coarse sediment expected in this area mean that a mini-Hamon grab ($0.1m^2$), or similar, would be used if sediment sampling is viable.

Metocean survey: Deployment of a single or multiple Acoustic Doppler Current Profiler (ADCP) on the seabed within the ÒnM array area will obtain data on flow conditions for a period of at least 30-days (full lunar cycle). Wave data may also be obtained to verify the local conditions. This data will be explored to characterise the available tidal energy resource and any variability to inform turbine design and array layout. Water sampling may be undertaken at times of ADCP deployment and recovery to determine baseline concentrations of particulate matter (if required).

Intertidal survey: Potential landfall locations will be assessed using a phase 1 walkover methodology, mapping intertidal habitats between mean high-water springs to mean low water spring tide mark. If any potentially sensitive habitats are identified, a Phase 2 survey may be required.

Underwater noise evidence: It is not currently anticipated that an underwater noise survey of the ÒnM site will be required to inform the EIA. Similarly, it is not expected that detailed noise modelling will be required, but that the assessment of the effects of noise during constructions, operations and maintenance and decommissioning phases will be qualitative. The assessment of the likely effects of underwater noise will be based on existing evidence including measurements of turbine nose at Nova's operational Shetland Tidal Array in Bluemull Sound and a desk-based study. This approach will be reviewed following receipt of the Scoping Opinion and following further work to fully understand all potential noise sources (including possible UXO clearance, if required). The need for noise modelling and approach to assessing the effects of underwater noise will be discussed with Marine Scotland and its consultees, including NatureScot, pending results of the analysis of noise measurements from Nova's operational turbines in Bluemull Sound, Shetland carried out in February 2023.

Archaeological evidence: A review of existing data including marine geophysical datasets and data gathered during seabed surveys to inform Project design (see above) will be undertaken to enhance the identification of archaeological assets.

Onshore habitat surveys: Extended Phase 1 habitat surveys will be undertaken if required within the onshore Project area to record broad habitat types and their suitability to support protected species. If Habitats of Conservation Concern (including Groundwater Dependent Terrestrial Ecosystems - GWDTE) are identified during the Phase 1 Habitat Survey, National Vegetation Classification (NVC) surveys will be undertaken to categorise the plant communities present

Onshore protected species surveys: Requirements for protected species surveys will be confirmed by the Phase 1 habitat survey of the onshore project area. If required, these are expected to include the following receptors:

- Badger Meles meles
- Otter Lutra lutra
- Water vole Arvicola amphibius.
- Bats: a Preliminary Bat Roost Assessment of trees and structures potentially impacted by the Proposed Development.

21.3.3 Summary of Mitigation Measures

Throughout this Scoping Report, mitigation measures have been outlined to avoid or minimise adverse effects on onshore and offshore receptors as a result of ÒnM. To ensure that a proportionate approach is taken to the EIA, it is assumed that a range of mitigation measures will be 'embedded' within the design and construction of the Project, as detailed in the following 'Mitigation Measure Register', provided in Appendix D.

Full details of the Project's evolution and embedded mitigation measures in relation to the relevant technical topics will be detailed within the EIA Report. Where LSE are identified, within the context of the EIA regulations, mitigation measures will be identified and agreed in consultation with relevant stakeholders. All mitigation measures will be developed on the basis of robust science, drawing on current and emerging good practice and its likely efficacy and success will be considered.

21.3.4 Structure of EIAR

The EIA Report will provide a comprehensive, proportionate assessment of the LSE of the ÒnM Project. At this stage it is proposed that the EIA Report will comprise a single document covering the onshore and offshore components of the Project and their corresponding effects. The EIA Report will present the results of the EIA in a series of introductory and technical chapters with any detailed specialist reports provided as Technical Appendices where appropriate. Each technical chapter will provide a description of the receiving environment, and the potential effects of the proposed development, mitigation measures and residual effects. The final structure of the EIA Report will be finalised once the EIA Scoping Opinion has been received to ensure it is fit-for-purpose. The EIA Report will be summarised in a separate Non-Technical Summary.

21.4 Next steps

This EIA Scoping Report has been produced in support of a request for an EIA 'scoping opinion' from the Scottish Ministers on the scope of the EIA required to support consent applications for the proposed 10MW ÒnM Project in the Sound of Islay.

Following receipt of the Scoping Opinion, the EIA for ÒnM will be progressed, taking account of the advice provided by Marine Scotland on behalf of the Scottish Minsters. It is anticipated this advice will be informed by the the views and opinions of Marine Scotland's consultees, the local community and other stakeholders on the potential environmental effects of the Project. These views will help determine the scope of the EIA, the approach to assessing the identified potential effects of ÒnM and any measures needed to reduce or remove the potential for adverse effects.

Nova is committed to open and positive dialogue and engagement with all stakeholders, regulators, and communities that may be affected by or indeed may affect the ÒnM Project. Nova will ensure that communication routes with stakeholders are further developed and maintained throughout the ÒnM EIA process.

The Scoping Opinion and ongoing stakeholder consultation for ÒnM will also enable Nova to gain a good understanding for key local issues or constraints and information on environmental factors that will inform and influence the final design of the Project. This will help Nova 'design out' any potential adverse environmental effects and enhance the Project's sustainability at the project design stage. Areas of project design where Nova thinks local knowledge and information will play a critical role include decisions on the landfall options, turbine layout and Project phasing.

The planned timeline for the EIA and submission of consent applications for ÒnM will be determined and agreed with MS-LOT, Argyll and Bute Council and other stakeholders following receipt of the Scoping Opinion.

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APPENDIX A

Òran na Mara EIA Scoping Workshop Backing Paper

NOVA INNOVATION

Òran na Mara tidal project EIA scoping workshop, 08/11/22 10:00-13:00 (MS Teams)

Aim:

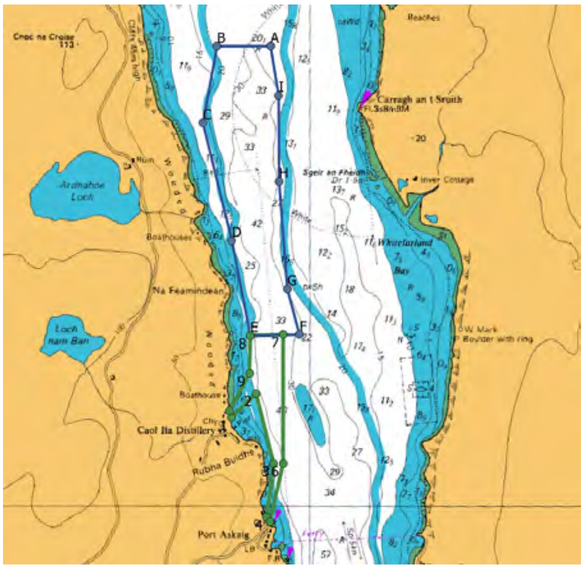
Workshop to access technical advice on key issues and environmental receptors identified in the agenda below to inform Nova's request for a scoping opinion in January 2023.

Agenda:

Time	Agenda item
Introductory session	
10:00-10:10	Welcome and introductions (noting some attendees may join later for specific items)
10:10-10.15	Workshop format (to be recorded unless attendees object)
10:15-10:30	Project overview
Technical sessions	
10:30-11:00	General discussion on use of evidence and data from SPR 10 MW Sound of Islay Tidal Array and other existing evidence for area
11:00-11:40	Marine mammal impact assessment
11:40-12:20	Marine bird impact assessment
12:20-12:50	Benthic ecology impact assessment
12:50-13:00	Summary and close

Project overview

Location:



Details:

Project capacity	10 MW
Turbine capacity	100-500 KW
Rotor diameter	8-14 m
Rotor speed	10-27 rpm
Hub height	8-12 m
Max. height	19 m (upright blades)
Cut in speed	0.8 m/s
Draft clearance	To be agreed in discussion with stakeholders (assumed ≈ 8 m)
Export cable	Single cable from an offshore hub. Various routes and landfall options currently being considered to Isla and Jura, to be discussed in workshop

Notes and questions for technical sessions

Use of SITA and other existing data for Òran na Mara scoping and EIA

Previous advice from Marine Scotland was a 5-year limit rule of thumb for onshore EIA data, but offshore is less clear (Firth and Tay offshore wind farm used 7-year old data). Advised some of the SPR baseline might be sufficient for ÒnM, with some supplementation by Nova and a commitment to post-consent monitoring.

ÒnM scoping will examine and present the case for the relevance of SPR and other data such as regional baselines for Scotwind area 17 and other regional modelled bird and mammal density estimates. It will identify any need for additional survey or baseline data gathering and proposed methods. Scoping will work to the principle that SPR data and existing data are sufficient for ÒnM unless stated otherwise in the scoping report. The overall aim is to ensure the evidence required for and presented in the EIA is fit for purpose and proportionate to impact risk.

Questions/discussion points:

- Any views on the general principle of using SPR data in the EIA?
- How would MS-LOT/Nature Scot/other workshop attendees like to see the case for using SPR and other existing data presented in the scoping report, to provide confidence that this approach is robust?
- Are there any data or evidence in the SPR EIA which it is clear are not relevant to ÒnM at this stage?
- For topics other than birds and mammals, EIA scoping will be based on an evidence-based approach (desk-based literature and data review) without being informed by Nova surveys. Will this approach be acceptable to MS-LOT/NatureScot.
- For the physical processes topic, would MS-LOT/NatureScot be happy with an evidence-based approach (desk-based literature and data review) without physical process modelling?

Marine mammals

- Scoping will be informed by Nova survey data (April to December 2022) supplemented by SPR mammal data and other data for the area. Preliminary results from surveys conducted from April to August 2022 (inclusive) provided in a separate document.
- Scoping will identify the most appropriate data/evidence sources for each element of the impact assessment (e.g., impact pathway/species), likely to be Nova survey data, SPR mammal data and other data for the area.
- Key SAC and MPA species features are harbour seal, harbour porpoise and minke whale but scoping will consider impacts on all species recorded in Nova and SPR surveys, and in other data sources for the project site, including consultation responses to SPR ES.
- Scoping will assume species consistently present and/or present in high numbers are most likely to interact with the project, as identified from Nova and SPR surveys and other data sources. Species only occasionally present and/or in low numbers less likely to interact with the project.
- Scoping will consider the use of phased turbine installation informed by monitoring as a mechanism for managing and better understanding risk for marine mammals.

Questions/discussion points:

- Advice or views on how to best present the case for use of SPR evidence and data in scoping/EIA?
- Any other key existing data that would be advisable to use to inform scoping?
- Use of marine mammal management units within assessments?
- Choice of model for collision risk assessment and use of PBR? Current PBR for key species (assume SCOS advice for seals, but other species)?
- Are there key information and data that can be shared for Inner Hebrides and Minches SAC (harbour porpoise), SE Islay Skerries SAC (harbour seal) and minke whale MPA (Sea of the Hebrides?) such as R&D studies, site condition monitoring, FCS assessments?

- Access to data and results of harbour seal tagging from SMRU – has this continued since last formal report? Is there further understanding on movements of harbour seal in and around the area that hasn't yet been shared in external reports?
- Views on use of 'deploy and monitor' to gather evidence for phased turbine installation?
- Views on use of evidence gained from monitoring mammal interactions with operational turbines (e.g., Nova Shetland Tidal Array and SEA MeyGen) in scoping and EIA?

Marine birds

- Scoping will be informed by Nova survey data (April to December 2022) supplemented by SPR bird data and other data for the area. Preliminary results from surveys conducted from April to August 2022 (inclusive) provided in a separate document.
- Scoping will identify the most appropriate data/evidence sources for each element of the impact assessment (e.g., impact pathway/species), likely to be Nova survey data, SPR bird data and other data for the area.
- Scoping will consider impacts on all species recorded in Nova and in other data sources for the project site, including SPR surveys.
- Scoping will assume species consistently present and/or present in high numbers are most likely to interact with the project, as identified from Nova and SPR surveys and other data sources. Species only occasionally present and/or in low numbers less likely to interact with the project.
- Scoping will consider the use of phased turbine installation informed by monitoring as a mechanism for managing and better understanding risk for marine birds.

<u>Questions/discussion points</u>

- Advice or views on how to best present the case for use of SPR evidence and data in scoping/EIA?
- Any other key existing bird data that would be advisable to use to inform scoping?
- Choice of model for collision risk assessment? Advice on how to assess any impacts for population level effects and data sources.
- Advice on how Avian flu should be factored into scoping and EIA; formal guidance or advice notes?
- Are there key information and data that can be shared for SPAs, such as R&D studies, site condition monitoring, FCS assessments?
- Should hypothetical spatial overlap using foraging radii be considered in scoping, or is survey data and other data sources on bird observations/presence in the sound sufficient?
- Views on use of 'deploy and monitor' to gather evidence for phased turbine installation?
- Views on use of evidence gained from monitoring bird interactions with operational turbines (e.g., Nova Shetland Tidal Array and SEA MeyGen) in scoping and EIA?

Benthic ecology

- Scoping for benthic ecology will be informed by SPR data and desk top review (Nova has not conducted any surveys for the area).
- Physical processes assessment to feed into benthic ecology assessment will also be based on desktop review without physical process modelling
- Scoping will outline need for and proposed approach to further benthic survey in light of SPR data and Nova project design (spatial overlap).
- Multiple cable landfall options being considered.

<u>Questions/discussion points</u>

- Known priority marine features in the project area (maerl, horse mussel) to inform narrowing of options for cable landfall or micro-siting?
- Any other key existing relevant data on benthic habitat/species features (i.e., greater resolution that that available on NMPi) – aware of JNCC 2019 survey.

- Does NatureScot have a copy of Keith Hiscock 1983 survey of the Sound of Islay? Can't locate online.
- Any standard buffer zones or proximity constraints for priority marine features if they are identified in the area?

Fisheries and commercial fisheries

Key information sources will be:-

- Information in the SPR ES, including consultation responses from Clyde Fisherman's Association and Scottish Fisherman's Federation.
- Information from national and regional fishing organisations.
- Liaison with local fishers for additional context and information and check no major changes in fisheries in project area.
- Official Marine Scotland fish and shellfish landings data for the area.
- Monitoring and surveillance information (VMS & AIS as well as anecdotal information from MS fishery officers).

Confirmed attendees (as of 04/11/2022)

Project team

Organisation	Name
Nova Innovation	Kate Smith
Nova Innovation	Gavin McPherson
Nova Innovation	Angela Maxfield
Intertek	Aodhfin Coyle
Intertek	Paul Evans
Intertek	Lesley Harris
APEM	Ross Culloch
APEM	Amie Wheeldon
APEM	Helen Hedworth
AWJ Marine	Jim Andrews

Marine Scotland/NatureScot

Organisation	Name
Marine Scotland Licensing	Marc MacFarlane
Marine Scotland Licensing	Ben Walker
Marine Scotland Licensing	Jane Renwick
Marine Scotland Science	Sue O'Brien
Marine Scotland Science	Joe Onoufriou
NatureScot	Malcolm Fraser
NatureScot	Karen Taylor
NatureScot	Jen Graham

Possible attendees (TBC)

Catherine Kelham: RSPB
Aly McCluskie: RSPB
Fiona Read: WDC
Hebridean Whale and Dolphin Trust

ÒRAN NA MARA EIA SCOPING WORKSHOP

8th November 2022 10:00 to 13:00 (MS Teams)

Introductory note

The record of the EIA scoping workshop provided in this document has been prepared by Intertek and Nova, using the automatically generated MS Teams transcript (which has limited accuracy) supplemented by participant notes and some feedback on a draft note circulated to participants. This approach means that the production of an accurate word-for-word transcript of the workshop has not been possible. Instead, the notes provide a record of key points and actions on the technical topics covered, assigned as far as possible to the correct individuals, to inform the production of the EIA scoping report for the project.

It is the responsibility of Nova (supported by Intertek) to ensure that it understands the advice provided on the technical topics and incorporates this into the EIA scoping report. Nova understands that engagement during this time will be limited and further feedback will come via the scoping opinion. It is also noted that some of the outstanding points and requests for further advice or clarification in the notes and actions may be provided in the scoping opinion.

1.1 Aim

Workshop to access technical advice on key issues and environmental receptors identified in the agenda below to inform Nova's request for a scoping opinion.

1.2 Agenda

Item	Time	Agenda Item
	Introductory Session	
1	10:00 – 10:10	Welcome and introductions (noting some attendees may join later for specific items)
2	10:10 – 10:15	Workshop format (to be recorded unless attendees object)
3	10:15 – 10:30	Project overview
	Technical sessions	
4	10:30 – 11:00	General discussion on use of evidence and data from SPR 10 MW Sound of Islay Tidal Array and other existing evidence for area
5	11:00 – 11:40	Marine mammal impact assessment
6	11:40 – 12:20	Marine Ornithology impact assessment
7	12:20 – 12:50	Benthic ecology impact assessment
8	12:50 – 13:00	Summary and Close

1.3 Attendees

Attendee	Initials	Organisation
Kate Smith	KS	Nova Innovation
Gavin McPherson	GMcP	

Attendee	Initials	Organisation
Angela Maxwell	AM	
Lesley Harris	LH	Intertek
Aodhfin Coyle (minutes)	AC	
Paul Evans	PE	
James Harding	JH	
Ross Culloch	RC	APEM
Sean Sweeney	SS	
Amie Wheeldon	AW	
Pheobe Meredith	PM	
Marc Hubble	MH	
Nick O'Brien	NOB	
Jim Andrews	JA	AWJ Marine
Simon Stephenson	SS	Seiche
Charlotte Birch	CB	
Catherine Kelhem	CK	RSPB
Aly McCluskie	AMcC	
Lauren Hartny-Mills	LHM	Hebridean Whales and Dolphin Trust
Fiona Read	FR	Whale and Dolphin Conservation
Malcolm Fraser	MF	NatureScot
Karen Taylor	KT	
Alex Robbins	AR	
Caroline Carter	CC	
Caitlin Cunningham	CCu	
Karen Hall	KH	
Jen Graham	JG	
Joe Onoufriou	JO	Marine Scotland Science
Ben Walker	BW	Marine Scotland Licensing
Marc MacFarlane	MM	Marine Scotland Licensing
Jane Renwick	JR	Marine Scotland Licensing

1.4 Minutes and actions

Item	Agenda	Actions
1	**Welcome and introductions (noting some attendees may join later for specific items)**	
2	**Workshop Format**	
3	**Project Overview** **See slides 5-9** **GMcP –** pProvided overview of OnM project including details of the site, information on the project area, details of the tidal turbine technology, and export cable route options. **MF** What cable protection may be be required for the export cables? **GMcP-** Burial is not an option for this area as the seabed is too hard, closer to the shore cable trenching is an option. Mattress protection was looked at, but this can be more damaging to the cable, double armouring of the cable is the favoured approach.	No actions but slides from workshop with project design details circulated to all attendees.
Technical Sessions		
4	**General discussion on use of evidence and data from Scottish Power Renewables See slides 10-12** **KS-** Introduced the consented SPR 10 MW project, located south of OnM site. Gave an overview of SPR project and consenting process. **KS-** Early discussions held with NatureScot and MS-LOT advised to look at the approach taken for Forth and Tay offshore wind farms, using older data to update current applications. Nova modified approach for OnM – developed series of questions provided in workshop slides – see slide 11. **KS** - Nova's proposed approach will look at each topic/receptor in SPR EIA, significant residual effects, and evaluate whether OnM will result in an increase in the worst-case design parameters for each potential impact pathway. The technical studies and baseline data will be assessed to see if still valid and whether or not there has been any changes to relevant policy, guidance, or legislation. **KS** – Summary of key questions that Nova has for NatureScot and MS-LOT (see slide 12). **MF** - NatureScot will provide written advice on the Physical Processes question. **MF** – Two issues with the SPR data, 1) Age of data, 2) Incomplete spatial overlap of the area. The 2-year baseline requirement could be reduced depending on the results from the first year of VP surveys. Asked for clarification on spatial overlap. **KS** – Example for bird and mammal VP surveys. Nova using two vantage points (Caol Ila and Caraig Dubh). Caol Ila was also one of SPR VPs, so some overlap with OnM site. Nova has the raw bird and mammal data collected by SPR, so when analysing OnM survey data will also consider SPR data. **KS** - Nova are keen to know if use of SPR data would add value to the project EIA, or if the age of the data was such a significant concern for NS and MS would there be much point in Nova going ahead with this approach. This is one of the aims of the call today.	**1. NatureScot to provide further on whether an evidence-based approach (desk-based literature and data review) without physical process modelling is appropriate for this site. (Note that this may be provided as part of NatureScot's advice to inform MS-LOT's scoping opinion).**

Item	Agenda	Actions
	MF – Nova provided a method statement earlier in the year which NatureScot provided feedback on, but we haven't seen an updated method statement. NatureScot need to see the up-to-date method statement for the bird and mammal surveys, and will consider whether the VPs for Nova and the SPR survey are comparable. **AR** - Difficult to combine data sets. If proposing to combine Nova and SPR data, Nova need to provide a methodology before NatureScot can advise on this. **KS** - Possible that SPR data and Nova data serves different purposes, SPR data gives wider context to occupancy patterns in the area, Nova is trying to understand finer scale detail for the site-specific data, to get a sound understanding of how important the sound is to birds and mammals and how they are using it are using the area. **KH** - fine to use data as a bit of context, but hard to compare and contrast between data sets when Nova haven't provided a full data set. **KS-** Nova to provide more detailed analysis of the OnM data before NS can provide a clearer steer on how to use alongside SPR data. **KS-** In principle are you happy for us to look at the EIA and the conclusions from the SPR project and where certain topics have concluded that the impact pathways are negligible or very unlikely, is it reasonable to bring this into our own assessment or how we can best present this information. **MF** - In principle it sounds ok, but Nova will need to present what data and questions will be taken from 2010 and 2014 SPR EIAs, and present the questions being asked in scoping. It would be better to see what Nova are taking from the EIA in the list of questions that will be provided. Need to clearly present what propose to take from SPR EIA- for each include sentence or paragraph so self-contained. Unlikely to be able to scope anything out at this stage. Justification is required to take account of the time gap if Nova think the data are still relevant. **JO** - MSS would be reticent to support scoping things out based on the data collected from SPR, a lot of value in determining impact pathways, but would not be comparable of current data to a 10-year-old EIA. **KT-** Nova needs to provide justification as to why something is scoped in or out, and how it has changed from SPR EIA. NS would need Nova to sense check why impact pathway is still relevant. **KS –** Is there critical data that has been gathered for the ScotWind project, or work within MS and NS that Nova should not be missing out on in our scoping report? **KT** – ScotMER has more of an offshore wind focus now.	**2. Scoping report to provide clarification on spatial overlap between Nova project site and SPR bird and mammal data.** **3. Nova to provide an up-to-date Method Statement to NatureScot and MS-LOT. (Note that this will be provided in the scoping report).** **4. Nova to work up more detailed analysis of the data, this has to be focused on as a priority. (Note that this will be provided in the scoping opinion).** **5. MS to provide written advice on the critical data**

Item	Agenda	Actions
		that is currently being undertaking by MS and NS, that should be included in the Scoping report.
5	**Marine Mammal Technical Session** **See slides 13-15** **RC –** Mammal questions and issues touched on in SPR discussion. APEM will be using survey data collected by RPS, data presented in the SPR EIA, and will also use Hague et al, 2020 and Carter et al 2022 papers (seal usage maps). **MF** – NS provided a list of essential references in 2020, this can be recirculated with up-to-date references. **RC** - Most commonly occurring species from RPS data, harbour, and grey seal, potentially thought we would see more harbour porpoise in the data based on historic data from that area. APEM will pull in all species mentioned in the wider evidence for the project area. **RC**- Impact pathways from the SPR data will be looked at and used to inform the assessment, elements of noise, Collision risk modelling, and other things that come up based on research. **JO -** Scale is important factor to look at in these projects, Carter has a 5km study area (basically the entire Sound of Islay study area contained within 1 grid cell), it would be useful to seek some refinement to the methods of Carter. SMRU have suggested they can refine some of the scale if there is local telemetry data available. **RC-** How much weight can we put on other relevant studies? **JO -** Useful way markers as to the way in which you can use some of the data sources in this area, 500m may not be a sufficient buffer zone around the area to capture the changes in species density that you might see when turbines are in operation, 2km buffer zone suggested. Useful to use other data sources but local data is much more beneficial. **RC** - how do we use existing data (telemetry tagging) and combine it with existing vantage point data to best inform the scoping report? **JO** - Not suggesting the evidence from other studies isn't used, it's an important caveat to consider that you might not be getting the full picture by transferring information from one site to another. **JO -** There is info that can be used in these projects. Telemetry data from the Sound of Islay can be leveraged to inform a collision risk model. Cautionary tale that there are big differences between sites. **KS -** Any views on how we best analyse our data, to remove uncertainty from consenting process. Can be a common issue that we get low numbers of species at these small tidal sites, so calculating density estimates can be challenging. **KH** - This is an example of why need to see full data set, it's very difficult to advise on analysis. Monthly surveys may not be enough to understand how animals are using the site. Past experience from narrow tidal sites suggests animals can be influenced by the presence	**1. NatureScot to provide an up-to-date reference list.** **2. APEM to speak with SMRU on the refinement of the method used by Carter et al 2022.**

Item	Agenda	Actions
	of the surveyor, seals can follow the surveyor, therefore lots of seal sightings but may be down to seals following surveyor, may need to look at vantage points. **KH** – No mention of Basking Sharks? **KS** - If basking sharks are present, they will be recorded in the data, none present in surveys to date. **MF** - 8 months will not be an appropriate data set, need to see the full 12 month analysed data. **KS** - We will probably need to extend to 12 months, Scoping report will be based on April to December, but within Scoping we will look at extending surveys from January to March so full 12 months data.	
	RC - SACs and MPA, what would need to be considered regarding connectivity and proximity to protected sites. Some sites mentioned in the slides, APEM will be scoping out, and will do it with some steer from NS and MS. **KH** - SACs and MPAs, all sites to be included in Scoping report, then justification as to why they will be removed. Basking shark together with minke whale are features of the Sea of the Hebrides MPA. **KH** - MPAs, largely monitored and managed within the site, any impacts close to the boundary of the site we wouldn't be scoping out, when Nova have a better handle on survey data and what species are present in the area, then that will give a better idea of what can be scoped out with regards to MPAs. Written comments to be provided on MPA and SAC monitoring. **RC -** Has NS got any guidance on the harbour porpoise SAC near the project area that is to be assessed? **KH -** Will need to be assessed given its proximity to both end of the Sound, will come back with written advice.	**3. NS and MS to provide written comments on MPA and SAC monitoring** **4. NS to provide written advice on how to assess the harbour porpoise SAC near the project area.** **5. Nova/Intertek to review/contact SMRU about use of tagging and aerial monitoring data**
	MF – Preference from NS and MS-LOT is for HRA screening report to be submitted at same time as Scoping report.	**6. Nova to submit EIA scoping and HRA Screening reports at the same time.**
	RC- Cumulative impact assessment - what should this encompass for marine mammals? Any thoughts from NS and MS on projects that we may need to be aware of? **LHM -** Surprising that no harbour porpoise have been recorded in surveys, are specific PAM surveys planned to be conducted**?** If these were carried out, could this and SPR data justify why further vantage point surveys are not needed? **RC -** Draws on Malcolm's observation earlier, that two years of site-specific data is needed but will be reduced if other evidence is available, may be able to draw in other data sources.	**7. MS to provide written advice on other project to be considered in the cumulative impact assessment.**
	LHM - Harbour porpoises difficult to detect visually especially if sea state starts to increase, and this is expected in a tidal area, may obscure a porpoise sighting. HWDT has (harbour porpoise) data from the area which can be provided. **RC** – To liaise with Lauren to get HWDT data. **RC -** Marine Management Units (MMU), are these needed in the assessment? **KH -** They should be used as context and not forgotten about, how MMU fits within local region and how it fits into the wider population information, differentiate between local level and regional area. MMMUs provide wider context but local effects are important **JO** - Collision risk modelling – suggest Nova model various scenarios and include narrative around uncertainty about avoidance rates - take guidance from SeaGen and MeyGen.	**8. APEM to have a conversation with HWDT regarding harbour porpoise data.**

Item	Agenda	Actions
	BW - The deploy and monitor policy is under review. MS-LOT will be carrying out a consultation on the new consenting manual in the meantime the interim policy is in place. **BW** – The MS commissioned cumulative effects framework is near completion and there will be workshops held in early 2023. The framework will be available in the spring 2023.	
6	**Marine Ornithology Technical Sessions** **See slides 16-19** **SS –** Number and abundance of all bird species is very low in the Nova surveys, with the exception of shag in the late summer months. **SS-** Comparisons will be made between SPR data and data collected by RPS on behalf of Nova. **SS -** Data presented in slides differs to the data presented in RPS report, mean of the counts in the RPS data is presented in the slides, to give a more realistic idea of abundance **AR -** Were states of tide considered when the survey was being undertaken? Are tidal state and direction of flow being recorded? Also, NatureScot suggested 2 km rather than 500m buffer for surveys so Nova need to justify smaller buffer (in scoping). **KS**- Tidal state and direction of flow is recorded during surveys, they are being carried out so we get representation across all tidal states. **AMcC –** Black guillemot have a distribution according to the tidal cycle and the diurnal cycle. Feed on butterfish early morning and late evening. All surveys were in 9 to 5 hours so need to try to get coverage outside these hours. **KS -** Nova to feedback to surveyor on that point, shorter days now, but may be possible in March. **SS** – Any advice on to deal with such low numbers to then try and compile the abundance estimates for use in the EIA Scoping report? **LH** - We are not proposing to scope anything out without survey data, this is a staged process, a lot of data required at Scoping which isn't normal, proportionality should be remembered**.** **SS -** What other data can be used to inform the birds topic? **AR** - Might be worth considering if there is any tracking data within the area, like work undertaken in Bluemull Sound as part of my PhD. **SS** - Any requirement to consider hypothetical birds? **AR** - Similar approach used for offshore wind should be used for connectivity - use Mean Max foraging range plus 1 standard deviation from Woodward et al 2019. Also general guide of 15km from Marine SPA. **SS** - Any advice on how to make use of SPR evidence and lessons learned, that could be incorporated into the scoping report? AR – this will be a question that we will have to come back to Nova on, there is a few things going on in terms of offshore wind, however we are trying to catch up on research projects which are ongoing with regards to tidal **SS**- Is there any ongoing work or work streams, publications that we may need to be aware regarding seabirds. **AMcC** Key work that is being done now as part of the EMMP for Morlais,which is a scheme in Wales, Swansea University doing tagging research, RSPB have tracking data from Colonsay (auk species).	**1. NatureScot to confirm if this buffer is correct.** **2. Nova to feed back to surveyor on VP surveys being restricted to office hours.** **3. Scoping report to provide details on data analysis including how to deal with low number of species.** **4. Nova to ensure the scoping report is clear where and how it proposes using SPR data in its EIA to enable feedback in scoping opinion** **5. APEM to contact RSPB about Colonsay data if useful/relevant.**

Item	Agenda	Actions
	AR- worthwhile discussing with Universities whether there is any relevant publications that are coming out. I'm on the cusp of getting the dive review out, which is an update on my PHD thesis. **AMcC** - Use of laser rangefinder to pinpoint locations of birds can be helpful, but expensive kit. **SS** – Preferred choice of Collision risk assessment? **AR** -Still using guidance that we have published, all three approaches are still being accepted, would be helpful to have a justification for each, and show comparisons between them, Exposure time model has a population model incorporated into it. **AR** – For the other PVA models you we recommend to use the Natural England PVA tool. **SS**- Avian flu, are there NS or RSPB guidance notes that we may need to be aware of? **AR** –NatureScot are developing advice on avian flu, as soon as it's available will be given to developers. **KT** – When we can publish advice we will, it is worth noting that NatureScot advice may not mirror Natural England's recent publication on assessing impacts of HPAI. If you need a steer at a certain point, and we haven't provided advice, come to us and we will talk APEM through as they write the chapter. **KS** – Feedback from surveyor is that Islay is badly affected by avian flu, more birds within big colonies, not so far in shag and black guillemot on Islay. **SS** – View of use of 'deploy and monitor' to gather evidence for phase turbine installation for risk to marine birds? And how to seek monitoring data on bird interactions **AR** - I think this is something we will come back to, would be really useful in terms of what evidence you have on bird interactions with wind farms/tidal farms, would be useful to know what data you are looking at. NatureScot to provide written advice on deploy and monitor methods.	**6. NatureScot to provide written advice on deploy and monitor methods.**
7	**Benthic Ecology technical session** **See slides 20-22** **JH** - Data sources to be used inc. SPR JNCC, EMODNet, MarLIN NMPi map. Potential key habitats identified (horse mussel beds, maerl beds, stony reef, potential kelp beds). **JH** - Receptors will be assessed based on conservation status (Priority Marine Features, Annex 1 Habitats and Annex 2 species, OSPAR list). **JH** - Is NMPi map up to date with Marine features or updates in the near future coming? **JH** - Will assessment reports of nearby identified features be available online? **MF** – Flex Marine power documentation will flag up maerl beds, worth looking at the documentation on that project. **KH** - Look at Scottish and southern Energy (SSEN) for other data sources. **JH** – Is there agreed buffer zones which can be applied as a proximity constraint for infrastructure routing or is this assessed on a case-by-case basis? **KH** – This is assessed on case-by-case basis depending on infrastructure and feature of interest. **JH** – Has anyone got a copy of the Keith Hiscock 1983 survey of the Sound of Islay? **CCu** – NS has a scanned in copy of this and will email across after the workshop? **KT** – Are all cable routes on the table at Scoping? **KS** – Yes, all cable routes will be included in the Scoping, however if any cable routes that ring alarm bells, please let us know now so we can scope out or modify.	**1. MS to check how up to date NMPI map is and will come back to Nova with an update.** **2. NS to email across Keith Hiscock 1983 survey** **3. NS to confirm if any cable route raise major issues. (Note that this advice may be provided via scoping opinion).**

NOVA INNOVATION

intertek

Item	Agenda	Actions
8	**Summary and Close** **KS –** How long will it take for the written advice to be provided to Nova? **MF –** If it's direct advice, we normally have a customer care standard of 20 days but will try and get back sooner to you. **LH –** Is there anything else that should be discussed that we may have missed? **MF –** Key thing is to present the case why the SPR data is applicable. **KT –** Tools and impact assessments should be detailed in the Scoping report. **LH** – This will be included. **KS –** Any thoughts on how useful the workshop and what has worked well? **MF** – Main feedback is, online works well for NS, getting the questions in advance and sticking to the questions in the workshop is helpful. **MMcF –** Getting the schedule in advance was good.	

APPENDIX B

Marine Mammal and Bird Surveys

B.1 MARINE MAMMAL AND BIRD SURVEYS

B.1.1 Summary

This Annex provides details of the land-based bird and mammal surveys which commenced in April 2022 in the Sound of Islay as part of Nova's evidence gathering programme for the Òran na Mara Project. The spatial focus of the surveys is the area in which turbines and other offshore infrastructure for ÒnM will be installed. Their objective is to gather data on bird and mammal presence, abundance and behaviour in the area, which will be used in the EIA to assess the potential effects of the Project and understand the potential for birds and mammals to interact with the activities and operations associated with construction, operations and maintenance, and decommissioning. The data acquired from the surveys will be a key source of baseline information on birds and mammal in the EIA, supplemented by existing data and evidence detailed in Chapters 9 and 10 of the ÒnM EIA scoping report.

This Appendix provides the following key information:

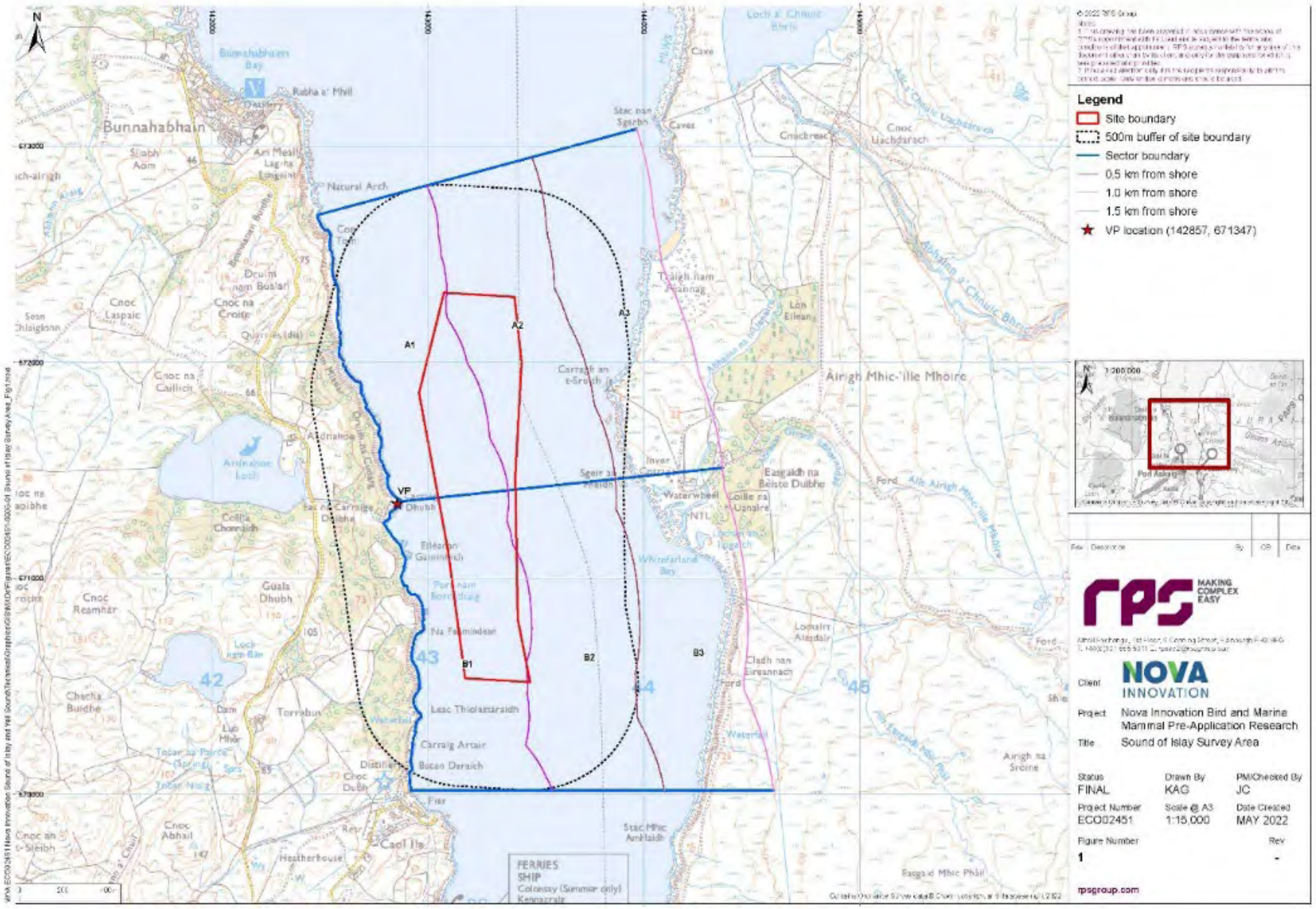
- Details of the land-based bird and mammal survey methodology.
- Details of the proposed approach to data analysis of the full dataset.
- Some preliminary data analysis outputs based on data gathered between April and December 2022.
- Field surveyor observations on bird and mammal presence and activity in the survey area.

B.1.2 Survey methods

B.1.2.1 Survey area

The north and south extents of the survey area have been determined by applying a 500m buffer to the Crown Estate Scotland (CES) Agreement for Lease (AfL) area for the Òran na Mara project (shown in Figure B-1). The landward extent of the survey area is Mean High Water Spring (MHWS) mark. To establish the seaward extent of the survey area, three distance bands were established: 0.5, 1.0 and 1.5km from the MHWS mark, with 1.5km being the maximum seaward extent of the survey area. Finally, the survey area is divided latitudinally into two sectors, A in the north and B in the south. Two vantage points (VP) was selected to achieve maximum viewshed coverage over the two sectors of the survey area: Carraig Dubh for Sector A and Caol Ila for Sector B.

Figure B-1 Islay Marine Mammal and Bird Survey Area



B.1.2.2 Survey method

In each survey, Sector A is surveyed for 3hrs after which the surveyor rests for 1hr and then Sector B is surveyed for 3hrs.

A reconnaissance survey was carried out in early April 2022 to confirm viewsheds and survey methods. From then on, the site has been surveyed once per month, with two surveys carried out in April to give a strong basis from which to engage with consultees on an appropriate level of survey effort.

Surveys are only carried out in sea state 2 or less and in good light levels. The tidal state and direction of tidal flow is recorded. Any obvious disturbances, for example boats or raptors are recorded.

During each 3hr survey of Sector A or Sector B, a 10min scan of the sector is made and all animals (birds, otters, marine mammals, basking shark) in the area are recorded. At the end of each 10min scan the total number of gannets in flight within the Sector is recorded. After each 10min scan a 5min rest is taken. This is repeated throughout the 3hrs. Animal behaviour is also recorded (diving, feeding, sitting on the water surface, flying through the area). Shag numbers roosting at sites within the survey area are also counted.

B.1.3 Data analysis

B.1.3.1 Introduction

This section provides an overview of the proposed approach to analysing the survey data. This is based on the data gathered to date, so may be subject to modifications pending completion the surveys and feedback received during scoping.

B.1.3.2 Kernel density analysis

A Kernel Density approach will be used to provide information on species densities across the survey area. Given the nature of the data (vantage point surveys), it is unlikely that true densities can be estimated. Moreover, given the heterogeneity of the habitat, distance analysis is not considered appropriate to correct for observer bias. The assumption of distance analysis is that in homogeneous habitats, the likelihood of detecting an animal decrease with distance from the observer. However, the habitat homogeneity assumption is violated for this data, making it questionable to implement. Given these limitations, Kernel Density Estimation will provide an estimate of relative densities of animals. Based on feedback from the surveyor, who has extensive experience of surveying this area, there is a high degree of confidence that nearly all animals/activities are detected during VP surveys, limiting the number of animals likely to have been missed.

The method to calculate Kernel Densities set out here is based on partial analysis of data from surveys carried out between April and December 2022 and is as follows:

1. The point shapefiles of bird observations were loaded into QGIS and the ‘interpolation kernel density estimation (KDE)’ function was used.
2. A density kernel radius of 500 m was selected, which was determined to provide the most appropriate smoothing between the data points. All other default settings were accepted.
3. The output raster size selected was 10-pixel rows to allow for finer resolution and a more detailed representation of bird distribution. For each species per survey, a GeoTIFF spatial distribution map was created.

The resulting KDE maps shown in Section B.1.4 (Figure 1 to Figure 12 for birds, Figure 13 to Figure 17 for marine mammals) show the estimated density of the selected species as a continuous surface, with areas of higher density appearing as "hot spots" on the map. This allows for visual exploration of the distribution of the species within the survey area and provides an estimate of the density of the species in each location. The spatial distribution ‘hot spots’ are visualised using blue to red and show a quantile distribution. The brighter red colour depicted in the 'hot spot' maps relates to a higher density of birds predicted to be in that area in comparison to the blue coloured areas of the spatial distribution. These spatial distribution maps present estimated relative densities and not absolute abundances and should be interpreted accordingly.

Not all months had an adequate number of data points to generate KDE maps and so a distribution map could not be generated for those specific species and surveys. For the full data set, the outputs will be presented as relative density maps for each survey month.

B.1.3.3 Hotspot analysis

The relative densities for key species will be used to carry out a 'hotspot analysis'. This may be carried out for single and combined species, to investigate whether certain areas are consistently utilized more than others. This will inform understanding of likely interactions between animals and the Òran na Mara project. The approach to identifying hotspots within and among species is not fundamentally different. Within species the basic approach will be to combine the relative density estimates of all surveys and creating a map with overall relative densities. This same approach can be implemented on combined species, to identify activity hotspots overall. The key output will be 'hotspot maps'.

B.1.3.4 Abundance analysis

Predictive modelling will be used to carry out abundance analysis. This will use a Poisson generalized linear mixed model (GLMM), where animal abundance will be the response variable and month and tidal state will be the predictor variables. The main objective of this analysis is to identify abundance patterns of key species throughout the year and by tidal state. This will provide insights into whether there is persistent usage of the study area, and which animals are likely to be at most risk of the potential impacts from the Òran na Mara project.

B.1.3.5 Animal behavioural analysis

Studying animal behaviour in relation to tidal cycles will be important to understand the risk of interactions between for diving animals (auks, cormorants, divers, grebes, seals) and turbines in relation to turbine operational status. Turbines will only be operational at certain tidal flows and states, so knowledge on when diving animals forage is highly pertinent to understanding impact risk. Foraging behaviour of animals observed during the vantage point surveys has been monitored and recorded. To study how foraging activity changes with the tidal cycle, a generalized linear mixed effect model will be implemented, which will examine the effect of tidal state on the likelihood that an animal is observed foraging. This will provide valuable insight into the environmental predictors of impact risk for animals that utilise the study area.

B.1.4 Preliminary results

B.1.4.1 Introduction

This section provides preliminary data analysis outputs based on data gathered between April and December 2022, including:

- Surveyor observations.
- Qualitative examination of data.
- Preliminary kernel density analysis for the five most common and abundant bird and mammal species recorded in the surveys.

B.1.4.2 Surveyor observations

The field surveyor who conducts all of the bird and mammal surveys in the Sound of Islay for ÒnM has a comprehensive knowledge of marine animal and bird behaviour within the survey and wider inner Sound of Islay area. This has been developed through many years of fieldwork carried out in the Sound of Islay area, including pre-application surveys for proposed developments such as ÒnM. For example, the same field surveyor carried out the baseline surveys for Scottish Power Renewables consented 10 MW tidal energy project in the inner Sound of Islay.

Such observational notes are an important part of the evidence base on the occupancy patterns and behaviour of marine wildlife in the site, particularly in relation to surface hydrodynamic features and tidal period. Key surveyor observations are as follows, with supporting annotated maps in Figure B-2.

B.1.4.3 General observations

- The coastline in the inner Sound of Islay is rocky and rugged interjected with basalt sills protruding into the water. These features are used as roosting and nesting sites for Shag. They also form overhangs with tumbled rocks which Otter use as lie ups.
- Within the survey area there are two outcrops of rock exposed at low tide; one near the lighthouse near Inver Cottage (Jura side) and one near Craig Dubh (Islay side). The latter is used as a haul out by Harbour Seal and as a drying roost by Shag.
- Tidal flow between the ebb and flood in the inner Sound of Islay changes an hour and a half before low tide and high tide, as the height of the waters in the Atlantic adjust with that of the Sound of Jura to the east of Islay. The rate of flow changes throughout the monthly spring/neap cycle, with peak flows occurring on spring tides.
- In areas along the coastal shores of the inner sound, out of the main tidal flows in the central channel, reverse flows and eddies are created. These features are most prominent in the bay at Caol Ila and to a lesser extent on the Jura side of the sound between Feolin and Inver Cottage (see Figure B-2).

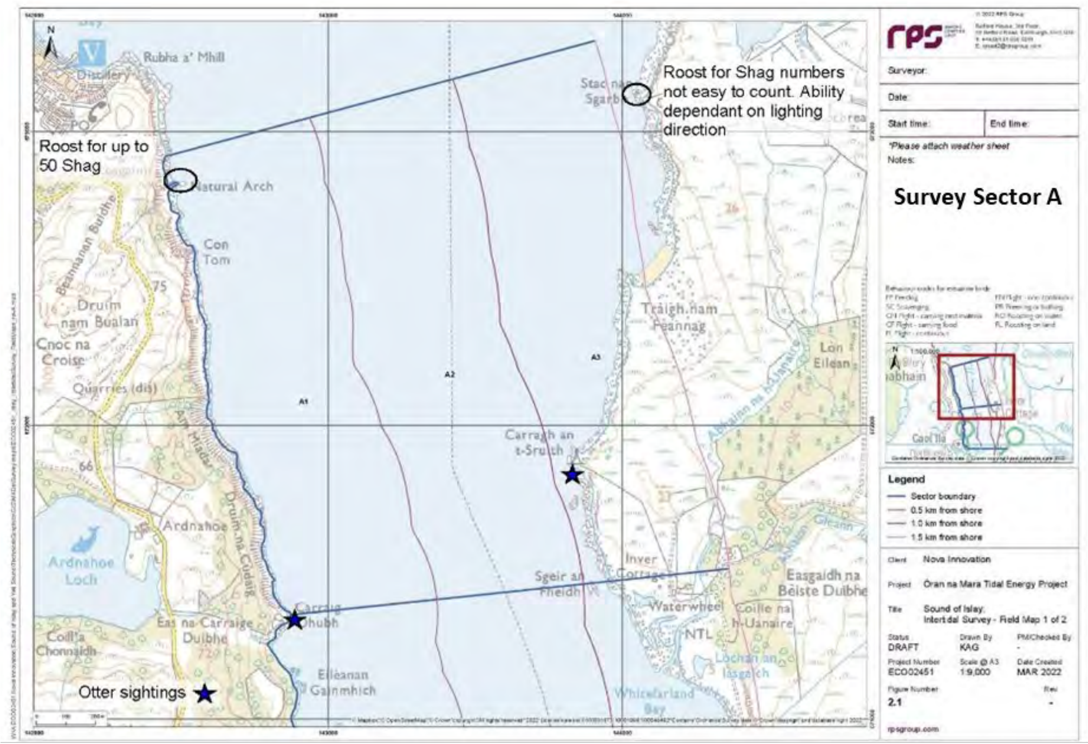
Birds

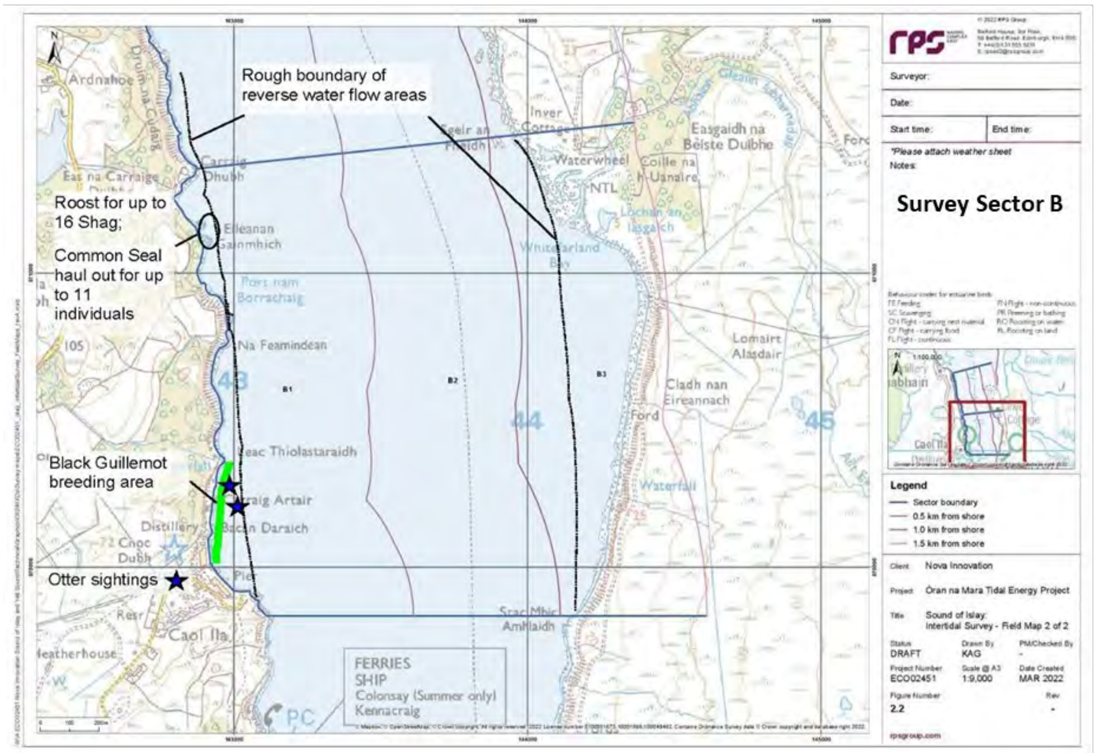
- The main species of bird observed in the survey area are Shag (common) and Black Guillemot. In the winter Great Northern Diver and Eider are also frequently seen. Smaller numbers of Red Throated Diver are seen year-round.
- During the summer months there is regular use of the inner sound by Gannet, but birds generally just fly through the sound with little feeding activity.
- Guillemot and Razorbill are more common the summer months, with birds using the sound as a travel corridor between nesting and feeding grounds.
- Auks may be seen through the central channel of the inner sound, often on the surface of the water, drifting with the tidal flow. Occasionally these birds can also be seen diving, but this is not always the case.
- There are three Shag drying roosts within the survey area, at Stac nan Sgarbh on Jura in the northeast of the survey area, at Eileanan Gainmhich on Islay in the centre-west of the survey area, and at Caol Ila on Islay in the southwest of the survey area. These are used by varying numbers of birds at different times of the year.
- The main feeding areas of use by diving birds are in the peripheries of the main flow on the Jura shore and at Caol Ila. Black Guillemot also breed on the rocky shore of Caol Ila.

Mammals

- Harbour seal are the most frequent marine mammal observed in the inner sound, including the survey area, with the occasional Grey Seal.
- Otter are occasionally sighted, but always close to shore.
- Bottlenose dolphin are occasionally viewed in the sound, generally in groups of numbers up to a dozen. In January 2023 however, an unusually large group of 40 to 50 individuals were sighted moving through the Sound, viewed from Feolin on Jura.
- There is one main haul out area for harbour seal within the survey area, with anywhere from 4-12 animals present at low water. Seals are occasionally observed diving in the sound, coming up for air or swimming for short periods of time before diving.

Figure B-2 Islay survey area, showing shag roosts, seal haul outs and areas of otter sightings, and areas near Caol Ila and Inver Cottage where reverse flows and eddies form





B.1.5 Qualitative examination of survey data (April to December 2022)

B.1.5.1 Overview

A total of fourteen bird species of four mammal species were recorded in the land-based surveys between April and December 2022. The majority of species occurred in low numbers, with the exception of common seal, gannet, black guillemot, eider, great northern diver and shag.

An overview of presence and abundance by season and tidal state is provided, based on data so far and key behavioural observations. These species summaries are descriptive only until detailed analysis is conducted on the full survey data set.

B.1.5.2 Birds

Shag

Shag was the most abundant species recorded between April and December 2022, with high numbers across all months. Numbers were slightly higher from the late breeding season through to the winter, suggesting that the area is increasingly important to the species after the main breeding season. The species was recorded in roughly consistent numbers across all tidal states, with slightly lower numbers on the rising (flood) tide, from mid to high tide. Most shag were recorded roosting at the three roost sites within the survey area: at Stac nan Sgarbh on Jura in the northeast of the survey area, at Eileanan Gainmhich on Islay in the centre-west of the survey area, and at Caol Ila on Islay in the southwest of the survey area. Some birds were seen diving or on the surface of the water. Small numbers of shags were recorded feeding. Kernel density analysis of the data for this species is shown in Figure B-3 .

Eider

Eider occurred in sporadic high numbers between April and December 2022. Numbers were moderate in April, then the species was either absent or occurred in low numbers only from May to October. Numbers rose again in November and peaked in December. This indicates that the survey area may be important for eider during the non-breeding season. Data gathered in January to March 2023 will enable this to be further examined. Eider was recorded in greatest numbers on the falling (ebb) tide. Most birds were recorded on the water, a large number were diving, some were feeding and some were roosting on land. Kernel density analysis of the data for this species is shown in Figure B-4.

Black Guillemot

This species showed some seasonal abundance patterns between April and December 2022. Numbers were moderate in April, May and June, high in July, low in August, September and October, and moderate in November and December. This indicates that the survey area may be important for black guillemot during the late breeding season and winter. The species was most abundant when the tidal state was rising from mid-high (flood) tide, while numbers were lower during other tidal states. Birds were overwhelmingly recorded resting on the water, with very few birds diving, actively feeding, flying, roosting on land or roosting on water. Kernel density analysis of the data for this species is shown in Figure B-5.

Gannet

This species occurred in moderate numbers from April to September, while almost no birds were seen from October to December. This suggests that the survey area may be of moderate importance to gannet during the breeding season. Most gannets recorded were in continuous flight, transiting through the survey area. Only very small numbers of birds were recorded diving or on the water. Kernel density analysis of the data for this species is shown in Figure B-6.

Great Northern Diver

This species showed a similar seasonal distribution pattern to eider, with sporadic high numbers between April and December 2022. Birds were recorded in April but were absent from May to September. Numbers were very low in October but then rose steeply in November and December. As with eider, this indicates that the survey area may be important for great northern diver during the non-breeding season. Data gathered in January to March 2023 will enable this to be further examined. The species was recorded in roughly consistent numbers across all tidal states, with slightly lower numbers on the rising (flood) tide from mid to high tide. Most birds were recorded on the water with some diving or feeding. Kernel density analysis of the data for this species is shown in Figure B-7.

Razorbill

This species was recorded in low numbers between April and December 2022. The species was recorded in roughly consistent numbers across all tidal states, with slightly lower numbers on the falling (ebb) tide from high to mid tide. All birds recorded were either on the water, feeding or diving.

Red-throated Diver

Low numbers of red-throated diver were recorded in April, June, August and December.

Black-throated Diver

Low numbers of black-throated diver were recorded in April, August, November and December. All birds were recorded on the falling tide. Half of the birds recorded were diving while half were on the surface of the water but not diving.

Guillemot

Very low numbers of guillemots were recorded between April and December 2022.

Great Black-backed Gull

Low numbers of great black-backed gulls were recorded on the water in April, with no further records between May and December 2022.

Cormorant

One cormorant was recorded between April and December 2022.

Canada Goose

One Canada goose was recorded between April and December 2022.

Greylag Goose

One greylag goose was recorded between April and December 2022.

Hen Harrier

One hen harrier was recorded between April and December 2022. This was a male crossing from Jura.

B.1.5.3 Marine mammals

Common Seal

This species was consistently present in between April and December 2022, with high numbers recorded in most months and a peak count in July. Most animals were observed hauled out at Eileanan Gainmhich on Islay in the centre-west of the survey area (Figure B-8).

Grey seal

Low numbers of grey seal were recorded in April, August and December.

Bottlenose Dolphin

Low numbers of bottlenose dolphin were recorded in August.

Otter

Low numbers of otter were recorded in April, October, November and December, all on Islay on the west coast of the survey area.

B.1.5.4 Preliminary kernel density analysis for the five most common bird and mammal species

Figure B-3 Relative density of shag in the survey area during April 2022 to December 2022. Figure note: Scale between months will vary depending on population size

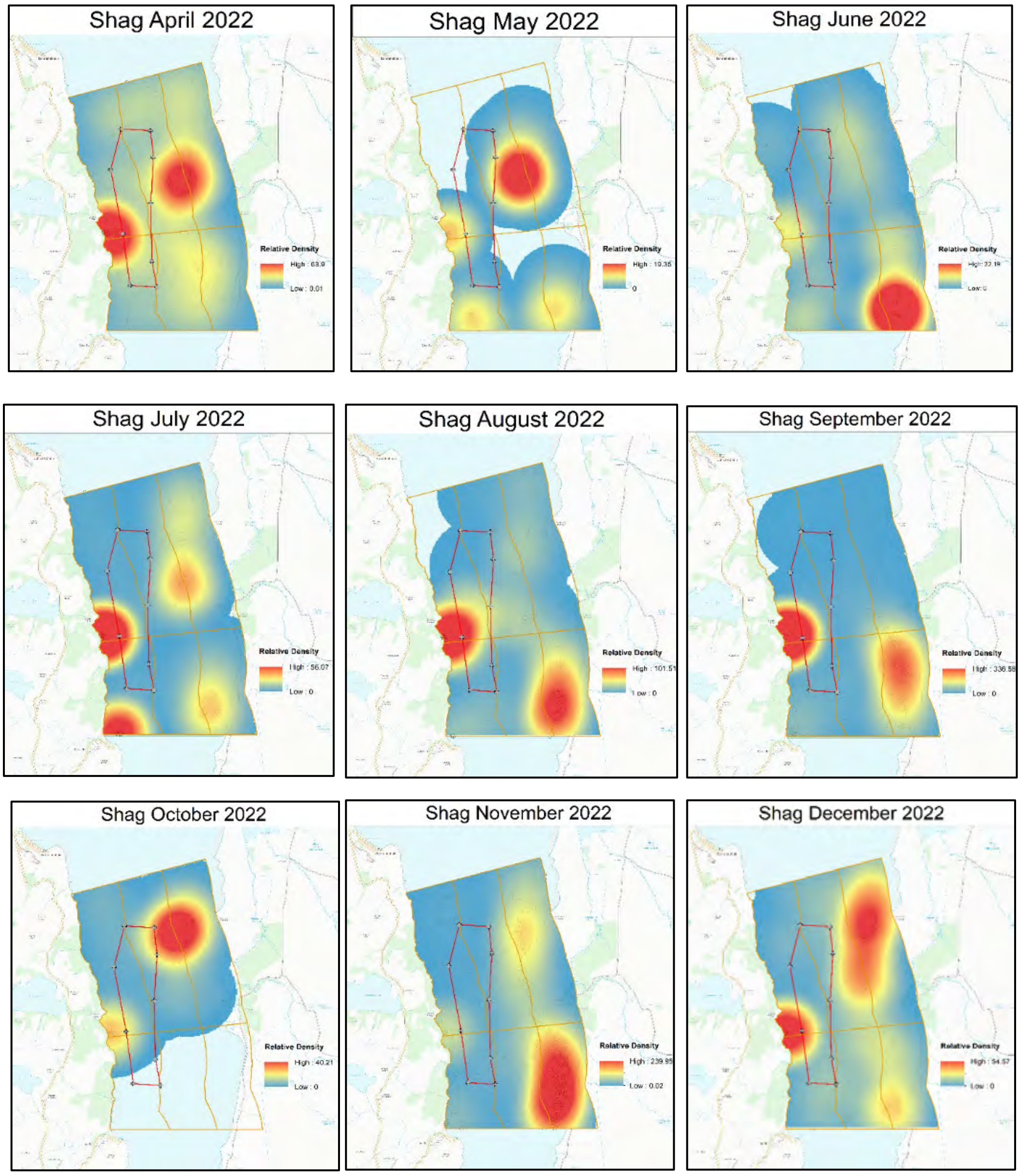


Figure B-4 Relative density of Eider in the survey area during April 2022, August 2022, October 2022, November 2022 and December 2022. Figure note: Scale between months will vary depending on population size.

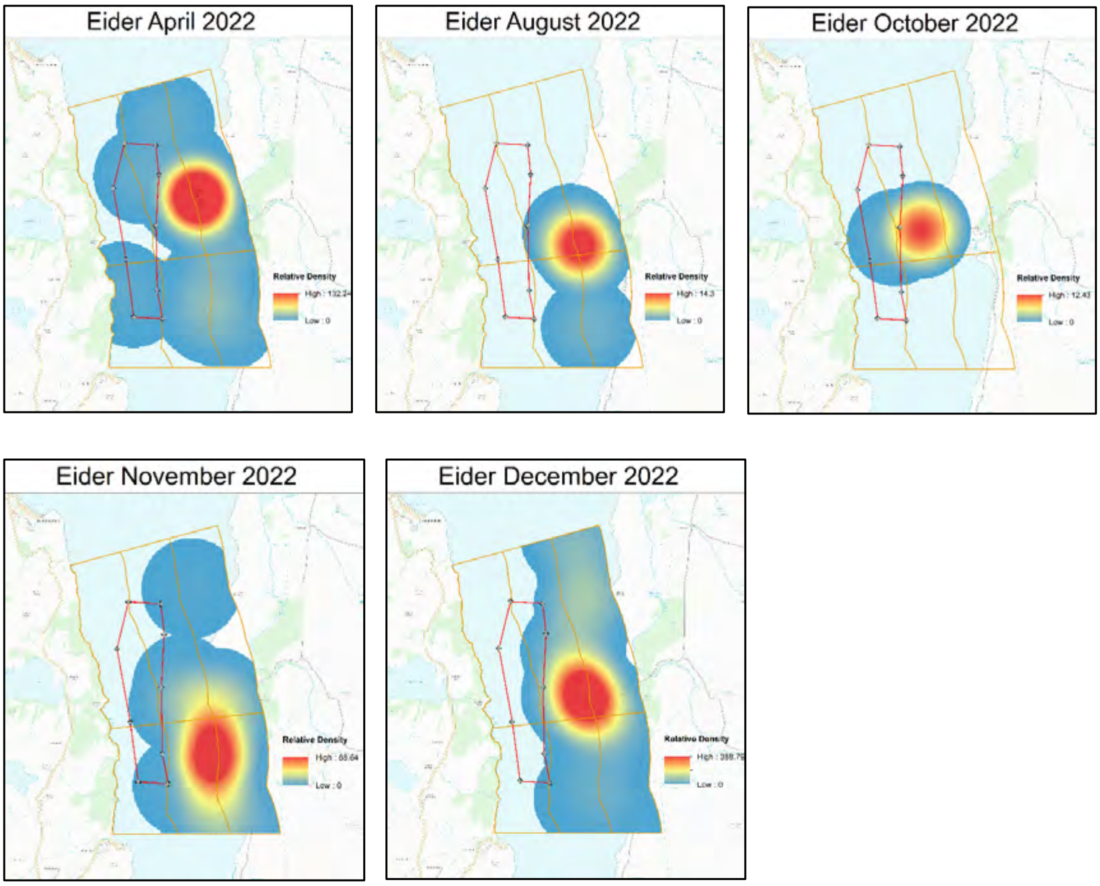


Figure B-5 Relative density of Black guillemot in the survey area during April 2022 to August 2022 and in November 2022 to December 2022. Distribution of Black guillemot in the survey area in September 2022. Figure note: Scale between months will vary depending on population size.

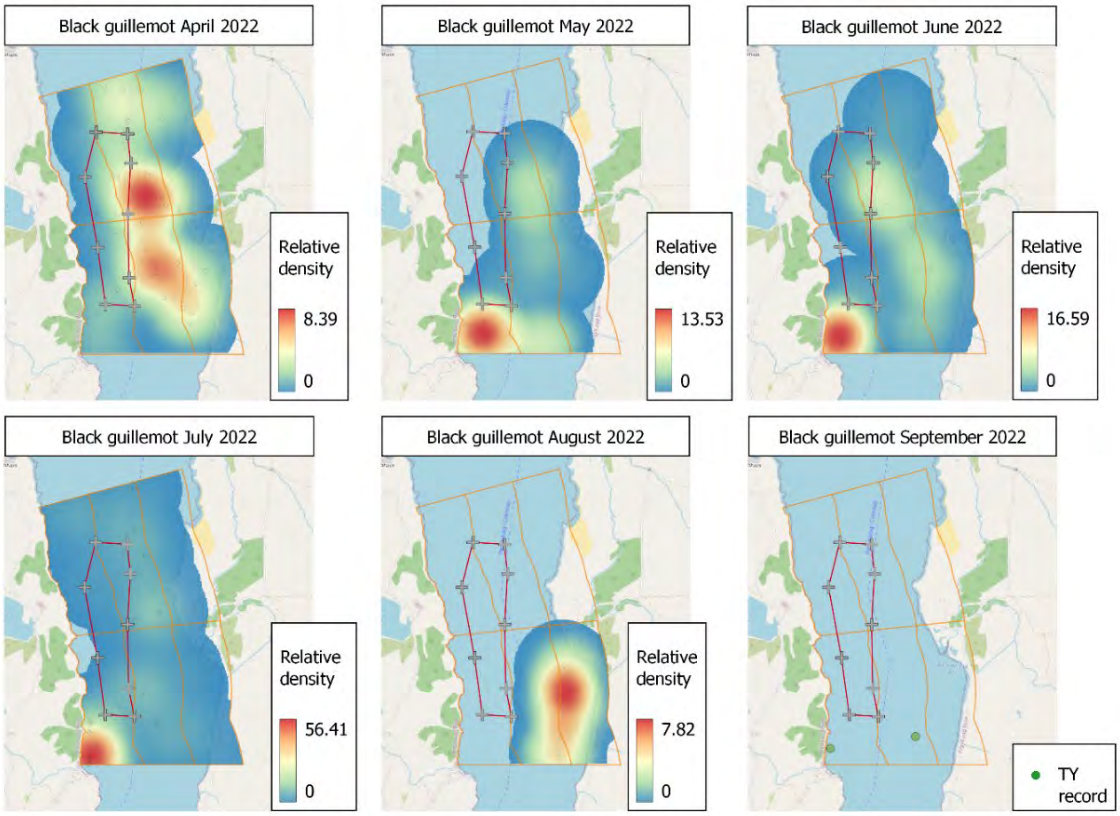


Figure B-6 Relative density of Northern gannet in the survey area during April 2022 to September 2022 and distribution of Northern gannet in the survey area in December 2022. Figure note: Scale between months will vary depending on population size. Note that the majority of birds were transiting the survey area and not diving.

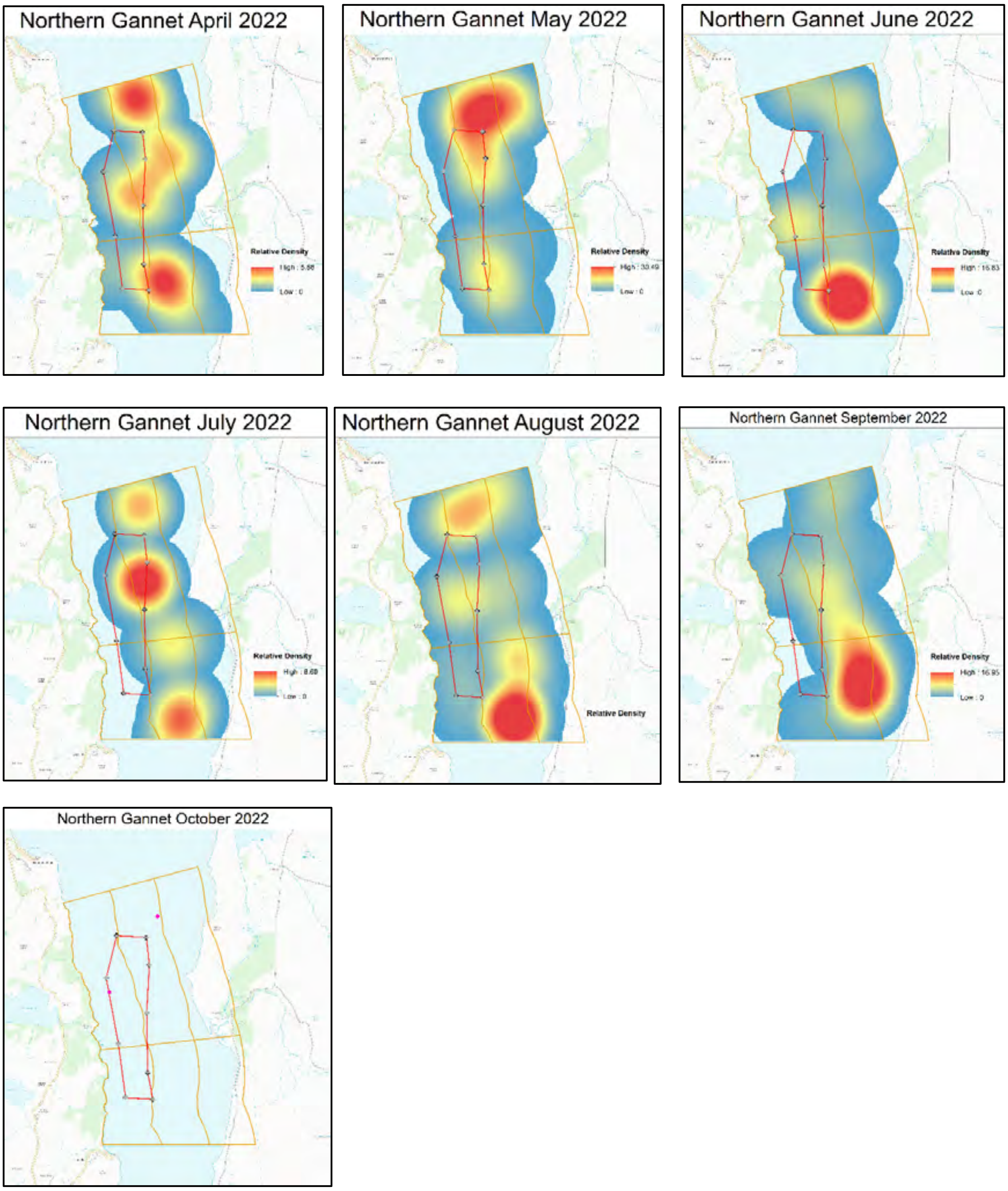


Figure B-7 Relative density of Great Northern diver in the survey area during April 2022, November 2022 and December 2022, and distribution of Great Northern diver in the survey area in October 2022. Figure note: Scale between months will vary depending on population size.

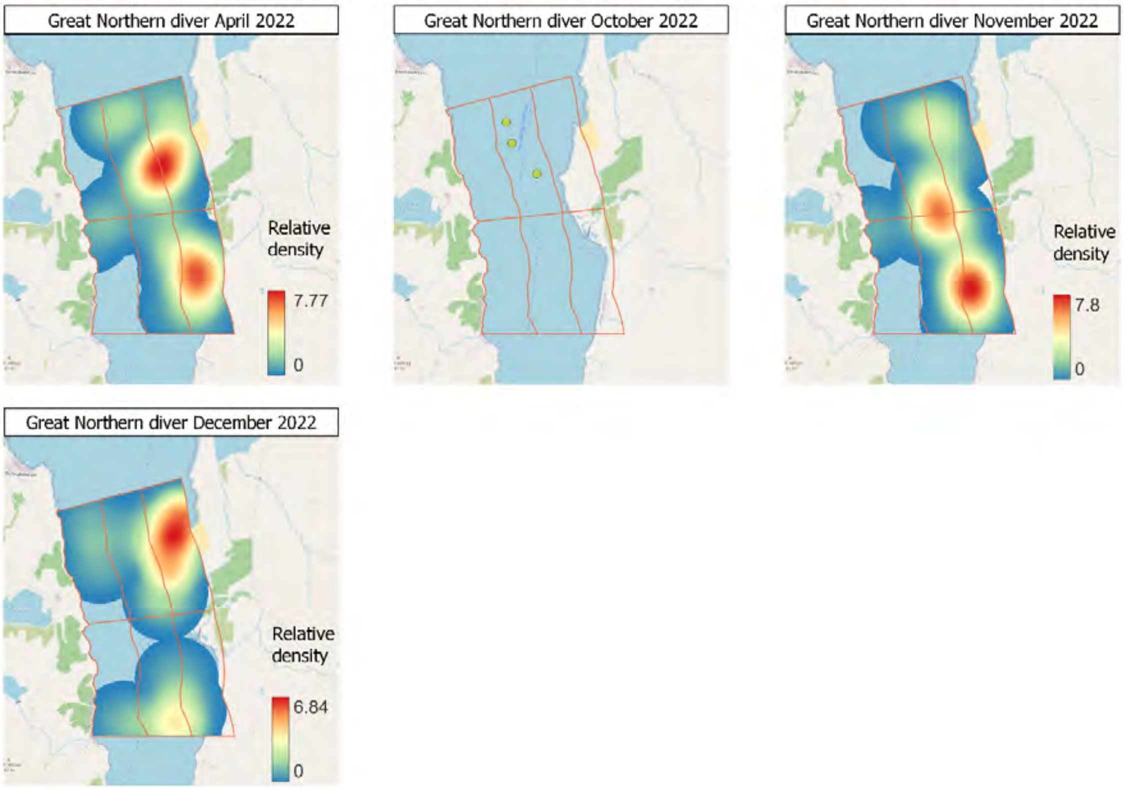


Figure B-8 Relative density of Common seal in the survey area during April 2022 to September 2022 and in November 2022 to December 2022. Distribution of Common seal in the survey area in September 2022. Figure note: Scale between months will vary depending on population size