

ElAR Scoping Report

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Abbreviation	Term in Full
AA	Appropriate Assessment
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
ASAM	Aeronautical Services Advisory Memorandum
ATC	Air Traffic Controller
AToN	Aids to Navigation
ATS	Air Traffic Service
BERR	Department for Business, Innovation & Skills, formerly Department for Business, Enterprise and Regulatory Reform
BESS	Battery Energy Storage System
BGS	British Geological Survey
BIM	Bord Iascaigh Mhara
BODC	British Oceanographic Data Centre
CA	Competent Authority
CAA	Civil Aviation Authority
CAP	Climate Action Plan
CAS	Controlled Airspace
CDP	County Development Plan
Cefas	Centre for Environment, Fisheries, and Aquaculture Science
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CLO	Community Liaison Officer
CNC	Cork Nature Network
COLREGS	International Regulations for Preventing Collisions at Sea 1972 Regulations
COP	Conference of the Parties
COWRIE	Collaborative Offshore Wind Research Into the Environment
CPA	Coastal Protection Act

Abbreviation	Term in Full
cSAC	candidate Special Areas of Conservation
CSTP	Celtic Sea Trout Project
CTA	Control Areas
CTV	Crew Transfer Vessel
DAFM	Department of Agriculture, Food and the Marine
DAS	Digital Aerial Surveys
dB	decibel
DDV	Drop Down Video
DECC	Department of the Environment, Climate and Communications, formerly Department of Communications, Climate Action and Environment (DCCAE)
DoHLGH	Department of Housing, Local Government and Heritage, formerly Department of Housing, Planning, and Local Government (DHPLG).
DTI	Department of Trade and Industry (UK)
DoT	Department of Transport
DoD	Department of Defence
EBA	European Boating Association
EC	European Commission
EC	Escherichia coli
ECC	Export Cable Corridor
EcIA	Ecological Impact Assessment
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EMODnet	European Marine Observation and Data Network
EMP	Environmental Management Plan
EPA	Environment Protection Agency
ESB	Electricity Supply Board

Abbreviation	Term in Full
ESBN	Electricity Supply Board Networks
ESCA	European Subsea Cables Association
EU	European Union
EU DCF	EU Data Collection Framework
EUNIS	European Nature Information System
FEAS	Fisheries Ecosystem Assessment Services
FEPA	Food and Environmental Protection Act
FIR	Flight Information Region
FL	Flight Level
FLO	Fisheries Liaison Officer
FLOWW	Fisheries Liaison with Offshore Wind and Wet Renewables group
FSA	Formal Safety Assessment
FT	Fehily Timoney and Company
FWPM	Freshwater pearl mussel
GBS	Gravity Base Structure
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
GPS	Global Positioning Systems
GSI	Geological Survey Ireland
GW	Gigawatt
HABMAP	Habitat Mapping
HDD	Horizontal Directional Drilling
HEFS	High-End Future Scenario
HGV	Heavy Goods Vehicles
HWM	Mean High Water Mark / High Water Mean Tide
HV	High Voltage
HVAC	Heating Ventilation Air Conditioning
IAA	Irish Aviation Authority

Abbreviation	Term in Full
IAC	Irish Air Corps
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities, formerly known as International Association of Lighthouse Authorities
IAIP	Irish Aeronautical Information Package
IBTS	International Beam Trawl Survey
ICAO	International Civil Aviation Organisation
ICES	International Council for the Exploration of the Sea
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
IE	Intestinal enterococci
IFI	Inland Fisheries Ireland
IFP	Instrument Flight Procedure
IFPO	Irish Fish Producers Organisation
IFR	Instrument Flight Rules
IFSA	Irish Federation of Sea Anglers
IMDO	Irish Maritime Development Office
IMO	International Maritime Organisation
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
INNS	Invasive and Non-Native Species
IOF	Important Ornithological Feature
iPCoD	Interim Population Consequences of Disturbance
IROPI	Imperative Reasons of Overriding Public Interest
ISA	Irish Sailing Association
IS&EFPO	Irish South and East Fish Producer's Organisation
ISPM	Inorganic Suspended Particulate Matter
IS&WFPO	Irish South and West Fish Producer's Organisation
IUCN	International Union for Conservation of Nature

Abbreviation	Term in Full
IBSG	Irish Basking Shark Group
IEN	Irish Environmental Network
IWDG	Irish Whale and Dolphin Group
IWeBs	Irish Wetland Bird Survey
IWT	Irish Wildlife Trust
JNCC	Joint Nature Conservation Committee
KFO	Killybegs Fisherman's Organisation
kHz	KiloHertz
KIS	Kingfisher Information Services
km	Kilometre
kV	KiloVolts
LoS	Line of Sight
LSE	Likely Significant Effects
LSVIA	Landscape, Seascape and Visual Impact Assessment
MAC	Maritime Area Consent
MAIB	Marine Accident Investigation Branch
MAP	Maritime Area Planning
MAPA	Maritime Area Planning Act 2021
MARA	Maritime Area Regulatory Authority
MBES	Multi-Beam Echo Sounder
MCA	Maritime and Coastguard Agency
MEC	Maximum Export Capacity
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MI	Marine Institute
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MoD	Ministry of Defence (UK)

Abbreviation	Term in Full
MPA	Marine Protected Areas
MPDM	Marine Planning and Development Management
MRFS	Mid-Range Future Scenario
MS	Marine Space
MSFD	Marine Strategy Framework Directive
MSL	Mean Sea Level
MSO	Marine Survey Office
MSP	Marine Spatial Planning
MW	Megawatts
NATS	National Air Traffic Service
NBDC	National Biodiversity Data Centre
NDP	Project Ireland 2040: National Development Plan 2018 – 2027
NECP	Ireland's National Energy and Climate Plan
NGO	Non-government Organisation
NHA	Natural Heritage Areas
NIAH	National Inventory of Architectural Heritage
NIFA	National Inshore Fishermen's Association
NIFF	National Inshore Fisheries Forum
NIFO	National Inshore Fishermen's Organisation
NIS	Natura Impact Statement
nm	Nautical Mile
NMI	National Museum of Ireland
NMPF	National Marine Planning Framework
NMS	National Monuments Service
NPF	National Planning Framework
NPWS	National Parks and Wildlife Services
NRA	Navigation Risk Assessment
NREAP	National Renewable Energy Action Plan

Abbreviation	Term in Full
OCT	Open Cut Trenching
O&M	Operation and Maintenance
OPERA	Operational Programme for the Exchange of weather Radar information
OPW	Office of Public Works
ORCA	Ocean Research and Conservation Association
ORE	Offshore Renewable Energy
OREDPA	Offshore Renewable Energy Development Plan
OREI	Offshore Renewable Energy Installation
OREP	Offshore Renewable Energy Project
ORESS	Offshore Renewable Electricity Support Scheme
ORJIP	Offshore Renewables Joint Industry Programme
OSP	Offshore Substation Platform
OSPAR	Oslo and Paris Conventions
OWF	Offshore Wind Farm
P&D	Planning and Development Act 2000
PoC	Points of Connection
pNHA	proposed Natural Heritage Areas
PTS	Permanent Threshold Shift
PVA	Population Viability Analysis
RED2	Recast Renewable Energy Directive
RES	Renewable Energy Supply
RESS	Renewable Energy Support Scheme
RMPs	Register of Monuments and Places
RNLI	Royal National Lifeboat Institution
RoI	Republic of Ireland
RPOs	Regional Policy Objectives
RSES	Regional Spatial and Economic Strategy
RYA	Royal Yachting Association

Abbreviation	Term in Full
SAC	Special Area of Conservation
SAR	Search and Rescue
SBP	Sub-Bottom Profiler
SCA	Seascape Character Assessment
SCANS-III	Small Cetaceans in European Atlantic waters and the North Sea
SEA	Strategic Environmental Assessment
SEAI	Sustainable Energy Authority of Ireland
SEL	Sound Exposure Level
SERIFF	South East Regional Inshore Fisheries Forum
SERA	South East Razor Association
SFPA	Sea Fisheries Protection Authority
SI	Statutory Instrument
SMP	Seabird Monitoring Programme
SMR	Sites and Monuments Record
SNCB	Statutory Nature Conservation Body
SNH	Scottish Natural Heritage
SOSS	Strategic Ornithological Support Services
SPA	Special Protection Area
SPM	Suspended Particulate Matter
SPV	Special Purpose Vehicle
SSC	Suspended Sediment Concentrations
SSR	Secondary Surveillance Radar
SSS	Side Scan Sonar
Statcoms	Static Synchronous Compensators
SWISS	South-West Irish Sea Survey
TII	Transport Infrastructure Ireland
TJB	Transition Joint Bay
TSS	Traffic Separation Scheme

Abbreviation	Term in Full
TTS	Temporary Threshold Shift
UAU	Underwater Archaeology Unit
UAV	Unmanned Aerial Vehicle
UK	United Kingdom
UKHO	UK Hydrographic Office
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
VER	Valued Ecological Receptor
VFR	Visual Flight Rules
VMS	Vessel Monitoring System
VP	Vantage Point
WCCC	Waterford City and County Council
WXCC	Wexford County Council
WWCC	Wicklow County Council
WFD	Water Framework Directive
WQ	Water Quality
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Glossary	Definition
Alternating Current (AC)	A flow of electrical current which reaches maximum in one direction, decreases to zero, then reverses itself and reaches maximum in the opposite direction. The cycle is repeated continuously and the number of cycles per second is equal to the frequency. The Irish electrical system is an AC network that uses a frequency of 50 Hz.
The Applicant	Shelmalere Offshore Wind Farm Limited
Baseline	Existing status of the receiving environment in the Potential Infrastructure Zones.
Battery Energy Storage System (BESS)	These are devices that enable energy from renewables, like offshore wind, to be stored and then released when customers need power most.
Bord Iascaigh Mhara (BIM)	Bord Iascaigh Mhara is the agency of the Irish State with responsibility for developing the Irish marine fishing and aquaculture industries.
Cable Landfall	This is the point where an underwater cable makes landfall.
Chartered Institute of Ecology and Environmental Management (CIEEM)	The Chartered Institute of Ecology and Environmental Management is the professional membership body representing and supporting Ecologists and Environmental professionals in the UK, Ireland and abroad. Previously known as Institute of Ecology and Environmental Management (IEEM).
Collision Risk Modelling (CRM)	Method used to predict the potential number of bird collisions that might be caused by the operation of a wind farm.
Community Benefit Scheme	<p>A scheme that is unique to each project and whose design is typically driven by the community that administer and avail of it.</p> <p>It can include for example:</p> <ul style="list-style-type: none"> • Contributing to the improvement of local recreational amenities • Supporting local projects that benefit the wider community • Engaging with local communities in enhancing sustainable energy awareness, use and efficiency
Community Liaison Officer (CLO)	The CLO actively engages with community groups and individuals with an interest in The Project. Engagement focuses on communities in the vicinity of the Potential Onshore Infrastructure Zone and the Potential Offshore Infrastructure Zone. This engagement is primarily focused on those groups and individuals that are not involved in the fishing industry.

Glossary	Definition
Community and Stakeholder Liaison Manager	The role of the Community and Stakeholder Liaison Manager is to coordinate and lead the extensive stakeholder and community consultation processes for all aspects of The Project, both onshore and offshore, throughout the life-cycle of The Project
Competent Authority	Organisation that has the legally delegated authority to carryout Appropriate Assessment and or Environmental Impact Assessment. For example, An Bord Pleanála.
Construction Phase	The period during which project infrastructure is being installed.
Decommissioning Phase	The period during which project infrastructure is being removed at the end of the operational lifetime of The Project.
Department for Transport, Tourism and Sport (DTTAS)	The Irish government department responsible for Transport, Tourism and Sport with a mission to support economic growth and social progress.
Department of Agriculture, Food and the Marine (DAFM)	The Irish government department responsible for agriculture, food and the marine.
Department of Communications, Climate Action and Environment (DCCAE)	The Irish government department responsible for communications, climate action, environment, broadcasting, energy, natural resources and postal services. The department must ensure that all of its policies are in line with EU and global obligations.
Department of Communications, Marine and Natural Resources (DCMNR)	Previous name of the Department of Communications, Climate Action and Environment.
Department of Housing, Planning, and Local Government (DHPLG)	The Irish government department responsible for housing, planning and local government.
Design Parameters	Set of parameters by which The Project is defined and which will be used to form the basis of future assessments for the EIAR.
Development Area	The area within the Potential Infrastructure Zones that will be the subject of the infrastructure .

Glossary	Definition
Development Consent	Planning permission from the Competent Authority for large-scale development to proceed.
Development Permission application	Documents submitted (including EIA) to Competent Authority when applying for Development Consent for a large scale development.
Development Phase	This relates to the development of The Project through commercial, environmental, technical and engineering consideration prior to construction.
EIA Scoping Report	This EIA Scoping Report sets out the proposed scope of work and methods to be applied in the development of an Environmental Impact Assessment Report (EIA).
EirGrid	State-owned electric power Transmission System Operator (TSO) in Ireland
Electricity Supply Board Networks (ESBN)	Licensed owner and operator of the electricity distribution system and onshore transmission asset owner in the Republic of Ireland, responsible for carrying out operations, maintenance, repairs and construction on the national electricity grid.
Electromagnetic Field (EMF)	This is a property of space caused by the motion of an electric charge. A stationary charge will produce only an electric field in the surrounding space. If the charge is moving, a magnetic field is also produced. An electric field can be produced also by a changing magnetic field.
Environmental Impact Assessment (EIA)	A systematic means of assessing a development projects likely significant effects undertaken in accordance with the EIA Directive (85/337/EEC). It is an assessment carried out by the Competent Authority.
Environmental Impact Assessment Report (EIA)	A report prepared by the Developer to describe the likely significant effects of a project and submitted with an application for Development Consent.
Environmental Protection Agency (EPA)	National agency responsible for protecting and improving the environment of Ireland.
European Commission (EC)	The executive body of the European Union responsible for proposing legislation, enforcing European law, setting objectives and priorities for action, negotiating trade agreements and managing implementing European Union policies and the budget.

Glossary	Definition
European Directive	A "directive" is a legislative act that sets out a goal that all EU countries must achieve. However, it is up to the individual countries to devise their own laws on how to reach these goals. One example is the EU Consumer Rights Directive (Directive 2011/83/EU), which strengthens rights for consumers across the EU, for example by eliminating hidden charges and costs on the internet, and extending the period under which consumers can withdraw from a sales contract.
Exclusive Economic Zone (EEZ) Boundary	The boundary between the Irish Exclusive Economic Zone (EEZ) and the English Exclusive Economic Zone.
Export Cable Corridor (ECC)	The area within which the proposed export cables will be laid, from the Turbine Array area to a point at Mean High Water Spring (MHWS).
Fehily Timoney and Company (FT)	Planning and Environmental Consultants responsible for leading preparation of the EIAR for The Project
Fisheries Liaison Officer (FLO)	FLOs are employed by a developer, such as Shelmalere Offshore Wind Farm Ltd., to liaise between the fishing community, fishing representative bodies and a developer. FLOs sometimes use local knowledge and fisheries experience to encourage co-operation and help ensure operations run smoothly and efficiently. FLOs are essential in areas of intensive fishing activity, aiming to minimise disturbance to both the fishing industry and the developer's survey vessels.
Foreshore Licence	Licences granted by the Foreshore Unit for works not requiring exclusive possessions, e.g. laying of submarine pipelines and cables and the carrying out offshore Site Investigations.
Formal Safety Assessment (FSA)	This is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and cost benefit assessment.
Geographical Information System (GIS)	A digital system that captures, stores, analyses, manages and presents data linked to geographic location. It links spatial information to a digital database.
Gravity Based Structures (GBS)	Gravity base foundations are structures that principally comprise concrete, steel or steel and concrete which rests on the seabed due to its own weight with or without added ballast or skirts.

Glossary	Definition
High Water Mark	The level reached by the sea at high tide, or by a lake or river in time of flood.
High Voltage Direct Current (HVDC)	A High Voltage Direct Current (HVDC) electric power transmission system (also called a power superhighway or an electrical superhighway) uses Direct Current for the bulk transmission of electrical power. For long-distance cables, HVDC systems are preferred as being less expensive and suffering lower electrical losses. For underwater power transmission, HVDC avoids the need to charge and discharge the cable capacitance each cycle. HVDC typically uses voltages between 100 kV and 1,500 kV.
Inter-Array Cable	Inter-Array Cable means the network of offshore subsea cables connecting the WTGs with the offshore substation(s). These cables are typically rated at least 66 kV and installed in single lengths from one turbine to its neighbour, forming a string (collection circuit) feeding the substation.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significant effects of change resulting from a project both on the landscape as an environmental resource in its own right and on views and Visual Amenity experienced by human & other receptors.
Licence Area	Area in which a Foreshore Licence is awarded to explore the seabed within 12 nm of the coast.
Lowest Astronomical Tide (LAT)	The lowest tide level which can be predicted to occur under average meteorological conditions and any combination of astronomical conditions.
Marine Area Regulatory Authority (MARA)	Maritime Area Regulatory Authority, a new regulatory body to be set up for the purpose of issuing Foreshore Licences and Maritime Area Consents.
Marine Strategy Framework Directive (MSFD)	Formally adopted by the European Commission (EC) in July 2008, the MSFD outlines a transparent, legislative framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal of the Directive is to achieve 'Good Environmental Status' (GES) by 2020 across Europe's marine environment.
Marine water quality	Marine water quality refers to the presence or absence of any number of pollutants in ocean waters. Some of the more important pollutants include oil, sedimentation, sewage, nutrients, heavy metals, and thermal pollution. Water quality monitoring relies on taking a suite of measurements of ocean water.

Glossary	Definition
Maritime Area Consent (MAC)	One of the main features of the Maritime Area Planning Act (MAPA) 2021 is the creation of a new lease consent process for the occupation of the maritime area for offshore project. It allows for the occupation of the seabed for the purposes of maritime usages that will be undertaken for undefined or relatively long periods of time (including any such usages which also require development permission under the Planning and Development Act 2000)
Maximum Export Capacity (MEC)	The Maximum Export Capacity (MEC) is the value (in MW, MVA, kW and/or kVA) provided in accordance with the User's Grid Connection Agreement or DSO Demand Customer's DSO Connection Agreement. This is the maximum capacity that can be exported to the Electricity Transmission/Distribution System by a project.
Mean High Water Springs (MHWS)	The highest-level which spring tides reach on average over a period of time above chart datum.
Mean Low Water Springs (MLWS)	The lowest level which spring tides reach on average over a period of time above chart datum.
Nationally Determined Contributions (NDCs)	As a contribution to the objectives of The Paris Agreement, countries have submitted comprehensive national Climate Action Plans (Nationally Determined Contributions, NDCs). These are not yet enough to reach the agreed temperature objectives, but the agreement traces the way to further action.
National Parks and Wildlife Service (NPWS)	The National Parks and Wildlife Service manages the Irish State's nature conservation responsibilities. The activities of the NPWS include the designation and protection of Natural Heritage Areas, Special Areas of Conservation and Special Protection Areas.
Natura Impact Statement (NIS)	This is a report prepared following Appropriate Assessment (AA) of Natura 2000 sites as required under the EU Habitats Directive which presents information on the assessment and the process of collating data on a project and its potential significant impacts on Natura 2000 site(s).
Natura 2000 sites	Sites both onshore and offshore which are designated for conservation and protection under the EU Habitats Directive.
Navigation Risk Assessment (NRA)	Navigation (Marine) Risk Assessment identifies and assesses the hazards and risks affecting vessel navigation, before considering current controls to

Glossary	Definition
	mitigate risks and further controls that could be adopted to minimise risk As Low as Reasonably Practicable (ALARP).
Nutrient Sensitive Areas (NSAs)	Areas of protected habitats and species as defined in the Nitrates Directive.
Offshore Export Cable(s)	The Offshore Export Cable(s) and all associated cable protection to Cable Landfall.
Offshore Renewable Electricity Support Scheme (ORESS)	The Department of the Environment, Climate and Communications (DECC) recently announced schedule of onshore and offshore Renewable Electricity Support Scheme auctions, with indicative auction dates out as far as 2025. These are intended to procure a total indicative volume of up to 49,000 GWh of renewable energy.
Onshore Grid Connection	This is the collective name for all grid connection works: <ul style="list-style-type: none"> Onshore Export Cable (including Joint Bays); and Electrical Infrastructure (including the Onshore Project Substation).
Onshore Project Substation	A compound containing electrical transforming equipment to ensure the wind farm export power operates within safety and performance parameters to enable connection to the National Irish grid. If needed, the onshore project substation will transform voltage from high to low, or the reverse by means of the electrical transformers before it is connected onto the Irish electricity grid.
Operations and Maintenance (O&M)	O&M is the activity that follows commissioning to ensure the safe and economic running of The Project. The objective of this activity is to make sure The Project achieves the best balance between running cost and electricity output.
Operational Phase	The period over which the offshore wind farm is generating and any works are for maintenance purposes.
OSPAR Commission	The forum through which Contracting Parties cooperate underpinning the OPSAR Convention. The Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention is the current legislative instrument regulating international cooperation on environmental protection in the North-East Atlantic
Points of Connection (POC)	The location where The Project connects to the existing Irish grid network.

Glossary	Definition
Population Viability Analysis	Population Viability Analysis is a species-specific method of risk assessment frequently used in conservation biology. It is traditionally defined as the process that determines the probability that a population will go extinct within a given number of years.
Potential Export Cable Corridor Infrastructure Zone.	The area currently under consideration for one or more export cables from the Potential Turbine Array Infrastructure Zone.
Potential Onshore Infrastructure Zone	Area of The Project where onshore project infrastructure may be located including Terrestrial export cable(s); Onshore Project Substation; Construction compounds.
Potential Turbine Array Infrastructure Zone	Area of The Project where offshore project infrastructure may be located including: <ul style="list-style-type: none"> - WTGs - Inter-array cables - Offshore substation(s) - Marine export cable(s)
Prescribed Bodies	A public body or institution declared by the Minister as set out in the Planning & Development Act 2000 (as amended). These are bodies that should be notified by a Planning Authority or Competent Authority of applications for Consent that may fall within their remit.
Ramsar site	A wetland site designated to be of international importance under the Convention on Wetlands, known as the Ramsar Convention.
Receptor	Environmental component that may be affected, adversely or beneficially, by The Project.
Relevant Project	As defined in the Transition Protocol contained in Appendix 4 of the MPDM Frequently Asked Questions. On 19 of May 2020, the Government announced that seven offshore renewable energy projects had been designated as Relevant Projects, namely Oriel Wind Park, Dublin Array, Codling Wind Park (2 projects - Codling I and Codling II), Skerd Rocks Offshore Wind Farm and the North Irish Sea Array.
Remotely Operated Vehicle (RoV)	A remotely operated underwater vehicle is a tethered underwater mobile device. ROVs are unoccupied, highly manoeuvrable, and operated by a crew either aboard a vessel/floating platform or on proximate land.

Glossary	Definition
Renewable Energy Support Scheme (RESS)	Set up by Department of the Environment, Climate and Communications (DECC), the RESS aims to promote the generation of electricity from renewable sources by providing financial support to renewable energy projects in Ireland.
Roadmap for a competitive low-carbon Europe	With its Roadmap for moving to a competitive low-carbon economy in 2050, the European Commission is setting out a plan to meet the long-term target of reducing domestic emissions by 80 % to 95% by mid-century as agreed by European Heads of State and governments.
Scour Protection	Scouring of soft surface sediments can occur around the base of foundations due to localised hydrodynamic effects, which can erode sediments causing scour pits to form. The formation of scour pits can impact on the stability of the structure. The presence of scour pits may increase the environmental impacts due to resulting changes in the hydrodynamic regime, and increased sediment load in the water column. As a precautionary assumption, it is assumed that scour protection would be required at all foundation locations.
Scrub	Scrub comprises scattered or dense stands of naturally regenerated locally native tree and shrub species, generally under 5m tall.
Seascape / Landscape and Visual impact assessment	A tool used to identify and assess the likely significant effects of change resulting from a project both on the seascape and landscape as an environmental resource in its own right and on views and Visual Amenity experienced by human & other receptors.
Special Area of Conservation (SAC)	Areas defined in the European Union's Habitats Directive (92/43/EEC) for protection of one or more special habitats and/or species terrestrial or marine.
Special Protection Area (SPA)	Sites classified in accordance with Article 4 of the EC Birds Directive (79/409/EEC) which came into force in April 1979. They are classified for rare and vulnerable birds (as listed on Annex 1 of the Directive), and for regularly occurring migratory species.
Special Purpose Vehicle (SPV)	A special purpose vehicle (SPV) is a subsidiary company that is formed to undertake a specific business purpose or activity.

Glossary	Definition
Species	A group of interbreeding organisms that seldom or never interbreed with individuals in other such groups, under natural conditions; most species are made up of subspecies or populations.
Strategic Environmental Assessment (SEA)	A Strategic Environmental Assessment (SEA) is a systematic process for evaluating the environmental implications of a proposed policy, plan or programme and provides means for looking at cumulative effects and appropriately address them at the earliest stage of decision making alongside economic and social considerations
Sub Bottom Profiling	Sub-Bottom Profiling (SBP) systems are used to determine physical properties of the sea floor and to image and characterise geological information a few metres below the sea floor.
Suspended sediment concentration	Suspended sediment generally consists of flocculated material and is often a mixture of inorganic particles (clays and silts), bacterial and algal communities, organic particles (detritus and extracellular polymers), and interfloc spaces (pores) that allow for the flow through or retention of water.
Temporary Threshold Shift (TTS)	Temporary Threshold Shift is a temporary shift in the auditory threshold. It may occur suddenly after exposure to a high level of noise, a situation in which most people experience reduced hearing. A Temporary Threshold Shift results in temporary hearing loss.
The Project	Shelmalere Offshore Wind Farm which consists of all element of the project which are functionally and legally inter-dependent. This would include all offshore infrastructure and onshore infrastructure required for the construction, operation and decommissioning of Shelmalere Offshore Wind Farm, including O&M facilities and wet storage areas.
The Project Team	The Shelmalere Offshore Wind Farm Team including Engineers, Environmental Scientists, Planners and Topic-specific discipline leads who are engaged to work on The Project.
Topic-specific Study Area	The physical area defined for each EIAR topic which includes the relevant EIAR Scoping Area(s) as well as potential spatial and temporal considerations of the impacts on relevant receptors. The Topic-specific Study Area for each EIAR topic is intended to cover the area within which an effect can be reasonably expected.

Glossary	Definition
Transition Joint Bay	A Transition Joint Bay (TJB) is the location where the offshore cable(s) ends and the standard onshore cable will commence, with each circuit containing three separate cables. Thus, it is essentially a buried concrete chamber adjacent to the Cable Landfall.
Trenchless Crossing	<p>Crossing refers to the process of passing gas, oil, water or sewer pipelines under environmentally sensitive areas such as wetlands, estuaries, rivers, lakes and protected areas.</p> <p>Trenchless technology has enabled this by making drilling possible below the bed of the sensitive areas using directional drilling techniques. Horizontal Directional Drilling (HDD) has become an important part of the pipeline industry because of its environment-friendly handling of sensitive locations.</p>
Unexploded ordnance (UXO)	Unexploded ordnance, unexploded bombs (UXBs), or explosive remnants of war (ERW) are explosive weapons (bombs, shells, grenades, land mines, naval mines, cluster munition, etc.) that did not explode when they were employed and still pose a risk of detonation.
Unmanned Autonomous Vehicle (UAV)	A machine that can move through the terrain intelligently and autonomously without the need for any human intervention
Valued Ecological Receptors (VERs)	The term 'ecological receptors' is used when impacts upon them are likely. The term 'resources/receptors of ecological value' is intended to refer to those that are judged to be of importance at a particular geographic scale (e.g. at an international, national, county scale).
Water body	A discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, a transitional water or a stretch of coastal water, designated for the purposes of implementing the Water Framework Directive (WFD).
Wet Storage	Areas identified along the coastline where safe anchorage is identified for offshore wind farm components.
Wind Turbine Generator (WTG)	Wind Turbine Generators (WTG) or "WTGs" are unit(s) generating electricity from wind. These electricity generating machines typically comprise a tower, rotor with three blades connected at the hub, nacelle and ancillary electrical and other equipment which may include J-tube(s), transition piece, access and rest platforms, access ladders, boat access systems,



Glossary	Definition
	corrosion protection systems, fenders and maintenance equipment, and other associated equipment, fixed to a foundation.
Zone of Influence (ZOI)	The area of the receiving environment which may experience both positive or negative effects as a result of a project.
Zone of Interest	Similar to ZOI this is an area of the receiving environment which may experience both positive or negative effects as a result of a project or an adjacent project.
Zone of Theoretical Visibility (ZTV)	A map, digitally produced, showing areas of land and or sea within which different elements of a project is theoretically visible.

1 INTRODUCTION

1.1 GENERAL

1.1.1 Introduction

Shelmalere Offshore Wind Farm (also referred to in this EIAR Scoping Report as ‘The Project’) is an offshore wind energy project under development off the coast of counties Wicklow and Wexford. Once operational, Shelmalere Offshore Wind Farm has the potential to generate up to 1GW of renewable energy. This represents a significant proportion of Ireland’s national targets for renewable energy generation by 2030 and beyond.

Figure 1-1 identifies the Potential Infrastructure Zones of Shelmalere Offshore Wind Farm for this EIAR Scoping Exercise which include the following:

- Potential Turbine Array Infrastructure Zone;
- Potential Export Cable Corridor Infrastructure Zone; and
- Potential Onshore Infrastructure Zone.

All key offshore and onshore project infrastructure will be located within the Potential Infrastructure Zones. More detail on potential locations of key infrastructure within the Potential Infrastructure Zones will be developed via the ongoing design process. The location of potential ports and wet storage facilities for the Construction, Operation and Maintenance (O&M), and Decommissioning phases of The Project are not currently defined and may be located outside the Potential Infrastructure Zones but once identified, will be assessed in the Environmental Impact Assessment Report (EIAR).

Fehily Timoney and Company (FT), in conjunction with Marine Space and Intertek, has been appointed by Shelmalere Offshore Wind Farm Ltd. as Planning and Environmental Consultants for The Project and will ultimately prepare an Environmental Impact Assessment Report (EIAR) and relevant supporting documents, including a Natura Impact Statement (NIS), to support a Development Permission application for Shelmalere Offshore Wind Farm. The EIAR will be prepared in accordance with the requirements of the EIA Directive 2011/92/EU, as amended and the NIS will be prepared in accordance with the requirements of the Habitats Directive 92/43/EEC.



1.1.2 The Applicant

Shelmalere Offshore Wind Farm is being developed by Shelmalere Offshore Wind Farm Ltd. (The Applicant). Shelmalere Offshore Wind Farm Ltd. is a Special Purpose Vehicle (SPV) created by DP Energy and partner Iberdrola for the delivery of the Shelmalere Offshore Wind Farm.

DP Energy is an Ireland based renewable energy developer, headquartered in Buttevant, County Cork. DP Energy is developing wind and solar projects across Australia, North America and the UK as well as here in Ireland. It has played a leading role in the Irish wind industry since the 1990s. DP Energy's first renewable energy projects in Ireland were the onshore wind farms Bessy Bell in County Tyrone commissioned in 1995, and Corrie Mountain in County Leitrim commissioned in 1998.

For the development of Ireland offshore wind projects, including Shelmalere Offshore Wind Farm, DP Energy has partnered with the global energy leader Iberdrola. Iberdrola is one of the world's largest energy companies and a leader in renewables, spearheading the energy transition to a low carbon economy. The group supplies energy to almost 100 million people in dozens of countries, has a workforce of nearly 40,000 and assets in excess of €140 billion. Across the world, Iberdrola helps to support 400,000 jobs across its supply chain, with annual procurement in excess of €12 billion.

Having previously worked together on the Port Augusta Renewable Energy Project, a 320 MW hybrid wind and solar project in South Australia which is currently under construction, DP Energy and Iberdrola are now investigating a number of offshore wind opportunities around the Irish Coast - east, south and west. Shelmalere Offshore Wind Farm is one such project.

Both DP Energy and Iberdrola are focused on developing sustainable projects, which form part of the goal of achieving a green economy. Shelmalere Offshore Wind Farm Ltd. aims to be part of the transformation of the energy industry in Ireland from fossil fuel to a low carbon system, as advocated by the Government's publication 'The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015 – 2030' ('The White Paper') which sets out a framework for energy policy to 2030 and outlines a transition to a low carbon energy system for Ireland by 2050.

1.1.3 Aim of the EIAR Scoping Report

This EIAR Scoping Report aims to identify the relevant, potentially significant impacts associated with the physical, human and biological environments arising from the construction, operation and maintenance (O&M), and decommissioning phases of Shelmalere Offshore Wind Farm. This EIAR Scoping Report also sets out the proposed approach to addressing those potentially significant environmental impacts through the EIAR process.

An overview of all potential EIAR issues is set out and the case is made for focusing the EIAR on those issues which have the potential to result in likely significant impacts, reducing the emphasis on those issues which are increasingly shown (from repeated assessment in offshore wind, available data and professional judgement) to result in non-significant impacts.

Whilst conforming to Irish regulatory and policy guidance, the future EIAR for Shelmalere Offshore Wind Farm will take account of the lessons learnt and good practice on offshore wind farm projects that have already been through the permitting, construction, O&M and decommissioning phases in and outside of Irish waters.

In line with this approach, this EIAR Scoping Report makes recommendations, supported by evidence, regarding the issues which are proposed to be excluded (i.e. scoped out) from assessment in the future EIAR. Each technical section of this EIAR Scoping Report summarises potential impacts on environmental receptors and states whether these will be considered further as part of the EIAR process (i.e. scoped in for consideration in the future EIAR).

This EIAR Scoping Report will be used to gather informed input on Shelmalere Offshore Wind Farm from stakeholders (including the general public) and to assist in determining the content of the EIAR for the Shelmalere Offshore Wind Farm.

Throughout the preparation of the EIAR, the design of Shelmalere Offshore Wind Farm will be revised and refined to take account of the findings of studies and surveys, as well as from consultation with the various Competent Authorities, other Prescribed Bodies, wider stakeholders, communities and the public. Feedback on The Project from such consultation will be considered within the design development and refinement process resulting in a final design which will be subject to assessment in the future EIAR for submission in support of the eventual Development Permission application for Shelmalere Offshore Wind Farm.

A list of the consultees issued with this EIAR Scoping Report is included in Appendix A.

1.2 BENEFITS OF THE PROJECT

Ireland's Climate Action Plan 2021 seeks to reduce the effects of climate change by transitioning from non-renewable forms of electricity generation to renewable electricity. This plan targets 80% renewable electricity by the year 2030. This 80% renewable electricity target is achieved, in part, through a commitment to target the installation of at least 5 GW of offshore wind energy by 2030.

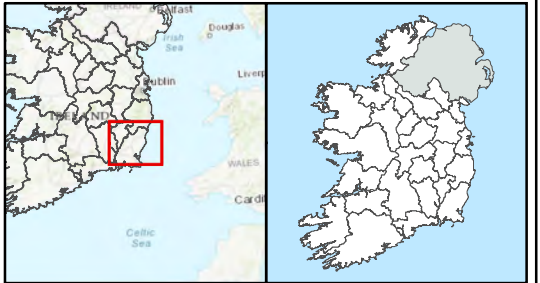
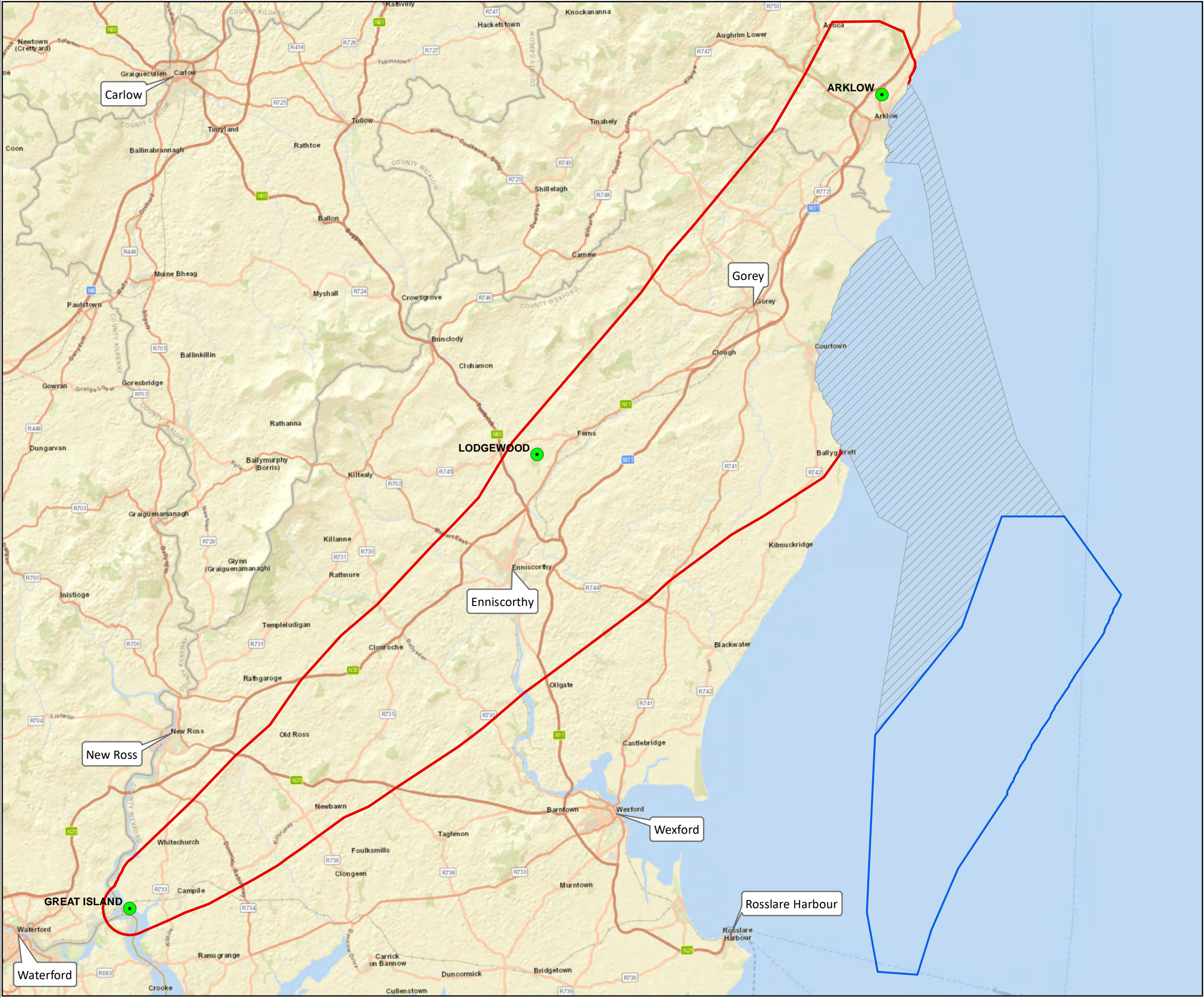


Shelmalere Offshore Wind Farm has the potential to generate up to 1 Gigawatt (GW) of clean renewable wind energy, delivering approximately 3,950,000 MWh of electricity per year. Based on high-level modelling, it is estimated that The Project could generate enough clean renewable electricity to supply up to 1 million homes annually. Shelmalere Offshore Wind Farm also has the potential to reduce Carbon Dioxide (CO₂) emissions by up to an estimated 1,280,000 tonnes every year, through the displacement of fossil fuels¹. This is equivalent to a passenger car driving the circumference of the world over 300,000 times.

Shelmalere Offshore Wind Farm, while providing clean renewable wind energy and helping to reduce Ireland's carbon (CO₂) emissions, also has the potential to assist Ireland in meeting its 80% renewable electricity target by the year 2030 and its commitment to target the installation of at least 5 GW of offshore wind energy by 2030. Chapter 2 of this EIAR Scoping Report, 'Need for The Project and Strategic Planning Context', sets out more information on the benefits of and the need for The Project.


An Offshore Renewable Electricity Support Scheme (ORESS 1) is currently being prepared by Government to procure electricity from the first phase of Ireland's offshore renewable energy projects. The draft ORESS 1 scheme requires developers to set aside €2 per MWh of electricity produced, for community benefit funds associated with local renewable energy projects. A second Offshore Renewable Electricity Support Scheme (ORESS 2) is to be prepared by Government and it is this scheme that the Government will use to procure electricity from projects such as Shelmalere Offshore Wind Farm. The terms of ORESS 2 have yet to be determined.

¹ Calculations based on: Average household electricity usage in 2017, 2018 (<https://www.cru.ie/wp-content/uploads/2017/07/CER17042-Review-of-Typical-Consumption-Figures-Decision-Pap>) = 4,200 kWh/year (4.2 MWh/year). Average carbon intensity of electricity in 2019 (<https://www.seai.ie/publications/Energy-Emissions-Report-2020.pdf>, <https://www.epa.ie/ghg/energyindustries/>) = 325 g CO₂/kWh. Capacity factor for offshore wind (www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-Report.pdf) = 45%

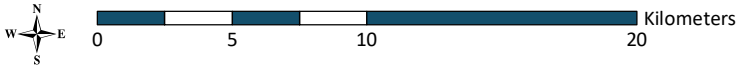


- Legend**
- Potential Turbine Array Infrastructure Zone
 - Potential Export Cable Corridor Infrastructure Zone
 - Potential Onshore Infrastructure Zone
 - Existing Network Substations (220kV)

TITLE:	
EIAR Scoping Report Potential Infrastructure Zones	
PROJECT:	
Shelmalere Offshore Wind Farm	
FIGURE NO: INFO	
CLIENT: Shelmalere Offshore Wind Farm Limited	
SCALE: 1:280000	REVISION: 0
DATE: 23/05/2022	PAGE SIZE: A3



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1.3 POTENTIAL INFRASTRUCTURE ZONES

The Potential Turbine Array Infrastructure Zone together with the Potential Export Cable Corridor Infrastructure Zone occupy an approximate area of 637 km². The Potential Onshore Infrastructure Zone occupies an approximate area of 1043 km². The Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone are located off the coast of counties Wexford and Wicklow. The Potential Onshore Infrastructure Zone is located primarily within County Wexford, with the most northern part of the Potential Onshore Infrastructure Zone located in County Wicklow and the most southern part in County Waterford. The extents of the Potential Infrastructure Zones are shown in Figure 1-1. The Potential Infrastructure Zones have been identified to allow for further investigations to take place to help determine the preferred design and siting of Wind Turbine Generators (WTGs), Export Cable Corridor (ECC), Cable Landfall and Onshore Infrastructure.

The Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone is contained entirely within 12 nautical miles (nm) from the High-Water Mark (HWM). The Potential Turbine Array Infrastructure Zone is approximately 4.9 nm from the coast at its closest point to land (HWM). The water depths across the majority of the offshore area under consideration are generally less than 60 metres.

The onshore grid connection cabling is expected to consist entirely of underground cable and will be buried in trenches in a combination of public roads and private lands between Cable Landfall location(s) and the Point of Connection (PoC) to the grid transmission network. As the Cable Landfall location(s) has yet to be defined, there is at this stage potential for multiple onshore cable corridors. The length of underground cable required could be up to approximately 90 km depending on the preferred route which has yet to be identified for The Project. However, given the potential points of connection identified at Lodgewood, Arklow and Great Island (see Figure 1-1), the selected cable corridor will be located within the confines of the Potential Onshore Infrastructure Zone.

An Onshore Project Substation will be constructed within the Potential Onshore Infrastructure Zone to provide a connection point between the offshore wind farm infrastructure and the PoC with the transmission network. This will take place either at one of the three existing 220/110 kV network substations at Lodgewood, Arklow and Great Island, or at a point along an existing High Voltage (HV) overhead line within the Potential Onshore Infrastructure Zone in the form of a 'loop-in' connection arrangement (see Figure 1-1).

The Project may also include a Battery Energy Storage System (BESS) to store electricity for release to the national grid at appropriate times as required by EirGrid. The requirement for BESS will be reviewed as the design of The Project develops.

The grid connection arrangement that will be assessed as part of the EIAR shall be designed in consultation with EirGrid and shall be subject to EirGrid's Functional Specifications and requirements. Further details on the potential grid connection arrangement options and associated infrastructure for Shelmalere Offshore Wind Farm can be found in Section 3.4.

1.4 CURRENT STATUS AND CONSENT PROCESS FOR THE PROJECT

Shelmalere Offshore Wind Farm Ltd. is currently at an early stage of development to determine the appropriateness of the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone for an offshore wind farm project and associated onshore infrastructure within the Potential Onshore Infrastructure Zone. Some surveys, stakeholder engagement and assessments are underway to help inform the necessary detailed environmental assessments and statutory consent applications to follow.

In December 2021, the Maritime Area Planning Act 2021 (MAPA) was enacted. MAPA, when it is commenced in full, will dovetail into the existing Planning and Development Act 2000 (as amended) and will provide the consenting mechanism for offshore renewable energy projects through the introduction of a new section (Section XXI) to the Planning and Development Act 2000 (as amended).

Prior to submitting a Development Permission application, The Applicant must successfully secure a Maritime Area Consent (MAC) from a not yet established government body called the Maritime Area Regulatory Authority (MARA), which is currently expected to be operational in Q1 2023.

In May 2020, the Department of Housing Planning and Local Government (now Department of Housing, Local Government and Heritage) announced that several offshore wind projects had been designated as 'Relevant Projects' (Phase One projects). This designation secured special status for those Phase One projects, with the Minister currently accepting applications for MAC for those projects. Shelmalere Offshore Wind Farm is being developed as a Phase Two project. The Phase Two projects must deliver the remaining 5 GW target identified in the Climate Action Plan 2021 which is not fulfilled by the Phase One projects. The MAC criteria for Phase Two projects are still being determined and the consultation process is still ongoing.

To inform the MAC application process, Shelmalere Offshore Wind Farm Ltd. applied in November 2020 for a Foreshore Licence to undertake the necessary offshore site investigations for the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone pursuant to Foreshore License application no. FS007261. The Foreshore Licence was subject to public consultation between 2nd November 2021 and 1st December 2021.

Submissions were received from the public and Prescribed Bodies. Shelmalere Offshore Wind Farm Ltd. made responses to the submission, with the latest response to submissions made on the 29th April 2022.



In addition to the application for a Foreshore Licence for site investigations within 12 nm of the coast, monthly offshore aerial bird, marine mammal and other marine megafauna surveys and Cable Landfall ecology surveys commenced in April 2021, with a 24-month duration currently planned to bring those surveys up to and including March 2023.

1.5 ENVIRONMENTAL IMPACT ASSESSMENT AND THE FUNCTION OF AN EIAR

A European Directive for EIA came into force in 1985 since the adoption of Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment.

The EIA Directive of 1985 has been amended a number of times by Council Directives between 1997 and 2014. The amended directive sets out the requirements for member states on the assessment of the effects of certain public and private projects on the environment.

The EIA Directive, as amended, requires the competent authority to undertake an EIA of certain public and private projects that are likely to have significant effects on the environment as part of the consent decision making process. In Ireland, the requirements of the EIA Directive, as amended, in relation to planning consents are specified in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (hereafter referred to as ‘the EIA Regulations’), as well as Part X of the Planning and Development Act, 2000, as amended, and in Part 10 of the Planning and Development Regulations, 2001, as amended.

The prescribed classes of development and thresholds that trigger a mandatory EIA and the provision of an EIAR are set out in Schedule 5 of the Planning and Development Regulations, 2001, as amended. The classes under Schedule 5 that are relevant to the overall project are listed below:

Part 2 Class 3 Energy Projects

(i) Installations for the harnessing of wind power for energy production with more than 5 turbines or having a total output greater than 5 megawatts.

Shelmalere Offshore Wind Farm will exceed that threshold and therefore an EIA will be required, necessitating the preparation of an EIAR.

This EIAR Scoping Report has therefore been prepared to assist the preparation of an EIAR that will comply with the requirements of The EIA Directive, the EIA Regulations, the Planning and Development Act 2000, as amended, and the Planning and Development Regulations 2001, as amended.

1.6 CONTRIBUTORS TO THE EIAR SCOPING REPORT

This EIAR Scoping Report has been prepared by FT, in conjunction with Marine Space and Intertek, on behalf of Shelmalere Offshore Wind Farm Ltd.

FT is a planning, environmental and engineering consultancy based in Cork, Dublin and Carlow, specialising in civil and environmental engineering, environmental science and planning. FT is well established as a leading consultancy in wind farm development in Ireland.

Marine Space is a leading UK-based planning and environmental services consultancy that specialises in the preparation of Environmental Impact Assessment Reports for offshore renewable energy projects. Intertek is a multi-national consultancy that provides solutions within the offshore wind sector and across the entire project life cycle.

In addition to FT, Marine Space and Intertek, other specialist contributors to the preparation of this EIAR Scoping Report include the following:

- Marine Geology, Oceanography, and Physical Processes – Intertek
- Marine Water and Sediment Quality – Intertek
- Underwater Noise and Vibration – SubAcoustech Ltd.
- Benthic, Epibenthic and Intertidal – MarineSpace
- Marine Mammals and Reptiles – MarineSpace, supported by APEM Ltd.
- Offshore Ornithology – APEM Ltd.
- Offshore Bats – MarineSpace, supported by FT.
- Fish and Shellfish Ecology – Intertek
- Commercial Fisheries – MarineSpace
- Shipping and Navigation – NASH Maritime Ltd.
- Offshore Archaeology and Cultural Heritage – ADCO
- Aviation and Radar – Osprey Consulting Services Limited.
- Coastal and Marine Infrastructure and Other Users – MarineSpace
- Population and Human Health , (including Socio-Economic, Tourism and Recreation) – FT
- Landscape, Seascape and Visual – Macroworks.
- Land Soils and Geology – FT
- Hydrology, Hydrogeology and Water Quality – FT
- Air Quality & Climate – FT
- Onshore Noise and Vibration – FT
- Onshore Biodiversity – FT
- Onshore Archaeology, Architectural and Cultural Heritage – Rubicon Heritage Services

- Traffic & Transportation – FT.

1.7 CONSULTATION

1.7.1 Community Consultation

Shelmalere Offshore Wind Farm Ltd. is committed to proactive, open and transparent dialogue and engagement with all stakeholders, regulators, and communities which may be affected by or indeed may affect Shelmalere Offshore Wind Farm. The Applicant recognises that the involvement of local communities, local authorities and statutory consultees from an early stage can bring about significant benefits for all parties. The Applicant has undertaken and will continue to undertake consultation with stakeholders, local authorities, local and wider communities (including the fishing industry) and those with an interest in any aspect of Shelmalere Offshore Wind Farm and its related infrastructure throughout all stages of the project lifecycle.

A project website (www.shelmalereoffshorewindfarm.com) has been created to inform the public about all aspects of the proposed development. The website is used to notify members of the public of project updates, project timelines, upcoming public consultation and any changes in the design and layout as a consequence of consultations, environmental assessment and engineering. It also provides an avenue for the public to contact The Project Team directly.

DP Energy's Community and Stakeholder Liaison Manager oversees the engagement between Shelmalere Offshore Wind Farm Ltd. and all interested stakeholders and community members. The Community and Stakeholder Liaison Manager ensures that information is communicated to all interested parties, but as importantly, ensures that feedback is communicated back to The Project Team so that information gathered during meetings and via all feedback channels helps to inform the development of The Project.

DP Energy's Community Liaison Officer (CLO) has been appointed as the main point of contact for members of the community and is available to answer any questions or discuss any concerns members of the public may have about The Project. The CLO has been resourced to deal with all queries and is conducting informal local community consultation in the area. Feedback from the CLO is passed onto The Project Team on an ongoing basis to facilitate the consultation process informing the design process.

Community consultation has begun with an online Public Information Evening held in March 2022. The Project Team delivered presentations and answered questions from attendees during a live session and a Questions & Answers sheet was compiled after the event and sent to all invitees. The Question & Answers sheet is also available to view on the project website.

A Virtual Exhibition Room has been created for The Project. This Virtual Exhibition Room contains information on all aspects of The Project including illustrating the Potential Infrastructure Zones and setting out information on ecology surveys, community engagement and fisheries engagement underway. The Virtual Exhibition Room also includes all documents relating to the Foreshore Licence Applications for offshore surveys and includes feedback forms. An invitation has been sent to community members to visit the Virtual Exhibition Room.

Extensive Public Consultation events are planned throughout the design and EIAR 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 EIAR processes where possible.

Shelmalere Offshore Wind Farm Ltd. is committed to consulting and communicating with the community throughout the lifecycle of Shelmalere Offshore Wind Farm.

1.7.2 Fisheries Consultation

Shelmalere Offshore Wind Farm Ltd. has been engaging with the fishing community since 2019, both through the Fisheries Liaison Officer (FLO) and via DP Energy's Community and Stakeholder Liaison Manager. Initial pier meetings have taken place with approximately 35 fishermen and women as well as aquaculture operators along the east coast of Ireland. Engagement is also ongoing with the Fish Producer Representative bodies, associations and forums (IS&WFPO, IS&EFPO, SERIFF, NIFA/NIFO, NIFF, KFO, IFPO, SERA) and with angling associations (IFSA). This consultation will continue throughout the development of The Project.

1.7.3 Technical Consultation

Consultation is a key element of the EIAR process and consultation will be an important factor in developing the topic specific methodologies for the EIAR. 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.

1.7.4 Early-Stage Consultation

Shelmalere Offshore Wind Farm Ltd. has held early-stage consultations with Statutory Bodies, Prescribed Bodies, non-statutory stakeholders and NGOs to introduce itself and The Project. Consultation has been ongoing since 2019 and will continue throughout the lifecycle of The Project. Engagement has been undertaken via email, phone calls, online meetings, in person meetings and an online Public Information Evening. Engagement with these organisations ranges from several interactions to single exchanges. The



list of those stakeholders that have been contacted to-date are identified in Table 1-1 below. The EIAR Scoping Report will be sent to these Stakeholders and to other Stakeholders who have not been contacted to-date. A list of consultees to whom a copy of this EIAR Scoping Report will be issued is included in Appendix A.

Table 1-1 Early initial consultation carried out on Shelmalere Offshore Wind Farm to-date

Organisation	Date of First Contact
Arklow Municipal District Council	Jan 2022
Wicklow County Council (WCC)	Nov 2020
Wexford County Council (WXCC)	July 2021
Gorey-Kilmuckeridge Municipal District Council	Oct 2021
Rosslare Municipal District Council	July 2021
National Parks and Wildlife Service	Jan 2021
Foreshore Unit	2019,
Marine Institute	Jan 2020
EirGrid	Dec 2020
Irish Whale and Dolphin Group (IWDG)	Jan 2021, April 2022
Inland Fisheries Ireland (IFI)	Feb 2022
Irish Environmental Network (IEN)	Nov 2021
Irish Marine Development Office (IMDO)	April 2022
Bord Iascaigh Mhara (BIM)	Jan 2020
BIM Aquaculture	Jan 2020
Cork Nature Network	Nov 2021
Ocean Research & Conservation Ireland Association (ORCA) Ireland	Jan 2021
Sustainable Energy Authority of Ireland (SEAI)	Jan 2020
Doyle Shipping Group (DSG)	Oct 2020
Commissioners of Irish Lights	Sept 2021
Marine Survey Office	Oct 2021
Bord Gais Energy	Mar 2022
Gas Networks Ireland (GNI)	Jan 2022
National Inshore Fisherman's Forum (NIFF)	Dec 2019
National Inshore Fisherman's Association/Organisation (NIFA/O)	Jan 2020
Irish South and West Fish Producers Organisation (IS&WFPO)	Feb 2020
Irish South and East Fish Producers Organisation (IS&EFPO)	Jan 2020

Organisation	Date of First Contact
Killybegs Fisherman's Organisation (KFP)	Sept 2021
Irish Fish Producers Organisation (IFPO)	Aug 2021
South East Regional Fisheries Forum	May 2020
Ballycotton Fisherman's Association	Feb 2020
Bantry Bay Port	July 2021
Coastwatch	Feb 2021
Cobh and Harbour Chamber	May 2021
Construction Industry Federation Cork	Aug 2021
Irish Naval Service	Dec 2019
Sea Fisheries Protection Agency	Dec 2019
Shannon Foynes Port Company	Mar 2021
Royal National Lifeboat Institution (RNLI)	April 2022
South East Razor Association	June 2022
Irish Seed Mussel Company	June 2022
Port of Cork	Mar 2020
Rosslare Europort	Sept 2021
Wexford Harbour	June 2022
Arklow Port	June 2022
Sustainable Water Network (SWAN) Ireland	May 2022
Voice of Irish Concern for the Environment (VOICE) Ireland	Feb 2022
Irish Marine Federation	May 2022
Irish Seal Sanctuary	June 2021
Irish Sailing Association	June 2022
Sea Angling Ireland	June 2022
Irish Federation of Sea Anglers	June 2022
National Maritime College of Ireland (NMCI)	Oct 2020
Marine and Renewables Research Centre (MaREI)	Oct 2021

2 NEED FOR THE PROJECT AND STRATEGIC PLANNING CONTEXT

2.1 INTRODUCTION

To inform the scoping of the EIAR for Shelmalere Offshore Wind Farm, this chapter sets out the need for Shelmalere Offshore Wind Farm with respect to climate change. It also outlines pertinent International, European and National energy policy, as well as national renewable energy targets applicable to The Project. Section 2.3 of this chapter of the EIAR Scoping Report outlines the International, European, National and Local energy and planning policies which the future EIAR will have regard to.

2.2 NEED FOR THE PROJECT

Shelmalere Offshore Wind Farm is necessary to produce renewable energy to enable Ireland's transition to a low carbon economy. Shelmalere Offshore Wind Farm has the potential to generate a Maximum Export Capacity (MEC) of up to 1 GW of clean renewable wind energy. The exact MEC of Shelmalere Offshore Wind Farm will be dependent on the final wind farm design and selected turbines. The Project has potential to play a significant role in providing renewable electricity in the Republic of Ireland.

At a strategic level, the need for The Project is supported by International, European, and National environmental and energy commitments and policies. As set out in Section 2.3 of this EIAR Scoping Report, the Climate Action Plan 2021 has increased the national targets for renewable electricity from 70 % by 2030 to 80 % by 2030, this is in the context of substantial and continuing failure by Ireland in meeting climate targets to date. This target is to be achieved partly by the delivery of at least 5 GW of offshore wind energy by 2030. Therefore, Shelmalere Offshore Wind Farm will seek to address Climate Change and provide Energy Security as outlined in Section 2.21 and 2.22 below.

2.2.1 Climate Change

The scientific community and governments across the world are in agreement that the global climate is changing and that this is due to human activities which have significantly contributed to climate change through emission of greenhouse gases. This human interference is resulting in increased air and ocean temperatures, drought, melting ice and snow, rising sea levels, increased rainfall, flooding and other influences (EPA, 2021).

The current Taoiseach of the Republic of Ireland, Michéal Martin, on the launch of the Climate Action and Low Carbon Development (Amendment) Act (2021) remarked that:

“The impact of our actions on the planet is undeniable. The science is undisputed. Climate change is happening. And we must act.” (Government of Ireland, 2020)

In this regard, the Government of Ireland enacted the Climate Action Plan (CAP) in June 2019 (updated in 2021) and more recently, the Climate Action and Low Carbon Development (Amendment) Act 2021.

It is estimated that the capacity of up to 1 GW of electricity from Shelmalere Offshore Wind Farm will result in the net displacement of up to an estimated 1,280,000 tonnes of CO₂ per annum through the displacement of fossil fuel².

Greenhouse gases and other emissions from fossil fuels give rise to global warming, acid rain and air pollution. Fossil fuels still dominate Ireland's electricity production. Shelmalere Offshore Wind Farm will provide renewable energy, offsetting the need for burning of fossil fuels. This is necessary to meet the challenges of future climate change.

The Department of Communications, Climate Action and Environment has stated that:

“Climate disruption is already having diverse and wide-ranging impacts on Ireland's environment, society, economic and natural resources. The Climate Action Plan clearly identifies the nature and scale of the challenge.” (DoCCAE, 2019).

The Project will assist in mitigating the effects of climate breakdown and help Ireland achieve its climate neutral economy no later than 2050, to be known as the ‘national climate objective’, as set out in the Climate Action and Low Carbon Development (Amendment) Act 2021 which is further explained in Section 2.3.4 below.

² Calculations based on: Average household electricity usage in 2017, 2018 (<https://www.cru.ie/wp-content/uploads/2017/07/CER17042-Review-of-Typical-Consumption-Figures-Decision-Pap>) = 4,200 kWh/year (4.2 MWh/year). Average carbon intensity of electricity in 2019 (<https://www.seai.ie/publications/Energy-Emissions-Report-2020.pdf>, <https://www.epa.ie/ghg/energyindustries/>) = 325 g CO₂/kWh. Capacity factor for offshore wind (www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-Report.pdf) = 45%

2.2.2 Energy Security

Secure supplies of energy are essential for Ireland's economy and for maintaining safe and comfortable living conditions. Energy import dependency is a significant indicator of the country's energy security. Ireland is one of the most energy import-dependent countries in the European Union, importing 67% of its fuel in 2018 at an estimated cost of €5 billion (SEAI, 2020a). The largest share of energy imports in 2018 was oil, which accounted for 73% of total energy imports, natural gas 17%, coal 8.2% and renewables 1.4%. Import dependency increased to 69% in 2019 (SEAI, 2020).

Price volatility of fossil fuels may increase as carbon prices escalate in the future. The cost of carbon credits is included in all electricity trade, and the price of electricity generated by coal is particularly vulnerable due to the high carbon emissions per unit of electricity generated. Coal still generates a significant amount of Ireland's electricity with 7% of electricity produced by coal in 2018 (SEAI, 2020b) down from 18.3% in 2017 (SEAI, 2018). However, the Programme for Government (2020) called for a review of options to replace coal with low carbon alternatives within a decade as reflected in the CAP (2021). As a result, coal accounted for 2% of net imports in 2019, while gas imports have increased due to the decline in production of the Corrib Gas Field, and oil imports have remained steady (SEAI, 2020).

The Energy White Paper, Ireland's Transition to a Low Carbon Energy Future 2015-2030 (DoCENR, 2015) sets out a framework to guide policy and actions that the government intends to take in the energy sector. The paper notes that *"There will be substantial increases in the cost of carbon in the short and medium term, through the EU Emissions Trading Scheme"*. The electricity produced by The Project will reduce dependence on imported fossil fuels and add to financial autonomy and energy stability in Ireland, further emphasising the need for Shelmalere Offshore Wind Farm.

Furthermore, the EU has re-written the energy policy framework in the Clean Energy for all Europeans Package (2019). Member states must meet new commitments to improve energy efficiency and the take-up of renewables in their energy mix by 2030. For example, the new rules on the electricity market, which have been adopted, will make it easier for renewable energy to be integrated into the grid, encourage more inter-connections and cross-border trade, and ensure that the market provides reliable signals for future investment. This EU policy framework encourages energy security for all EU member states, emphasising a need for renewable energy and a move away from fossil fuels.

The need for energy security has accelerated due to the global energy market disruption caused by Russia's invasions of Ukraine. In May 2022, as detailed in Section 2.3.3 below the European Commission presented its REPowerEU Plan which seeks to phase out Europe's dependency on Russian fossil fuels through *"energy savings, diversification of energy supplies, and accelerated roll-out of renewable energy"*.

2.3 POLICY

2.3.1 Introduction

Statutory and policy requirements at national level to mitigate climate change and increase renewable energy generation are informed by higher level international and European legislation, as outlined below. This policy context contributes directly to establishing a clear and urgent need for The Project.

2.3.2 International Global Policies

2.3.2.1 United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty negotiated at the United Nations Conference on Environment and Development (UNCED), in Rio de Janeiro in 1992. Its ultimate objective was to achieve "... *stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*" (United Nations, 2013).

The Conference of the Parties (COP) is the highest body of the UNFCCC and consists of environment ministers who have met annually since 1995 to assess progress in dealing with the issue of climate change. At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal, The Paris Agreement. That agreement sets out a global action plan to put the global community on track to avoid dangerous climate change by limiting global warming to well below 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C above pre-industrial levels.

2.3.3 EU Directives and Policies

The various directives and policies of the EU set a clear mandate for each member state to transition to sustainable, renewable energy and reduce greenhouse gas emissions. This is reflected in the theme of European Commission President, Ursula von der Leyen's inaugural 'State of the Union' address delivered on 16 September 2020 which emphasised the need to transform the European economy and society to deal with the climate change emergency. During this address, it was also stated that the EU aims to reduce its net greenhouse gas emission by at least 55% on 1990 levels by the end of this decade. Before setting out the relevant directives and policies of the EU below, this section will first examine Ireland's response to EU renewable energy and emissions targets to-date.

2.3.3.1 European Union Targets for 2020 and the Irish Context

The year 2020 was a significant milestone for renewable energy and emissions targets in Europe. The EU Directive on the Promotion of the Use of Energy from Renewable Sources (2009/28/EC) set a target of 20% of EU energy consumption from renewable sources by 2020 and a 20% cut in greenhouse gas emissions by 2020, the so-called 20:20:20 plan.

As part of this Directive, Ireland's overall national target for the share of energy from renewable sources in gross final consumption of energy in 2020 was 16% (increased from 3.1% in 2005).

For electricity alone, Ireland set a national target of 40% of energy from renewable sources by 2020 as outlined in the National Renewable Energy Action Plan (NREAP). The sectoral components of the overall 16% target are detailed in Table 2-1, which outlines each form of renewable energy supply (RES). The latest figures from SEAI detail the 2020 share of renewable energy.

Table 2-1 demonstrates that Ireland has made significant progress in achieving its 2020 renewable electricity targets but did not meet its electricity target of 40% of energy from renewable sources.

Table 2-1 Target and Actual Share of Renewable Energy in Energy Sectors between 2018 and 2020.

Form of Renewable Energy Supply	2018 Position (SEAI, 2020)	2019 Position (SEAI, 2020a)	2020 Position (SEAI, 2021)	Target Share For 2020
Electricity (RES-E)	33.2%	36.5%	39.1%	40%
Heat (RES-H)	6.5%	6.3%	6.3%	12%
Transport (RES-T)	7.2%	8.9%	10.2%	10%

Source: SEAI (2021), Renewable Energy in Ireland 2020 Update and SEAI (2020a), Energy in Ireland 2021 Report

2.3.3.2 2030 Climate and Energy Framework

In October 2014, EU leaders adopted the 2030 Climate and Energy Framework (European Commission, 2014) which was subsequently updated in 2018. This framework provides a long-term perspective beyond 2020 targets. The 2030 Climate and Energy Framework sets out three key targets for the year 2030:

- At least 40 % cuts in greenhouse gas emissions (from 1990 levels)
- At least 32 % share of renewable energy
- At least 32.5 % improvement in energy efficiency (from 1990 levels).

Further to this, the European Commission in 2016 published its 2030 emissions targets break down for each Member State. While the overall EU target is a reduction of 40 % on 1990 greenhouse gas emissions by 2030, every Member State negotiates an individual target. Ireland's target is to reduce its emissions by 30 % relative to its 2005 emissions.

2.3.3.3 A Roadmap for Moving to a Competitive Low Carbon Economy in 2050

Looking beyond 2020, in compliance with the EC Energy Roadmap 2050, an EU target of at least 27% has been indicated as the share of renewable energy consumed in the EU in 2030.

The Roadmap has informed national policy and has influenced the Climate Action Plan (2021) which sets out actions to reduce climate change towards 2050.

2.3.3.4 Recast Renewable Energy Directive (RED2)

In June 2018, an agreement was made in Europe between negotiators for the European Commission, the European Parliament and the European Council with regard to increasing renewable energy use in Europe.

The new regulatory framework includes a binding renewable energy target for the EU for 2030 of 32% with an upwards revision clause by 2023. This agreement will help the EU meet The Paris Agreement goals. In terms of renewable energy production, the Paris Agreement has achieved:

- A new, binding EU renewable energy target of 32% by 2030, including a review clause by 2023 for an upward revision of the EU level target;
- Improved design and stability of renewable energy support schemes.

2.3.3.5 European Green Deal (December, 2019)

The European Green Deal is a growth strategy for the EU which aims to transform the EU into a fair and prosperous society, improving quality of life with modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. The EU aims to do this by becoming climate-neutral by 2050.

The EU aims to increase the greenhouse gas emission reductions targets for 2030 to at least 50% and towards 55%, compared to 1990 levels, in order to achieve net-zero greenhouse gas emissions by 2050. A key principle for achieving this will be to develop an energy sector based largely on renewable resources.

2.3.3.6 EU Strategy for Offshore Renewable Energy

In July 2020, the EU launched a roadmap for its Strategy for Offshore Renewable Energy. The aim of the roadmap was to inform citizens and stakeholders of the EU's approach to this strategy in order to allow them to provide feedback and to participate in consultation activities.

This roadmap for the Strategy for Offshore Renewable Energy also highlighted the EU response to the COVID-19 pandemic with regards to offshore renewable energy.

“As Europe deals with the effects of COVID-19 it is crucial to avoid significant delays in offshore renewables investment, as this sector can also ensure the recovery leads to sustainable growth.”

The aim of the strategy is to ensure that offshore renewable energy can help reach the EU's ambitious energy and climate targets. The strategy assesses the EU's potential contribution to the offshore renewable energy sector. The strategy is to support the long-term sustainable development of this sector. The European Commission estimates between 240 and 450 GW of offshore wind power is needed by 2050 to keep temperature rise below 1.5°C. The Strategy proposes to increase Europe's offshore wind capacity from its current level of 12 GW to at least 60 GW by 2030 and to 300 GW by 2050.

2.3.3.7 EC REPowerEU Plan

In May 2022 the European Commission presented its response to the hardships and global energy market disruption caused by Russia's invasions of Ukraine. The EC outlined their objectives to *“ending the EU's dependence on Russian fossil fuels”* and *“tackling the climate crisis”*. The measures in the REPowerEU Plan seek to phase out Europe's dependency on Russian fossil fuels through *“energy savings, diversification of energy supplies, and accelerated roll-out of renewable energy”*.

It recognises that a significant *“scaling-up and speeding-up of renewable energy”* will accelerate EU energy independence and assist in the green transition. The European Commission proposes to *“increase the headline 2030 target for renewables from 40% to 45%”* under the 'Fit for 55' package of European Green Deal legislation. This increased ambition recognises the need to *“tackle slow and complex permitting for major renewable projects”*, and a targeted amendment to the Renewable Energy Directive to recognise renewable energy as of overriding public interest. The REPowerEU Plan continues to be discussed by The European Commission.



2.3.4 National Policies

National energy and climate policy is derived from the overarching European policy which aims to unify the European Union in energy and climate goals. The following section sets out the relevant national policies which will influence Ireland's development in the coming decades with respect to energy production, carbon neutrality and climate change mitigation.

2.3.4.1 Climate Action and Low Carbon Development (Amendment) Act 2021

The Climate Action and Low Carbon Development (Amendment) Act 2021, signed into law 23rd July 2021, is an Act to provide for the approval of plans by the Irish Government in relation to climate change for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by the end of the year 2050.

This Act establishes a legally binding framework with clear targets and commitments set in law and will ensure the necessary structures and processes are embedded on a statutory basis to ensure we achieve our national, EU and international climate goals and obligations in the near and long term.

The Act embeds the process of carbon budgeting into law. The Government is required to adopt a series of economy-wide five-year carbon budgets, including sectoral targets for each relevant sector, on a rolling 15-year basis, starting in 2021. This includes a provision for the first two five-year carbon budgets to equate to a total reduction of 51% emissions over the period to 2030, in line with the Programme for Government which commits to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieving net zero emissions by 2050. This Act will drive implementation of a suite of policies to help achieve this goal.

The Act also requires that all Local Authorities prepare individual Climate Action Plans to include both mitigation and adaptation measures, representing a mandate for Local Authorities to adapt to climate change.

2.3.4.2 Climate Action Plan (2021)

The Government published a Climate Action Plan (CAP) in June 2019. The CAP resulted from the Irish Government declaring a climate and biodiversity emergency on 9th May 2019. The CAP identifies how Ireland will achieve its 2030 targets for carbon emissions throughout various sectors with a number of actions. The CAP is fundamental in implementing the Climate Action and Low Carbon Development (Amendment) Act 2021. A new updated CAP was published in November 2021 which updates the targets for renewable energy by 2030 from the previous 70% to now 80% target. Similar to the 2019 CAP, the target is to be achieved by providing at least 5 GW of offshore wind energy by 2030.

To achieve this target, the 2021 CAP deems it necessary to “Finalise design and rollout of dedicated offshore RESS auction” (Action 122) and to “Develop a clear Offshore Renewable Energy Grid Connection Policy” (Action 118).

2.3.4.3 National Energy and Climate Plan 2021 – 2030

Ireland’s National Energy and Climate Plan (NECP) was first submitted to the European Commission on the 31st December 2018. It outlines Ireland’s energy and climate policies in detail. The NECP is a consolidated plan which brings together energy and climate planning into a single process for the first time. The NECP 2021 – 2030 was updated in June 2021. The 2021 publication was prepared to incorporate all planned policies and measures that were identified up to the end of 2019 and which collectively target the delivery of a 30 % reduction by 2030 in greenhouse gas emissions from 2005 levels.

Under the Programme for Government: Our Shared Future, Ireland is committed to achieving a 7% annual average reduction in greenhouse gas emissions between 2021 and 2030. The NECP was drafted in line with the current EU effort-sharing approach, before the Government committed to this higher level of ambition, and therefore does not reflect this higher commitment. Ireland is currently developing those policies and measures and intends to integrate the revision of the NECP into the process which will be required for increasing the overall EU contribution under The Paris Agreement.

In terms of offshore wind, the NECP states *“Ireland is targeting at least 3.5 GW of offshore renewable energy”*. It also states, *“This will be delivered in a competitive framework of auctions and corporate contracting with a renewed focus on community and citizen participation.”*

The NECP identifies three phases to developing offshore wind in Ireland:

- Phase 1, which will take place in the first half of the NECP’s timeframe, includes early projects, as well as the development of a consenting regime for offshore wind;
- Phase 2 focuses on achieving the 2030 target of at least 3.5GW of offshore wind, moving towards full decarbonisation; and
- Phase 3 looks beyond 2030, at longer-term options.

The NECP also highlights that the main focus area for fixed bottom offshore wind development in Ireland up to 2030 will be *“the Irish Sea East coast due to the relatively favourable sea depth and wave conditions, the more developed and robust onshore transmission system and the close location to big electricity demand growth centres”*

2.3.4.4 Project Ireland 2040: National Development Plan 2018 – 2027

The National Development Plan 2018-2027 (NDP) published in February 2018, in tandem with the National Planning Framework (NPF), seeks to drive Ireland’s long term economic, environmental and social progress over the next decade, in accordance with the spatial planning context of the NPF.



The key role of the NDP is to set out the updated configuration for public capital investment over the next 10 years in order to achieve the National Strategic Outcomes as set out within the NPF.

The NDP outlines a number of key energy initiatives, which set out to diversify our energy resources, and to assist in the transition towards a decarbonised society.

The NDP further emphasises National Strategic Outcome 8: Transition to Sustainable Energy, noting that:

“Ireland’s energy system requires a radical transformation in order to achieve its 2030 and 2050 energy and climate objectives. This means that how we generate energy and how we use it, has to fundamentally change. This change is already underway with the increasing share of renewables in our energy mix and the progress we are making on energy efficiency.

Investment in renewable energy sources, ongoing capacity renewal, and future technology affords Ireland the opportunity to comprehensively decarbonise our energy generation. By 2030, peat and coal will no longer have a role in electricity generation in Ireland. The use of peat will be progressively eliminated by 2030 by converting peat power plants to more sustainable low-carbon technologies.”

2.3.4.5 National Marine Planning Framework

In May 2021, the Government published Ireland’s first national framework for managing marine activities, the National Marine Planning Framework (NMPF). The NMPF is Ireland's first plan for more sustainable, effective management of marine activities and will inform the Government's objectives and priorities.

The objective of the Framework is to provide for a more strategic, plan-led and efficient use of marine resources. The NMPF supports the establishment of Ireland as a world leader in offshore renewable energy deployment, highlighting the importance of offshore renewable energy in Ireland’s decarbonisation journey.

The NMPF outlines a number of policies in relation to offshore renewable energy (ORE), including:

ORE Policy 1 *“Proposals that assist the State in meeting the Government’s offshore renewable energy targets, including the target of achieving 5GW of capacity in offshore wind by 2030 and proposals that maximise the long-term shift from use of fossil fuels to renewable electricity energy, in line with decarbonisation targets, should be supported....”.*

ORE Policy 11 *“Where appropriate, proposals that enable the provision of emerging renewable energy technologies and associated supply chains will be supported”*

ORE Policy 10 *“Opportunities for land-based, coastal infrastructure that is critical to and supports development of ORE should be prioritised in plans and policies, where possible”.*

In addition to the above policies The Project will also need to comply with other relevant planning and environmental policies contained in the NMPF which will inform the scope of the EIAR.

2.3.4.6 Offshore Renewable Energy Development Plan

In 2014, the Government published the Offshore Renewable Energy Development Plan (OREDPP). The OREDPP sets out key principles, policy actions and enablers for delivery of Ireland's significant potential for offshore renewable energy.

The OREDPP provides a framework for the sustainable development of Ireland's offshore renewable energy resources. The OREDPP identifies opportunity for the following:

- The sustainable development of Ireland's abundant offshore renewable energy resources;
- To increase indigenous production of renewable electricity;
- To contribute to reductions in our greenhouse gas emissions;
- To improve the security of our energy supply; and
- To create jobs in the green economy.

Looking towards 2030 and 2050, the OREDPP sets out goals which will require the expansion of renewable generation including offshore wind. The OREDPP actions include:

“Develop the Supply Chain for the Offshore Renewable Energy Industry in Ireland ... export renewable electricity which could bring potentially significant employment creation opportunities. In addition to construction, and operations and maintenance jobs, the supply chain for wind generation will be galvanised as such projects are likely to form a significant part of the initial export activity.”

“Ensure Appropriate Infrastructure Development: The development of offshore renewable energy is critically dependent on the development of enabling infrastructure at a number of points in its value chain, including grid and port facilities.”

It should be noted that OREDP II is currently being developed by the Department of the Environment, Climate and Communications and is expected to be available for consultation during 2022.

2.3.5 Regional Policies

National policies are translated into regional and local policies. This section focuses on the Regional Policies relevant to The Project.

2.3.5.1 Regional Spatial and Economic Strategy for the Eastern and Midlands Region 2019 – 2031

The Regional Spatial and Economic Strategy for the Eastern and Midlands Region 2019-2031 (RSES) is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives. At this strategic level, it provides a framework for investment to better manage spatial planning and economic development to sustainably grow the Eastern and Midlands Region to 2031 and beyond.

The Eastern and Midland Region covers twelve Counties which include Longford, Westmeath, Offaly, Laois, Louth, Meath, Kildare, **Wicklow**, Fingal, South Dublin and Dún Laoghaire-Rathdown County Councils and Dublin City Council. The Strategy establishes a broad framework for development and the way in which the Region’s society, environment, economy and the use of land should evolve.

The policies in the Strategy are structured under Regional Policy Objectives (RPOs). Those RPOs of potential relevance to Shelmalere Offshore Wind Farm includes:

RPO 7.43 – *“Climate Action Regional Offices and local authorities should consider the identification of critical infrastructure within their functional areas, and particularly of the interdependencies between different types of sectoral infrastructure, as a first step in ‘future-proofing’ services and to help to inform longer term adaptation planning and investment priorities.”*

RPO 10.24 – *“Support the sustainable development of Ireland’s offshore renewable energy resources in accordance with the Department of Communications, Energy and Natural Resources ‘Offshore Renewable Energy Development Plan’ and any successor thereof including any associated domestic and international grid connection enhancements.”*

2.3.5.2 Regional Spatial and Economic Strategy for the Southern Region 2019 – 2031

Regional Spatial and Economic Strategy for the Southern Region 2019 – 2031 (RSES) covers nine counties which include Clare, Limerick, Kerry, Cork, Tipperary, Kilkenny, **Waterford**, Carlow and **Wexford**. Those RPOs contained in the RSES and of potential relevance to Shelmalere Offshore Wind Farm include:

RPO 95 - *“It is an objective to support implementation of the National Renewable Energy Action Plan (NREAP), and the Offshore Renewable Energy Plan and the implementation of mitigation measures outlined in their respective SEA and AA and leverage the Region as a leader and innovator in sustainable renewable energy generation.”*

RPO 99 – *“It is an objective to support the sustainable development of renewable wind energy (on shore and offshore) at appropriate locations and related grid infrastructure in the Region in compliance with national Wind Energy Guidelines.”*

2.3.6 Local Policy

The Potential Onshore Infrastructure Zone is contained within counties Wexford, Waterford and Wicklow. The Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone are located off the coasts of counties Wicklow and Wexford. This section details the relevant local policies contained in County Development Plans that will influence the preparation of the future EIAR.

2.3.6.1 Wicklow County Development Plan (2016 – 2022)

The Wicklow County Development Plan 2016 – 2022 (Wicklow CDP) sets the overall strategy for planning and sustainable development within the administrative boundaries of County Wicklow. The Wicklow CDP, through the policies and objectives contained therein, provides the direction for the future development of County Wicklow. The Council are currently in the process of drafting the new Wicklow County Development Plan 2022-2029.

There are a number of objectives in the Development Plan which supports the development of offshore wind energy projects including:

Objective CCE7: *“To facilitate the development of offshore wind energy projects insofar as onshore facilities such as substations/connections to the grid may be required.”*

Objective CCE8: *“To support community-based wind energy projects.”*

Objective CCE17: *“To support the development and expansion of the electricity transmission and distribution grid, including the development of new lines, pylons and substations as required.”*

The Draft Wicklow County Development plan 2022-2028 is currently being prepared and is likely to be the Plan in place when preparing the EIAR for The Project. The Draft Wicklow County Development Plan 2021 – 2027 contain a number of policies which are supportive of offshore wind energy projects and onshore electrical infrastructure. Relevant Policies include the following:

Objective CPO 16.2: *“To facilitate and support the development of offshore wind energy projects insofar as onshore facilities such as substations/connections to the grid may be required and the development of Operations and Maintenance (O&M) bases as may be required”.*

Objective CPO 16.3: *“To support community-based wind energy projects”*

Objective CPO 16.19: *“To support and facilitate the development of landing locations for offshore generated wind energy and for any cross-channel power interconnectors”.*

Objective CPO 16.20: *“Proposals for the undergrounding of cables should demonstrate that environmental impacts including the following are minimised:*

- *Habitat loss as a result of removal of field boundaries and hedgerows by topsoil stripping*
- *Short to medium term impacts on the landscape where, for example, hedgerows are encountered;*
- *Impacts on underground archaeology;*
- *Impacts on soil structure and drainage; and*
- *Impacts on surface waters as a result of sedimentation”.*

In addition to the above policies, The Project will also need to comply with other relevant planning and environmental policies contained in the current and draft Development Plans which will inform the scope of the EIAR.

2.3.6.2 Wexford County Development Plan 2013 - 2019 (as extended)

The Wexford County Development Plan includes a number of policies which support the development of renewable energy projects including:

Objective WE10: *“Facilitate onshore support infrastructure including landing locations for land-sea connections for appropriate offshore development, subject to relevant policy, legislation, environmental, landscape, amenity, seascape and technical considerations and subject to the development management standards”.*

Objective EN07: *“To encourage and favourably consider proposals for renewable energy developments and ancillary facilities in order to meet national, regional and county renewable energy targets and to facilitate a reduction in CO2 emissions and the promotion of a low carbon economy, subject to compliance with development management standards in Chapter 18 and compliance with Article 6 of the Habitats Directive.”*

Objective EN04: *“To facilitate the provision of and improvements to energy networks in principle, provided that it can be demonstrated that:*

- *The development is required in order to facilitate the provision or retention of significant economic or social infrastructure*
- *The route proposed has been identified with due consideration for social, environmental and cultural impacts*
- *The design is such that will achieve least environmental impact consistent with not incurring excessive cost*
- *Where impacts are inevitable mitigation features have been included*
- *Proposals for energy infrastructure should be assessed in accordance with the requirements of Article 6 of the Habitats Directive.”*

The Council are currently in the process of drafting the new Wexford County Development Plan 2022-2028. There are a number of main policies within the Draft Development Plan supporting the development of for offshore wind energy projects and onshore electrical cable infrastructure including:

Objective PT01: *“To facilitate the provision of and improvements to energy networks in principle, provided that it can be demonstrated that:*

- *The development is required in order to facilitate the provision or retention of significant economic or social infrastructure.*
- *The route proposed has been identified with due consideration for social, environmental and cultural impacts.*
- *The design is such that will achieve least environmental impact consistent with not incurring excessive cost.*
- *Where impacts are inevitable mitigation features have been included.*
- *Proposals for energy infrastructure should be assessed in accordance with the requirements of Article 6 of the Habitats Directive”.*

Objective CZM14: *“To support development in the coastal zone and maritime area that will facilitate a transition to a low carbon economy such as carbon capture and storage and renewable energy developments include offshore tidal and wind energy subject to compliance Objective CZM44 and the proper planning and sustainable development of these areas”.*

Objective CZM49: *“To support, within the context of the Offshore Renewable Energy Development Plan (OREDPA) and its successors, the development of Ireland’s offshore renewable energy potential, including domestic and internal grid connectivity enhancements subject to compliance with the objectives of this County Development Plan, the protection of the scenic amenity and coastal views associated with the coastal areas and marine area which area crucial to the tourism industry, the protection of the amenity, livelihood and cultural well-being of coastal communities, the protection of coastal features, habitat and species and compliance the Habitats Directive and normal planning and environmental criteria and proper planning and sustainable development”.*

In addition to the above policies, The Project will also need to comply with other relevant planning and environmental policies contained in the current and draft Development Plans which will inform the scope of the EIAR.

2.3.6.3 Waterford City and County Development Plan 2011 – 2017 (as extended)

The Waterford County Development Plan 2011 – 2017 (as extended) includes a number of policies which support the development of renewable energy policies including:

Policy Objective INF 26: *“To facilitate improvements in energy infrastructure and encourage the expansion of the infrastructure at appropriate locations within the County.”*

Waterford County Council are currently in the process of drafting the new Waterford County Development Plan 2022-2028. There are a number of main policies within the Draft Development plan supporting the development of for offshore wind energy projects and cables including:

Policy Objective L03: Landscape and Seascape Character Assessment: *“We will assess all proposals for development outside of our settlements in terms of the 2020 Landscape and Seascape Character Assessment (Appendix 8) and the associated sensitivity of the particular location. We will require a Landscape and Visual Impact Assessment (LVIA) for proposed developments with the potential to impact on significant landscape features within the City and County. Proposals for significant development (e.g. renewable energy projects, telecommunications and other infrastructure and the extractive industry) shall be accompanied by a LVIA”.*

Policy Objective UTL 13: *“It is the policy of Waterford City and County Council to promote and facilitate a culture of adopting energy efficiency/ renewable energy technologies and energy conservation and seek to reduce dependency on fossil fuels thereby enhancing the environmental, social and economic benefits to Waterford City and County.*

This will be achieved by:

- *Facilitating and encouraging, where appropriate, proposals for renewable energy generation, transmission and distribution and ancillary support infrastructure facilities in accordance with the Waterford Renewable Energy Strategy, the Waterford Landscape and Seascape Character Assessment undertaken to inform this Development Plan, and the National Wind Energy Guidelines, or any subsequent update/ review of these;*
- *Promote and encourage the use of renewable energy, including micro-generation among business, agriculture, education, health and other sectors;*
- *Promoting, encouraging, ensuring and facilitating community engagement, participation and implementation of/ in renewable energy projects;*
- *Implementing, including in the Council's own activities and in the provision of services/ works, the use and integration of low carbon, renewable energy infrastructure and technologies;*
- *Supporting appropriate options for, and provision of, low carbon and renewable energy technologies and facilities, including the development and provision of district heating (and/ or other low carbon heating technologies); anaerobic digestion and the extraction of energy and other resources from sewerage sludge.*
- *The preparation and implementation of a Climate Action Plan (including adaptation and mitigation measures) for Waterford".*

Objective UTL 19: Undergrounding Cables: *"Where undergrounding of cables is being pursued, proposals should demonstrate that environmental impacts including the following are minimised:*

- *Habitat loss as a result of removal of field boundaries and hedgerows (right of way preparation) followed by topsoil stripping (to ensure machinery does not destroy soil structure and drainage properties);*
- *Short to medium term impacts on the landscape where, for example, hedgerows are encountered;*
- *Impacts on underground archaeology;*
- *Impacts on soil structure and drainage; and*
- *Impacts on surface waters as a result of sedimentation.*

In addition to the above policies, The Project will also need to comply with other relevant planning and environmental policies contained in the current and draft Development Plans which will inform the scope of the EIAR.

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3 PROJECT DESCRIPTION

3.1 INTRODUCTION

The Project comprises both offshore and onshore elements. For the purposes of this EIAR Scoping Report, the boundary between the offshore and onshore elements is the High-Water Mark of mean or ordinary tides, shown as 'HWM' on Ordnance Survey mapping.

As detailed in Section 1.1.1 and 1.3 of Chapter 1 of this EIAR Scoping Report, three key infrastructure zones have been identified for the purposes of discussion in this EIAR Scoping Report. These are the:

- Potential Turbine Array Infrastructure Zone;
- Potential Export Cable Corridor Infrastructure Zone; and
- Potential Onshore Infrastructure Zone.

The Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone together occupy an area of approximately 637 km² and are located off the coast of counties Wexford and Wicklow. The extents of these zones are shown in Figure 1-1.

The Potential Turbine Array Infrastructure Zone is located entirely within 12 nautical miles of the coast as shown in Figure 1-1. The zone boundary is 4.9 nm from the coast at its closest point to land (HWM).

The Potential Onshore Infrastructure Zone is defined by the Potential Export Cable Corridor Infrastructure Zone and the possible Points of Connection (PoC) to the national grid at either Lodgewood, Arklow or Great Island or at a point along an existing High Voltage (HV) overhead line within the zone. The Potential Onshore Infrastructure Zone occupies an area of approximately 1,043 km².

3.2 EXPECTED CONSTRUCTION PROGRAMME

The expected construction programme for The Project would last approximately three to four years in total, with the likely sequencing of this programme set out indicatively in Table 3-1.

Table 3-1 Indicative Construction Programme

Activity	Year 1				Year 2				Year 3				Year 4			
	Q1 ³	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Onshore Project Substation works																
Horizontal Directional Drill (HDD) under roads																
Onshore export cable installation																
Transition Joint Bay																
HDD at Cable Landfall																
Offshore export cable installation																
Inter-Array cable installation																
Offshore Substation works																
Wind Turbine Generator (WTG) foundation installation																
WTG installation and commissioning																
Energisation of the Wind Farm																

³ Quarter of calendar year (e.g. 3-month period from beginning of January to end of March = Q1).

3.3 DESIGN ITERATION

The design will be developed in parallel with the EIA process and will therefore evolve as the EIA progresses. The design will be influenced by commercial factors, engineering, community and stakeholder consultation and environmental factors. Given the scale of The Project, and offshore wind farm projects in general, the preliminary planning design may include some flexibility with regard to design parameters. The EIA and NIS that will be prepared for The Project will comply with the European Commission's EIA Directive and Habitats Directive and national legislation and guidance at the time of submission of a Development Permission application. The approach to preliminary planning design will ensure that the design allows the Competent Authority to undertake an Appropriate Assessment and Environmental Impact Assessment of The Project.

3.4 PROPOSED OFFSHORE INFRASTRUCTURE

3.4.1 Overview

The offshore elements of The Project will comprise the following infrastructure:

- Nominally 67 WTG and supporting tower structures;
- An equivalent number of WTG foundations with associated support and access structures;
- Offshore platform to support offshore substation and an accommodation unit;
- Subsea inter and intra-array electricity cables (between individual WTGs and the proposed offshore substations);
- Nominally three subsea export cables (from the offshore substation(s) to Cable Landfall); and
- Associated Cable Landfall(s).

Further details of each of these offshore elements are provided in the following sections.

3.4.2 Wind Turbine Generators (WTGs)

There is potential for around 67 WTGs to be installed within the Potential Turbine Array Infrastructure Zone, comprising the following components which are also illustrated in Figure 3-1:

- Steel tower (supported and fixed to the seabed by means of a foundation – see Section 3.3.3);
- Transition piece (interface between tower and foundation);
- Nacelle and rotor (the nacelle is the part of the WTG containing the generating components, i.e. generator, gearbox, drive train, and brake assembly: the rotor connects the blades to the generator and/or gearbox);
- Blades (the part of the WTG that harness wind energy and drive the rotor).

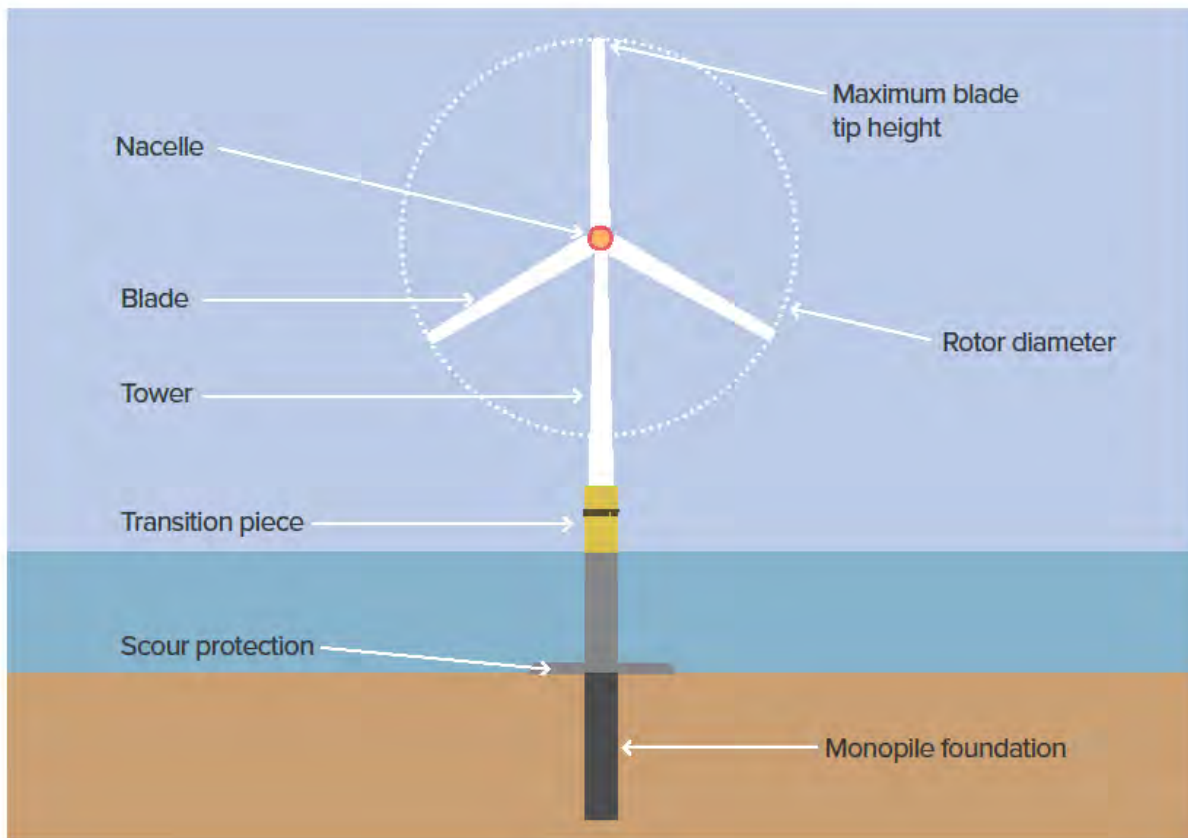


Figure 3-1 Key components of a typical WTG

The exact number of WTGs installed will depend on a number of factors that will be fully considered when making any final decision. These factors include the following:

- The area within the Potential Turbine Array Infrastructure Zone that is considered the most suitable, in terms of seabed conditions for development, following completion of detailed surveys;
- Key environmental constraints, for example, visual receptors, seabed habitats, shipping traffic;
- Discussions and views of stakeholders, including, but not limited to the public, fishers, navigation bodies and technical consultees;
- The final WTG size/capacity selected, which will be based on both the review of seabed conditions and market availability of WTGs.

Based on the offshore WTGs that are expected to be available to the market at the time Shelmalere Offshore Wind Farm would be entering its Construction Phase, it has been assumed that a 20 MW WTG may be the largest possible potential WTG considered for Shelmalere Offshore Wind Farm.

The WTGs would most likely be installed in the following sequence:

- foundation;
- transition piece;
- tower;
- nacelle;
- rotor; and
- blades.

Alternatively, sections of the structures may be prefabricated at a suitable shoreport/landside facility, prior to being transferred to the installation location.

The WTGs may also be fitted with appropriate aviation and navigation markings and lighting in accordance with relevant guidance and legislation and in consultation with the relevant stakeholders.

Table 3-2 Indicative Wind Turbine Generator parameters

Parameter	15 MW	18 MW	20 MW
Estimated number WTGs installed	67	56	50
Estimated rotor diameter (m)	236	265.4	285
Estimated rotor swept area per turbine (m ²)	43,750	55,325	63,800

3.4.3 WTG Foundations

The Project plans to use WTGs mounted on fixed bottom foundations. The final foundation solutions for which Development Consent will be sought shall be selected following detailed surveys as part of the EIA assessments and preliminary design development. There may be a requirement to use a multiple option solutions depending on the site-specific conditions and final layout design. Foundation type options are illustrated in Figure 3-2 and described in detail in the following sections of this EIA Scoping Report.

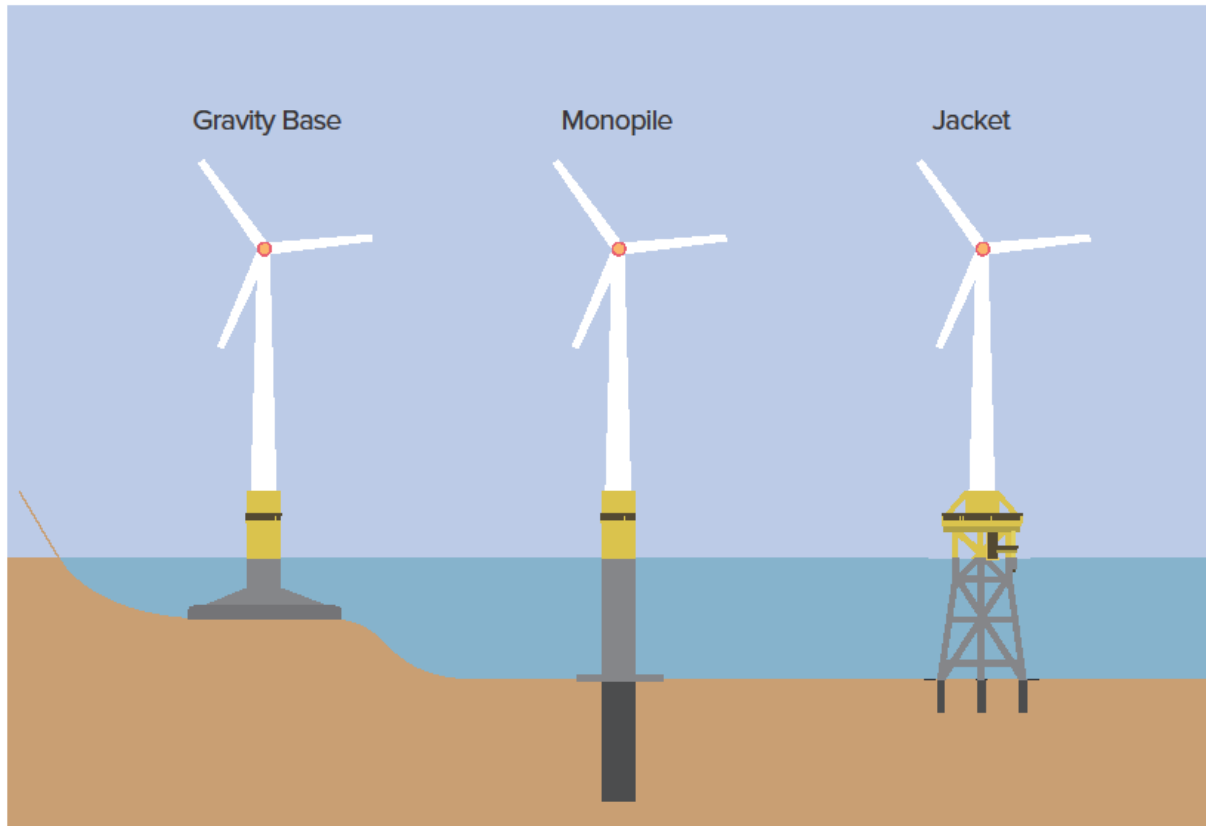


Figure 3-2 Examples of Fixed Wind Turbine Generator Foundation Options

3.4.3.1 Monopile Foundations

Monopile foundations are comprised of a single pile that is driven into the seabed and are typically used in water depths up to 40 m, though recent technological advances within the industry have shown they may be able to be deployed at greater depths. The exact dimensions of the monopiles would depend on the size of the WTGs deployed and also on site-specific ground conditions.

WTG installation methods will depend on the seabed conditions and may include percussive piling and/or vibro piling, undertaken via industry-standard vessels and plant. In certain locations, ground conditions may necessitate drilling prior to piling. This would be undertaken via industry-standard drilling rigs inserted within the pile itself. Any drill arisings produced via this activity would most likely be deposited *in situ* within the Potential Turbine Array Infrastructure Zone, in close proximity to the pile location.

Scour protection may also likely be required at some foundation locations, dependent on the local hydrodynamic regime. A range of possible options will be considered for scour protection including rock placement; frond mats; concrete mattresses; or the use of integrated skirts / aprons.

3.4.3.2 Gravity Base Foundations

Gravity Base foundations are feasible in water depths of up to circa 70 m and rely on their own weight and size to compensate for the loads from the WTGs. Gravity Base foundations are usually comprised of concrete, or steel, or both concrete and steel.

The main drivers for the use of Gravity Base foundations are general wind and wave loading, water depths, seabed nature and flatness, need for dredging and/or levelling, environmental considerations, including stakeholder concerns and availability of port infrastructure and cost of construction and/or conversion.

The exact dimensions of a Gravity Base foundation would depend on the size of the WTGs deployed and also on site-specific ground conditions. Some degree of seabed preparation is also often required prior to the installation of Gravity Base foundations. This would include seabed levelling via dredging.

Gravity Base foundations often require significant amounts of scour protection which may take the form of rock armour; rock filled bags; pre-cast concrete block mattresses; concrete and grout filled bags; sand bags; and/or glass fibre reinforced polymer.

3.4.3.3 Suction Bucket Foundations

Suction buckets, also referred to as suction anchors or suction caissons, are a less widely deployed type of pile foundation system. However, their use has been growing steadily in the offshore industry, particularly for soft soil in deep water. Suction anchors are cylindrical foundation structures usually made of steel with a large diameter opening at the base and closed at the top. The top contains a vent valve which allows water evacuation from the caisson during installation. If self-weight penetration is insufficient, suction caissons are installed using a pump attached to the top of the lid that creates a differential pressure (within the cylindrical foundation compartment to achieve required penetration depth.

The exact dimensions of any suction buckets would depend on the size of the WTGs deployed and also site-specific ground conditions. Some degree of seabed preparation is also often required prior to the installation suction bucket foundations. This would include seabed levelling via dredging.

Suction bucket foundations also often require significant amounts of scour protection which may take the form of rock armour; rock filled bags; pre-cast concrete block mattresses; concrete and grout filled bags; sandbags; and/or glass fibre reinforced polymer.

3.4.3.4 Jacket Foundations

Jacket foundations are structures that are composed of three or four legs, cross linked in a lattice formation, typically made of steel. Each leg is secured to the seabed through either a pile and grouted or a suction caisson, depending on the ground conditions. Jacket foundation substructures can normally be deployed in water depths up to 60 m.

The exact dimensions of a jacket foundation would depend on the size of the WTGs deployed and also on the site-specific ground conditions.

Similar to monopiles, installation methods for jacket foundations depend on the seabed conditions and may include percussive piling and/or vibro piling. At certain locations, ground conditions may require drilling prior to piling. This would be undertaken via industry-standard drilling rigs inserted within the pile itself. Any drill arisings produced via this activity would most likely be deposited *in situ* within the OWF array study area, in close proximity to the pile location.

Scour protection would also likely be required at some foundation locations, dependent on the local wave/tidal regime. A range of possible options will be considered for scour protection including rock placement; frond mats; concrete mattresses; or the use of integrated skirts / aprons.

3.4.4 Offshore Substation

Offshore substations (OSS) provide a centralised connection point for the inter-array cable circuits and connects to an export cable(s) that takes generated electricity onshore. The offshore substation houses transformers, associated electrical equipment and potentially accommodation facilities, depending on the requirements to be specified by EirGrid.

OSSs consist of two main components: (1) a substructure foundation; and (2) a topside – see Figure 3-3.

The substructure will likely be a large jacket structure which will be attached to the seabed either through either a pile and grouted, suction caisson or GBS, depending on the ground conditions. The topside will house electrical equipment and supporting functions, such as storage, communications and accommodation facilities. The OSS will comply with approved standards from EirGrid at the time of design, such as emergency accommodation and heli-pads.



Currently, the OSS requirements will be guided by “ODS-GFS-00-001-R1 Functional Specification Offshore Substation General Requirements” (EirGrid, 2018)⁴ and shall be designed and installed using indoor Gas Insulated Switchgear (GIS) technology in line with “Functional Specification for 110/220/400kV Gas Insulated Switchgear (GIS) XDS-GFS25-001” (EirGrid, 2019)⁵. New Offshore Functional Specifications are expected to be released by EirGrid during 2022 which will supersede these reference documents.

Nominally, two OSS platforms will be required for The Project. The OSSs would also be fitted with appropriate navigation markings and lights in accordance with relevant guidance and legislation, such as *The Marking of Man-Made Offshore Structures*. (IALA, 2021)⁶.

⁴ EirGrid, 2018. ODS-GFS-00-001-R1 Functional Specification Offshore Substation General Requirements (Rev R1, 2018) <https://www.eirgridgroup.com/site-files/library/EirGrid/ODS-GFS-00-001-R1-Offshore-Substation-Functional-Specification.pdf>

⁵ EirGrid, 2019. Functional Specification for 110/220/400kV Gas Insulated Switchgear (GIS) XDS-GFS25-001 (Rev R4, 2019) <https://www.eirgridgroup.com/site-files/library/EirGrid/1-GIS-Functional-Specification.pdf>

⁶ International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), 2021. Recommendation 0-139, The Marking of Man-Made Offshore Structures.

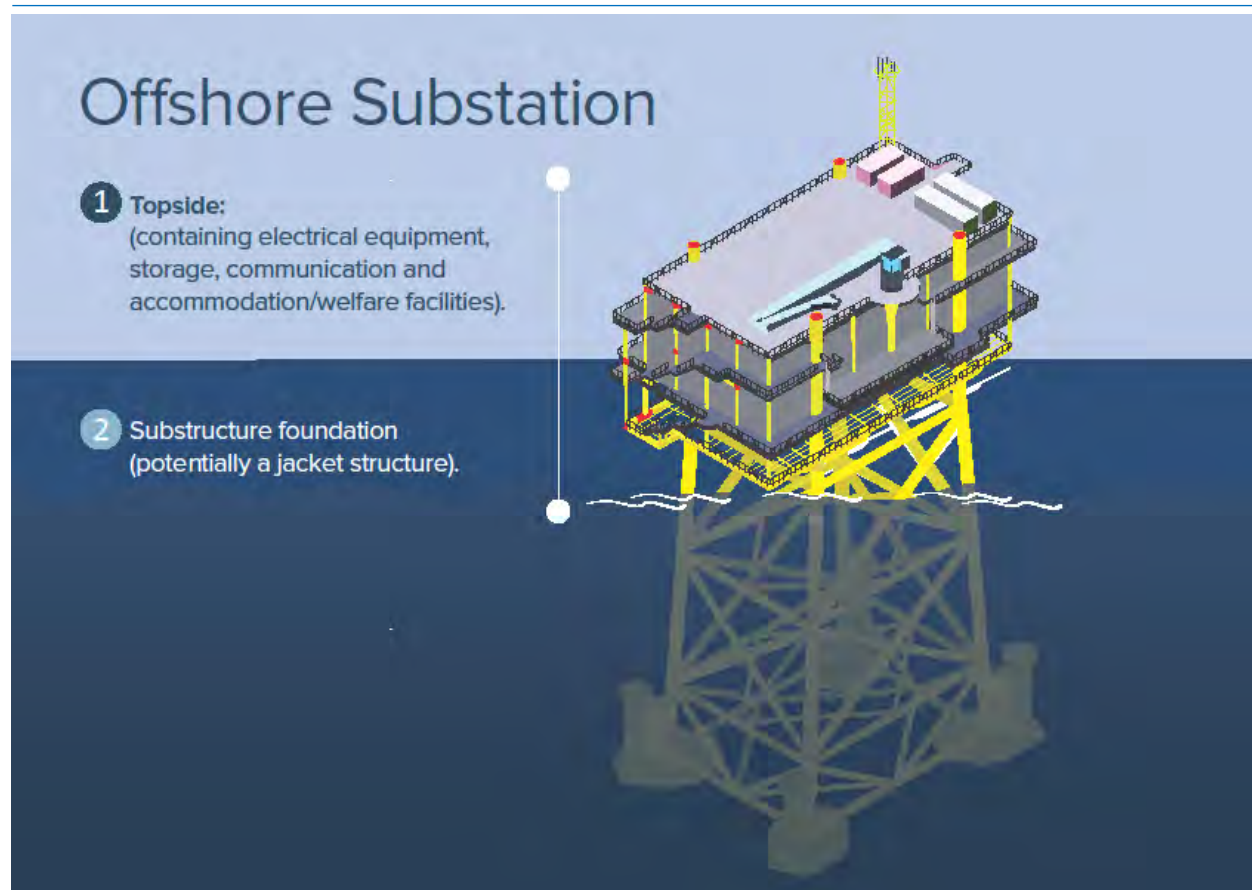


Figure 3-3 Illustrative Offshore Substation

3.4.5 Inter-Array Cables

Inter-array cables will be used to connect the WTGs together in a radial connection to form a string which is connected to the offshore substation platform. The inter-array cables are expected to be 66 kV or higher, with the voltage dependent on the capacity of the WTGs. The exact configuration and total length of inter-array cables will be developed via further design and engineering studies.

3.4.6 Export Cables

Nominally, three export circuits will be required to connect the offshore wind farm array to shore. Subsea cables are available in both single core (requiring three per circuit), and three core technologies (requiring one per circuit).

Using single core cables can export more power, but the installation is more challenging than for three-core cables. At present, the use of three-core cable is preferred, subject to further studies.

The export cables will consist nominally of three, three-core 220 kV subsea cables and be an estimated offshore length of 44 km. An example of the three-core export cable is shown in Figure 3-4.



Three-core cable with optic fibers,
lead sheath and wire armour

All cables will be installed using one, or a combination of techniques described as follows:

- **Ploughing:** The cable is simultaneously laid and buried. The cable plough lifts a section of the seabed deposit and places the cable below. The seabed deposit is then returned to its original position. In areas of very hard substrate, modifications to this technique may be used, including use of a rock cutter plough or vibrating share plough;
- **Trenching:** A trenching tool comprising a remotely operated vehicle (ROV) fitted with high pressure water jets is used to fluidise the seabed in a narrow trench in which the cable will be laid. The fluidised sediments settle back onto the seabed giving a degree of back-fill. Where stiff clay or rock is present a cutting attachment may be used which will cut a trench into the seabed whilst the cable is simultaneously laid; and
- **Jetting:** The cable is first laid on the seafloor. An ROV equipped with high pressure water jets will proceed along the cable route, fluidising the seabed around the cable, allowing the cable to be lowered into the trench. The fluidised sediment subsequently settles back onto the seabed.

Dependent on ground conditions, there may be a requirement to undertake seabed preparation prior to any cable installation works. This may include sandwave levelling via dredger in order to remove/reduce any slopes that may lead to cable free-spans during the installation process.

Prior to cable installation, Pre-Lay Grapnel Runs (PLGR) will be undertaken to clear the area of debris. Boulder clearance may also be required if the final cable routes cannot avoid areas with high densities of boulders. Even though all efforts will be made to bury the cables to target burial depths, this may not be possible due to localised ground conditions. Therefore, there may also be a need for remedial cable protection to be deployed. This may take the form of rock placement, concrete and frond mattresses and/or rock bags at certain locations.

3.4.7 Cable Landfall (sub-tidal and intertidal zones)

Two potential options are proposed for installing the export cable(s) in the shallow sub-tidal/intertidal region so that they can be connected to the onshore cables within the Transition Joint Bay(s) (TJB).

- **Horizontal Directional Drilling (HDD):** HDD is a Cable Landfall solution that can reduce direct impacts on existing habitats. HDD is drilled from the acceptable point of cable emergence onshore to the point of safe cable exposure offshore. This is generally deep enough not to be exposed due to erosion or contribute to natural erosion rates in the Cable Landfall area. This operation requires a special drilling tool capable of drilling horizontally and with the flexibility to change height as it drills to gradually curve from the entry point to the eventual exit height.
- **Open Cut Trenching:** This methodology consists of creating a trench (usually via terrestrial and/or amphibious plant) in which the cable is laid and then buried. This can avoid unwanted cable displacement, keeping it out of the surf zone, hence reducing risk of damage. The operation is carried out with a cable plough which buries the cable into a trench as it travels. When the export cable is successfully landed, it can then be safely laid to the offshore site and the lead turbine.

3.4.8 Additional Infrastructure

In addition to the offshore infrastructure listed above, there may be a requirement for a range of additional infrastructure within the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone. These may include the following:

- Long-term metocean (FLiDAR) buoy;
- Long-term navigation buoys/lights and associated moorings.

3.5 PROPOSED ONSHORE INFRASTRUCTURE

The onshore infrastructure associated with Shelmalere Offshore Wind Farm includes the following key elements:

- Cable Landfall infrastructure
- Underground grid connection cabling and associated ancillary infrastructure
- Onshore Project Substation(s) and grid connection works
- Temporary construction compounds

An overview of the potential permanent onshore infrastructure associated with Shelmalere Offshore Wind Farm is presented in Figure 3-5 below.

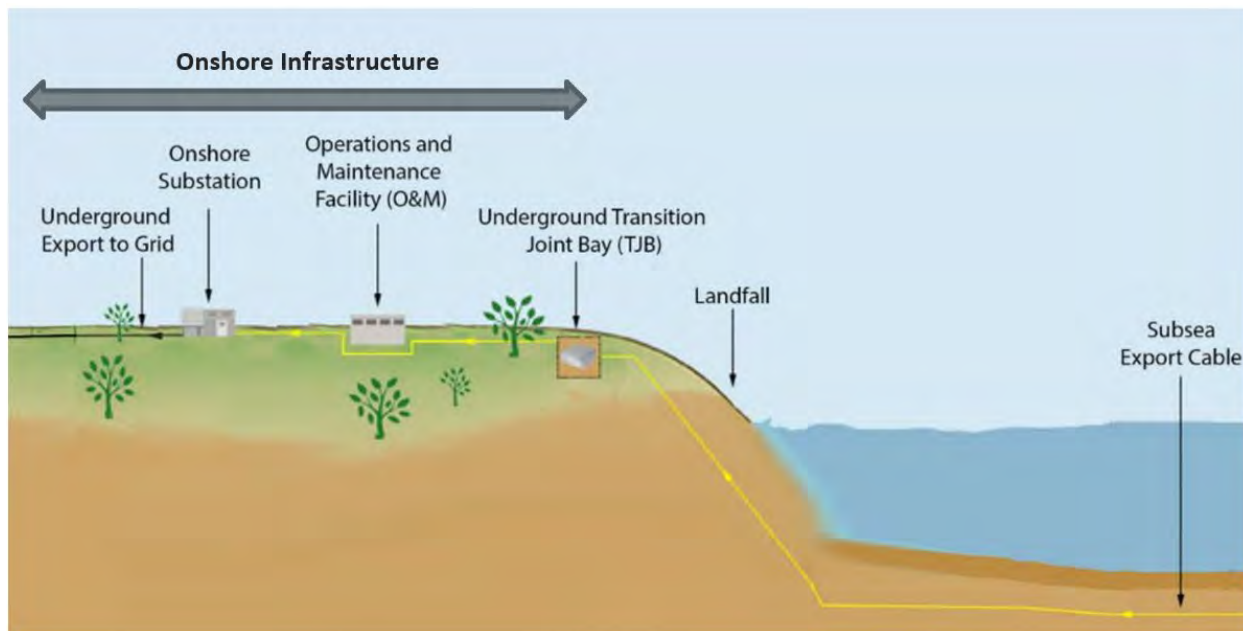


Figure 3-4 Overview of Onshore Infrastructure

3.5.1 Cable Landfall Infrastructure

Electrical cables carrying power from the OWF array shall be brought ashore using TJB's at one or more Cable Landfall location. The Cable Landfall location marks where the offshore cabling ends and the onshore underground grid connection cable begins, with each circuit containing three separate cables. Potential Cable Landfall areas will be contained within the Potential Export Cable Corridor Infrastructure Zone and Potential Onshore Infrastructure Zone.

At Cable Landfall locations, the subsea three-core cables are terminated in a TJB. This is a buried concrete chamber located where the offshore three-core subsea cables come onshore and are joined to the onshore single core underground cables. The subsea cables must be split out into their individual cables so they can be connected to the onshore cables. The jointing must be carried out in a controlled environment, requiring a purpose designed shed or tent to be placed temporarily on top of each TJB chamber. These will be removed once the onshore cables have been joined with the offshore cables.

A separate chamber is required for each cable. In the TJB, the fibre optic cores will also be spliced to a separate fibre optic cable which will run in a separate duct alongside the onshore underground grid

connection cable ducts. TJB's shall also include separate link box and communications chambers which may be located adjacent to the main joint bay chamber.

The TJBs will have removable covers which will be installed following the testing and commissioning of the grid connection. The chambers will then be covered over and buried.

After installation and reinstatement of the TJBs, the only visible above ground equipment will be manhole covers to allow access to the link boxes and the communication chambers. Figure 3-7 shows an example general arrangement of a TJB and temporary hard standing area to facilitate cable pulling for a 3-no. cable arrangement.

3.5.2 Underground Grid Connection Cabling

The onshore underground grid connection cabling shall commence at the TJB(s) located at the Cable Landfall location(s) where each offshore electricity export cable will be joined with the onshore underground grid connection cables for each electrical circuit.

The underground grid connection cabling will consist entirely of underground cable and shall be buried in trenches in a combination of public roads and private lands between the Cable Landfall location(s) and the existing grid transmission network.

Underground grid connection cabling works will involve the installation of ducting, joint bays and associated ancillary infrastructure. This will require movement of plant and construction materials, followed by excavation, laying of cables and subsequent reinstatement of trenches.

It is expected that for in-road installations, full and partial road closures will be put in place to facilitate underground grid connection cabling works along with appropriate traffic management.

Offshore HV cables are typically a three-core design, with three integrated phase conductors and optical fibre cable combined in a single armoured sheath arrangement. Onshore HV cables are typically single-core design with separately insulated power cables and optical fibre(s) running in individual ducts. Assuming a worst-case scenario of three offshore cables, up to nine onshore cables and up to three optical fibre cables would be required. Cables can be installed in flat formation or trefoil formation.

Figure 3-10 shows an indicative cable trench cross section for three 220 kV circuits within public roads. An approximate 10 m corridor width is expected for three circuits to meet current EirGrid Functional Specifications.

A 4 m separation distance is assumed between circuits for repair and maintenance, however the exact spacing will be agreed with EirGrid. New Offshore Functional Specifications are expected to be released

by EirGrid during 2022 which will provide further guidance regarding onshore underground grid connection cabling requirements. This guidance will inform the project design. Flat formation will be employed for cable joints and other locations such as utility crossings.

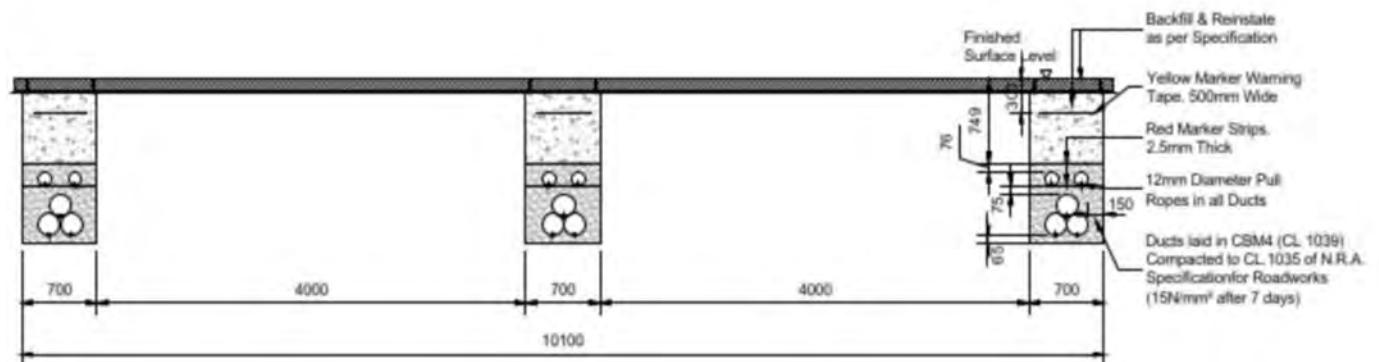


Figure 3-5 Three-Circuit Trench Configuration in Public Roads



Figure 3-6 Typical HV Cable Duct Installation in Public Road⁷

⁷ Source: EirGrid North Connacht 110kV Project Autumn 2021 Update Report: <https://www.eirgridgroup.com/site-files/library/EirGrid/North-Connacht-Brochure-Autumn-Update-2021.pdf>

In instances where an in-road solution is not possible, off-road options will be used. Figure 3-11 shows the cable cross section for three 220 kV circuits within third party lands. An approximately 40 m wide easement strip will be required for this arrangement. The majority of this space is required to facilitate construction vehicle access, joint bay installation, fencing boundaries and soil management prior to reinstatement.

An approximate 25 m wide permanent easement will be required following construction within which the underground grid connection cabling will be contained.

The underground cable may be required to traverse watercourses and other infrastructure. A suitable crossing method will be developed to minimise disruption and minimise negative environmental effect.

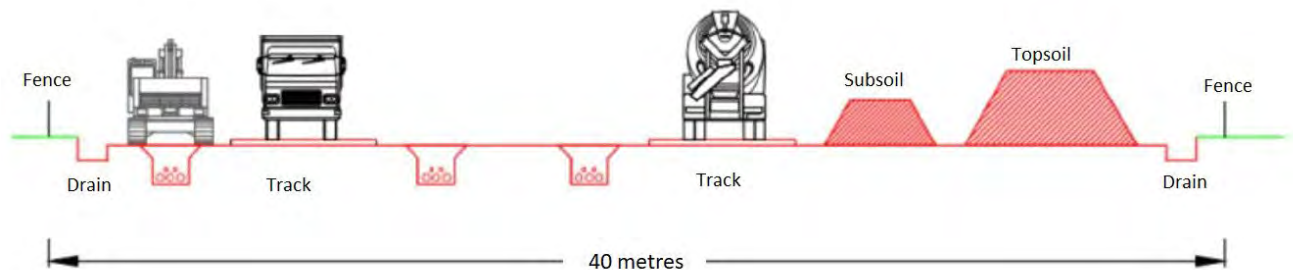


Figure 3-7 Off-Road Three-Circuit Trench Configuration

Joint bays are concrete chambers where individual lengths of cables are joined to form one continuous cable. A joint bay is constructed in a pit. Each joint bay is expected to measure up to approximately 15 m (L) x 3 m (W) x 3 m (D). The final joint bay design will conform to EirGrid Functional Specifications and electrical design study requirements. A reinforced concrete slab is laid in the bay to accommodate the jointing enclosure. The total number of joint bays is dependent on the total length of underground grid connection cable route, cable length per drum and the total number of circuits required for the final grid connection arrangement.

Suitable joint bay locations along the grid connection route will be identified and assessed as part of the EIAR. Figure 3-11 shows a standard EirGrid single circuit joint bay and cable installation works. Joint bays will indicatively be located at intervals of between 500 m and 2 km depending on the final electrical design requirements, cable routing constraints and cable length that can be accommodated on a single cable drum.



Figure 3-8 Typical HV Joint Bay and Cable Installation⁸

3.5.3 Onshore Project Substation and Grid Connection Works

An Onshore Project Substation(s) will be constructed within the Potential Onshore Infrastructure Zone to provide a connection point between the Cable Landfall infrastructure and the proposed PoC with the onshore transmission network. The exact location of the PoC to the onshore transmission network will be identified as part of the grid connection design which will be developed in consultation with EirGrid. The most likely PoC will be at either one of the three existing 220/110 kV network substations shown in Figure 1-1 at Lodgewood, Arklow and Great Island, or at a point along an existing HV overhead line within the Potential Onshore Infrastructure Zone in the form of a 'loop-in' connection arrangement.

The Onshore Project Substation shall conform to EirGrid Functional Specifications and shall use Air Insulated Switchgear or Gas Insulated Switchgear technology type. Additional electrical infrastructure for the Onshore Project Substation may be required in the case of a 'loop-in' connection to an existing overhead line in order to facilitate the safe connection of The Project to the grid. This additional equipment may be located within the Onshore Project Substation compound, or it may be necessary to place in a second substation location. This is subject to further design.

New Offshore Functional Specifications are expected to be released by EirGrid during 2022. These will provide further requirements for the Onshore Project Substation. Indicatively, the dimensions of the onshore OWF substation compound may be some 280 m x 175 m and will include control buildings and external electrical and ancillary infrastructure required to safely export the electricity generated from the OWF to the national grid. A typical Gas Insulated Switchgear substation compound layout configuration is presented in Figure 3-12 for a 1 GW project, with three incoming circuits. Ancillary equipment such as shunt reactors, harmonic filters and Static Synchronous Compensators (Statcoms) are also shown. The footprint of this equipment may be reduced at a later stage upon engagement with relevant equipment manufacturers and confirmation of EirGrid's Functional Specifications.

⁸ Source: EirGrid North Connacht 110kV Project Autumn 2021 Update Report: <https://www.eirgridgroup.com/site-files/library/EirGrid/North-Connacht-Brochure-Autumn-Update-2021.pdf>



Examples of electrical and ancillary infrastructure associated with the Onshore Project Substation compound include:

- Cable/Line disconnects and circuit breakers;
- Current and voltage transformers;
- Busbars;
- Power transformers;
- Power quality compensation equipment;
- Control Buildings;
- Earth Grids;
- Lightning protection and telecommunications masts;
- Steel gantries and cable chairs;
- Concrete plinths and bunds;
- External lighting;
- Security cameras;
- Palisade fencing and gates;
- Access and drainage infrastructure;
- Landscaping.

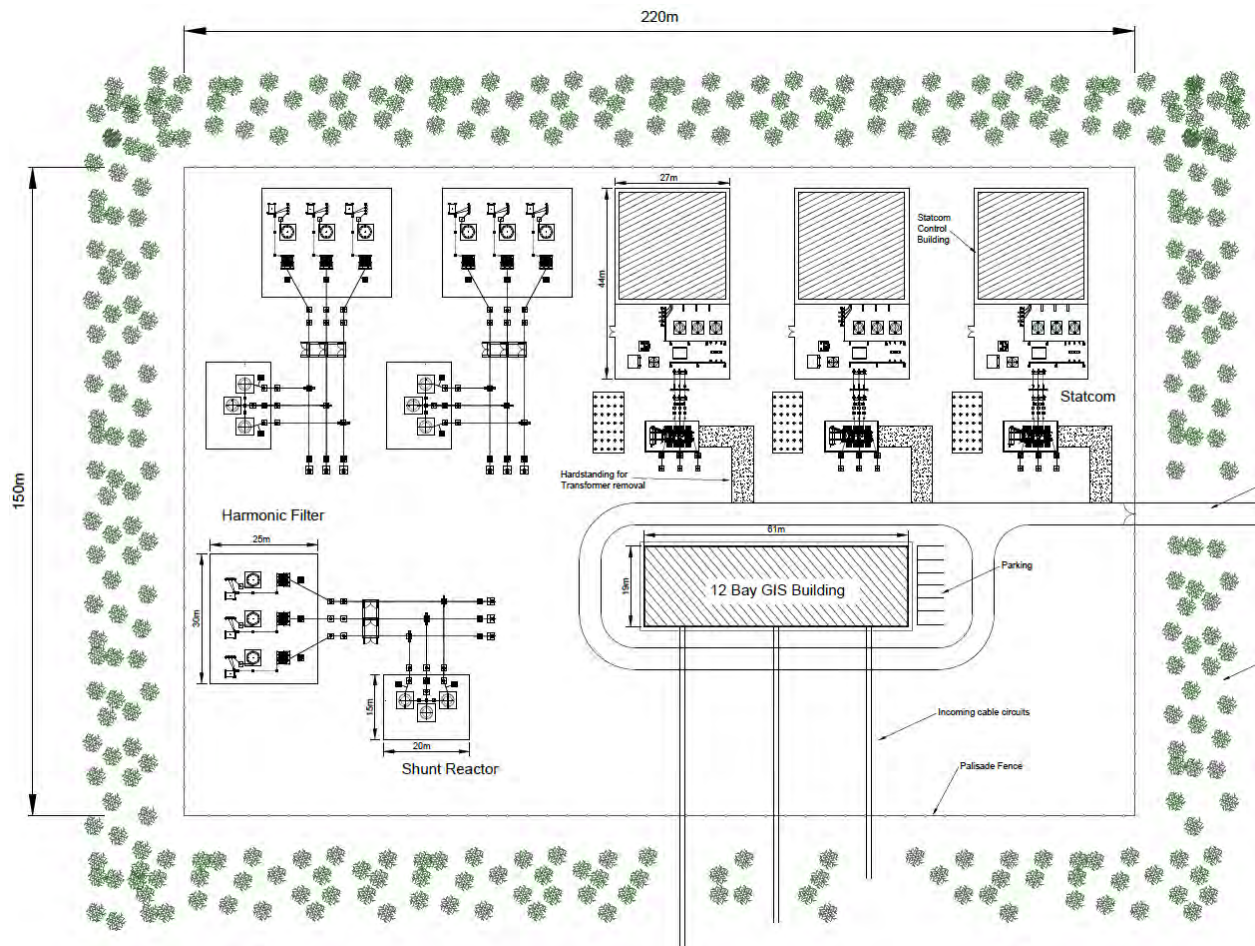


Figure 3-9 Typical 220 kV Substation Compound General Arrangement⁹

⁹ Source: Mott McDonald



Figure 3-10 Example Gas Insulated Switchgear Substation Building and AIS Substation Compound¹⁰¹¹

A Battery Energy Storage System (BESS) compound may form part of Shelmalere Offshore Wind Farm. The BESS would be located adjacent to the Onshore Project Substation compound where possible. The size and electrical capacity of the BESS shall be determined during the EIAR process of Shelmalere Offshore Wind Farm.

A BESS typically consists of uniform containerised battery storage units to facilitate on site energy storage and/or to provide ancillary services to the electricity grid which help it operate more safely. The storage units will most likely use Lithium-ion battery storage technology which is comparable to the batteries found in domestic electrical appliances such as laptops and mobile phones. The batteries will be located on a battery rack and typically sealed within a container or other suitable enclosure where they will be continually monitored and controlled for performance and temperature. Outdoor racks are also offered by certain manufacturers.

Battery containers typically comprise high-quality galvanised metal with a dedicated Heating, Ventilation and Air Conditioning (HVAC) unit to provide internal climate control. Typical modular battery containers (where used) are similar in size to standard shipping containers and sit on concrete pad foundations above the finished ground level.

¹⁰ Source : <https://www.eirgridgroup.com/site-files/library/EirGrid/May-update-brochure-FINAL.pdf>

¹¹ Source : Cordal Wind Farm (<https://neodyne.ie/portfolio-items/cordal-windfarm/?portfolioCats=39>)



Figure 3-11 Typical Battery Energy Storage System (BESS) Compound¹²

3.5.4 Temporary Construction Compounds

During the construction phase, it will be necessary to provide temporary facilities for construction personnel as well as storage space for materials and equipment. Temporary construction compounds shall be constructed at selected locations within the Potential Onshore Infrastructure Zone to meet these requirements. The location of the temporary site compounds shall be selected during the course of the EIAR process. Temporary hard standings to facilitate cable installation works shall be required at Cable Landfall. These hard standings shall also be classified as temporary construction compounds and will be similar in construction.

Facilities to be provided in temporary construction compounds will include the following:

- Site offices and welfare units in the form of modular temporary units;
- Employee parking;
- Tanks for water supply;
- Storage containers;

¹² Image source:

https://www.solarpowerportal.co.uk/news/50mw_battery_celebrated_as_northern_irelands_largest_energised

- Surface and wastewater drainage infrastructure;
- Diesel generators;
- Waste management areas;
- Bunded fuel storage areas;
- Signage;
- Temporary access roads;
- Lighting;
- CCTV and other security measures as necessary;
- Material/non-fuel storage areas.

Temporary construction compounds shall be aggregate hard standings surrounded by security fencing and associated access gates. All temporary construction compound facilities will be removed, and the lands reinstated on completion of the construction phase of Shelmalere Offshore Wind Farm.

3.5.5 Operations and Maintenance (O&M) Facility

During the operational phase, Shelmalere Offshore Wind Farm will require ongoing planned and reactive maintenance. A team of circa 100 personnel, based in an Operations and Maintenance (O&M) facility will undertake this maintenance.

The OWF systems will be remotely monitored and operated from the O&M facility. The facility will include offices, welfare facilities, stores, and berthing facilities for Crew Transfer Vessels (CTVs). 24/7 access to the OWF will be required.

The O&M facility typically comprises the following infrastructure:

- Facility building;
- Car parking facilities;
- Warehousing;
- Floating berths for CTV's;
- Helipad (if required).

An illustration of Shelmalere Offshore Wind Farm's proposed outline O&M operational overview is presented in Figure 3-15 in which the O&M facility is referred to as the 'Onshore Support Base'. A detailed O&M strategy shall be prepared by the Developer during the EIAR process of Shelmalere Offshore Wind Farm.

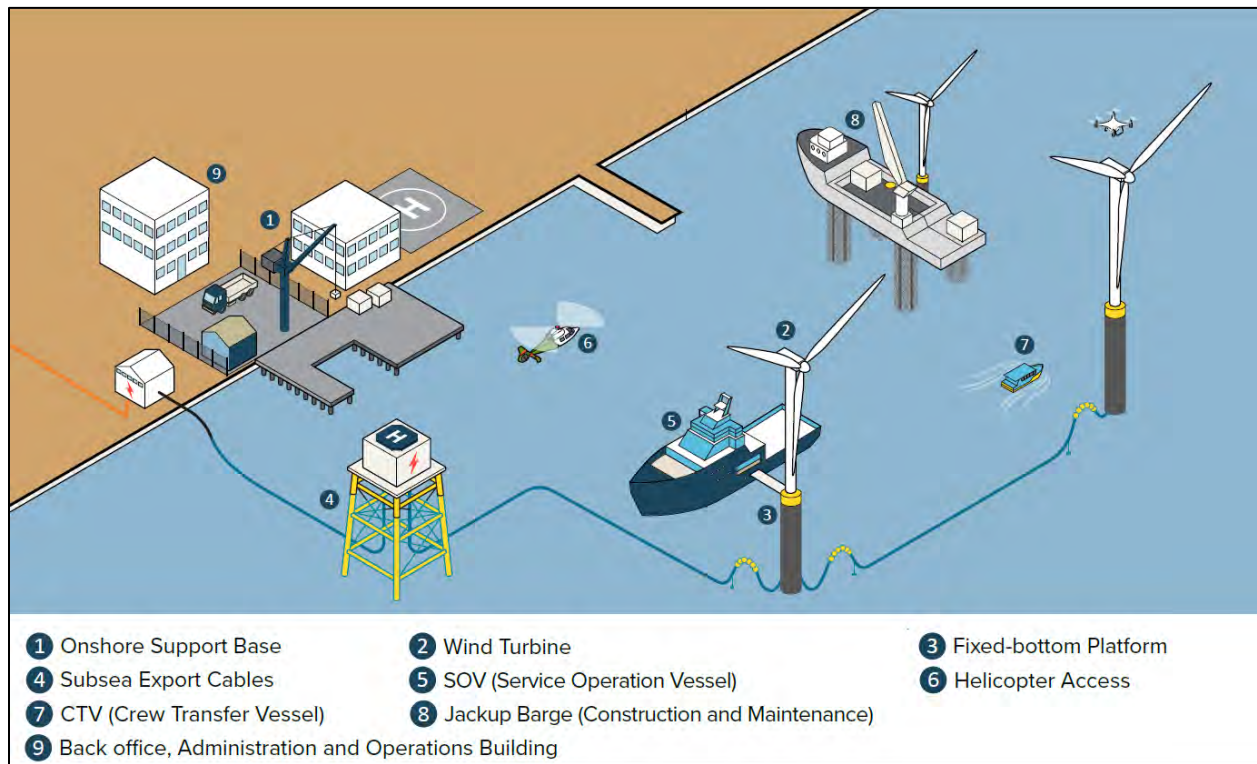


Figure 3-12 Outline O&M Operational Overview

The operation and maintenance of the OWF will commence upon completion of the construction stage and will continue until decommissioning. If commissioning of The Project is carried out on a phased basis (as is common with energy developments of this scale), then the O&M phase shall commence in accordance with the particulars of the project's construction and O&M contracts which may include provisions for the potential adoption of commissioned phases of wind farm as they come online and begin generating.

The location of an onshore operations and maintenance facility has not yet been identified. Once a location is identified, the components will be described and assessed within the future EIA and the likely cumulative effects on the receiving environment due to this infrastructure element will be assessed.

3.5.6 Transmission Network Upgrade

Depending on the method of connection to the national grid, transmission network upgrades may be required as determined by EirGrid. These upgrade works will be described and assessed in the EIA and the likely cumulative effects on the receiving environment of any potential upgrade works will be assessed.

3.6 DECOMMISSIONING OF INFRASTRUCTURE

A detailed decommissioning/rehabilitation plan will be developed and agreed with the Maritime Area Regulatory Authority (MARA) prior to the end of Shelmalere Offshore Wind Farm's operational lifetime and shall reflect the available technology, techniques and statutory requirements at the time as well as any conditions of the Development Consent specific to project decommissioning/rehabilitation. The decommissioning/rehabilitation plan will provide details for:

- The decommissioning of infrastructure;
- 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;
- The removal of any deposited or waste material.

The decommissioning/rehabilitation plan will also identify:

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

At the end of the operational lifetime of Shelmalere Offshore Wind Farm, it is likely that the onshore grid connection infrastructure adopted by the national grid network as part of Shelmalere Offshore Wind Farm would remain part of the national grid and so would likely be left *in situ*. This includes the Onshore Project Substation. Any permanent access tracks providing operational access to buried joint bays in private lands (if required) would also most likely be left *in situ*. Electrical cable ducts and reinstated joint bays including Transition Joint Bays at Cable Landfall would also most likely remain *in situ*. Cables which do not form part of the national grid at the end of the operational life of Shelmalere Offshore Wind Farm will likely be removed and recycled.

The decommissioning process is likely to follow a reverse programme to that used in the construction phase. The decommissioning process will also likely utilise the information gathered during the EIAR process, as well as the mitigation measures set out in the EIAR, to ensure that potential impacts on the receiving environment associated with the decommissioning activities are equal to or less than those associated with the construction phase in terms of magnitude and duration.



Similar to the decommissioning of the onshore elements, decommissioning of offshore infrastructure will likely comprise the reversal of the installation process. As described above, a detailed decommissioning/rehabilitation plan will be developed and agreed with the Maritime Area Regulatory Authority (MARA) prior to the end of the operational life of Shelmalere Offshore Wind Farm.

4 STRUCTURE AND SCOPE OF THE EIAR

4.1 INTRODUCTION

This section of the EIAR Scoping Report sets out what an EIAR is and then sets out the methodology applied in carrying out an EIAR and its general structure. It will be this methodology and structure that will be applied to the future Shelmalere Offshore Wind Farm EIAR.

4.2 CONTENT OF THE EIAR – STATUTORY REQUIREMENT

An EIAR is a report of the effects, if any, which a proposed development, if carried out, would have on the environment. The EIAR sets out to provide the Competent Authority and the public with a comprehensive understanding of The Project, the receiving environment, the likely significant effects on the environment of The Project and any measures proposed to mitigate those potential effects.

Article 3 of the 2014 EIA Directive states that an “*environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*

- a) *population and human health;*
- b) *biodiversity, with particular attention to protected species and habitats;*
- c) *land, soil, water, air and climate;*
- d) *material assets, cultural heritage and the landscape;*
- e) *the interaction between the factors referred to in points (a) to (d)”.*

The effects referred to above shall include the expected effects deriving from the vulnerability of The Project to risks of relevant major accidents and / or disasters.

4.3 EIAR METHODOLOGY

4.3.1 General

The EIAR will be prepared in accordance with Directive 2011/92/EU as amended by Directive 2014/52/EU (the EIA Directive), Schedule 6 of the Planning and Development Regulations 2001 (as amended) and Article 5 of the EIA Directive. Together, these set out the information to be contained in an EIAR.

Schedule 6 of the Planning and Development Regulations 2001 (as amended) describes the information to be contained in an EIAR as follows:

- a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development;
- b) A description of the likely significant effects on the environment of the proposed development;
- c) A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development;

- d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.

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

- Department of the Housing, Planning, Community and Local Government (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*;
- Department of Housing, Planning, Community and Local Government (2017) *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems*, and;
- Department of Housing, Planning, Community and Local Government (2017) *Circular PL 1/2017 – Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition*; and;
- Environmental Protection Agency (2022) *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (May 2022)*.
- European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on Scoping*;
- European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on the Environmental Impact Assessment Report*;
- Chartered Institute of Ecology and Environmental Management, CIEEM (2018). *Guidelines for Ecological Impact Assessment in Britain and Ireland, Marine and Coastal*;
- Department of Housing, Local Government and Heritage (2018). *National Marine Planning Framework Baseline Report*;
- Department of Housing, Local Government and Heritage (2021). *National Marine Planning Framework*;
- Department of Communications, Climate Action and Environment (now DECC) (2017). *Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects*; and;
- Department of Communications, Climate Action and Environment (now DECC) (2018). *Guidance on Marine Baseline Ecological Assessments and Monitoring Activities for Offshore Renewable Energy Projects Parts 1 and 2*.

The recently published EPA Guidelines 2022 state that the scoping process should focus effort and resources on key significant issues that are guided by the following criteria:

- Use of likelihood and significance as the principal criteria for determining what environmental aspects need to be considered and addressed in the EIAR;
- Consider precedence to ensure any EIARs for similar projects on similar sites are used to develop an appropriate technical scope and robust assessment; and
- Recognise potential direct and indirect interactions that may magnify effects and/or give rise to cumulative significant effects (from multiple non-significant effects).

The EIAR Team will have regard to these guidelines in the preparation of the future EIAR. The EIAR Team will also have regard to best practice guidance for each individual topic to be covered in the EIAR as well as any new guidance or legislation that may come into effect prior to submission of a Development Permission application for Shelmalere Offshore Wind Farm.

4.4 PROPOSED EIAR STRUCTURE

The structure that the EIAR Team proposes to use for the EIAR for Shelmalere Offshore Wind Farm, is the Grouped Format Structure where each environmental topic is considered in a separate chapter of the EIAR document.

Using the Grouped Format Structure, a separate chapter is dedicated to each topic, e.g. Air Quality, Biodiversity, etc. The description of the receiving environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in the chapter, outlined further in the Proposed EIAR Chapter Structure section below. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

Given the need to ensure that the EIAR is readily accessible to the general public, as well as to the statutory authorities, the EIAR team has proposed to structure the EIAR as follows:

Upfront Chapters

- Chapter 1:** Introduction
- Chapter 2:** Background to the Proposed Development including Planning Policy
- Chapter 3:** Consideration of Reasonable Alternatives
- Chapter 4:** Description of the Project
- Chapter 5:** Population and Human Health (including Socio-Economic, Tourism and Recreation)
- Chapter 6:** Landscape, Seascape and Visual

Offshore Chapters

- Chapter 1:** Marine Geology, Oceanography and Physical Processes
- Chapter 2:** Marine Water and Sediment Quality
- Chapter 3:** Underwater Noise and Vibration
- Chapter 4:** Benthic, Epibenthic and Intertidal
- Chapter 5:** Marine Mammals and Reptiles
- Chapter 6:** Offshore Ornithology
- Chapter 7:** Offshore Bats
- Chapter 8:** Fish and Shellfish Ecology
- Chapter 9:** Commercial Fisheries
- Chapter 10:** Shipping and Navigation
- Chapter 11:** Offshore Archaeology and Cultural Heritage
- Chapter 12:** Aviation and Radar
- Chapter 13:** Coastal and Marine Infrastructure and Other Users
- Chapter 14:** Offshore Air and Climate

Chapter 15: Offshore Airborne Noise

Onshore Chapters

- Chapter 1:** Land, Soils and Geology
- Chapter 2:** Hydrology, Hydrogeology and Water Quality
- Chapter 3:** Onshore Air Quality and Climate
- Chapter 4:** Onshore Noise and Vibration
- Chapter 5:** Onshore Biodiversity
- Chapter 6:** Onshore Archaeology, Architectural and Cultural Heritage
- Chapter 7:** Traffic and Transportation

Summary

- Summary of Transboundary Effects
- Summary of Inter-Related Effects
- Summary of Cumulative Effects
- Summary of Mitigation, Monitoring and Residual Effects

4.4.1 Proposed EIAR Chapter Structure

It is proposed that the broad methodology framework used in each chapter of the future EIAR includes the following:

- Introduction;
- Assessment Methodology;
- Receiving Environment;
- Do Nothing Scenario;
- Potential Impacts;
- Mitigation Measures;
- Monitoring Measures;
- Residual Impacts.

4.4.2 Introduction

This section of the EIAR chapter for each topic will introduce the topic to be assessed and the elements of that topic to be examined within the chapter.

4.4.3 Assessment Methodology

Specific topic-related methodologies will be outlined in this section of the EIAR chapter for each topic. This will include the methodology used in describing the receiving environment and undertaking the assessment. It is important that the methodology is documented so that the reader understands how the assessment was undertaken. This can also be used as a reference if future studies are required.

4.4.4 Receiving Environment

An accurate description of the receiving environment is necessary to predict the potential impacts of a proposed development on that environment. Existing baseline environmental monitoring data can also be used as a valuable reference for the assessment of actual impacts 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. 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 receiving 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 policies, guidelines or professional judgements. The sensitivity of the environment will also be described.

4.4.5 'Do Nothing' Scenario

In this section of each chapter of the future EIAR, the EIAR Team's topic-specialists will predict the situation or environment which would exist if Shelmalere Offshore Wind Farm 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.

4.4.6 Potential Impacts

In this section of each chapter of the future EIAR, the EIAR Team's topic-specialists will predict how the receiving environment may interact with Shelmalere Offshore Wind Farm. The full extent of the potential impacts of Shelmalere Offshore Wind Farm on its receiving environment, before proposed mitigation measures are introduced, will be outlined. Potential impacts from both the construction, O&M and decommissioning phases of Shelmalere Offshore Wind Farm will be set out.

The evaluation of the significance of the potential effects of Shelmalere Offshore Wind Farm on its receiving environment will also be undertaken as part of each chapter of the EIAR. For most chapters, pre-existing standardised criteria for the significance of effects will be used in accordance with the guidelines set out in the EPA (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports. Where the EPA guidance criteria may not be appropriate for a specific topic under assessment, alternative international standards, European Commission or good practice guidelines will be referenced and clearly explained to evaluate the significance of effect. Figure 4-1 below is an extract from the EPA guidance on determining significance of effect.

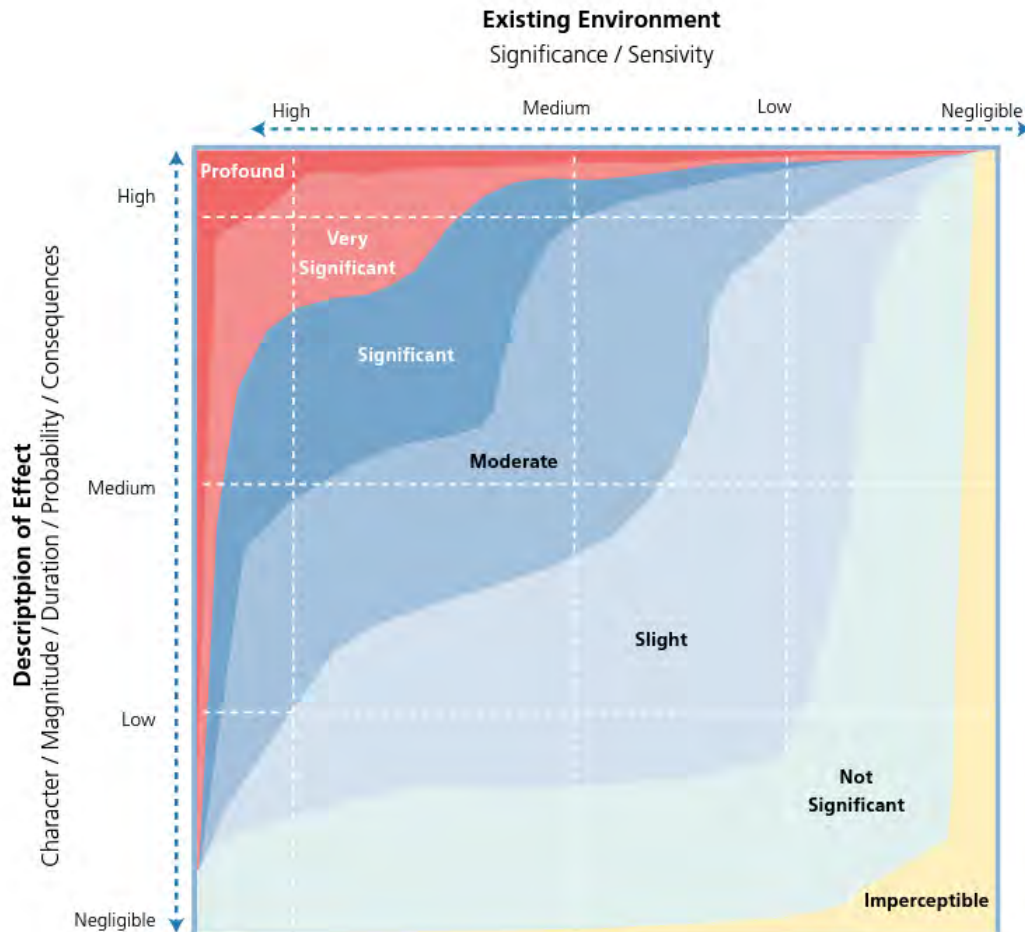


Figure 4-1 Extract from EPA (2022) determining significance of effect

For some EIAR topics, potential effects will be assessed via a Source-Pathway-Receptor (S-P R) model, which will help identify potential impacts on relevant receptors resulting from the construction, operation, and decommissioning of Shelmalere Offshore Wind Farm. The parameters of the model are defined as follows:

- Source – the origin of a potential impact (noting that one source may have several pathways and receptors), for example, an activity such as cable installation and a resultant effect such as re-suspension of sediments.
- Pathway – the means by which the effect of the activity could impact on the receptor e.g., for the example above, re-suspended sediment has potential to settle and smother immobile benthic species, causing a reduction in prey availability.

- Receptor – the element of the receiving environment that has the potential to be impacted e.g., for the above example, seabirds which are unable to forage effectively due to a reduction in benthic prey availability.

4.4.7 Mitigation Measures

If significant effects are anticipated, mitigation measures will be devised to minimise effects on the environment. In this section of each chapter of the EIAR, those mitigation measures will be set out. Mitigation by avoidance, by reduction and by remedy will be outlined where required.

4.4.8 Cumulative Effects

This section of each chapter of the EIAR will examine potential cumulative impacts of Shelmalere Offshore Wind Farm with other plans and projects. It will also include the Interactions with other environmental topics and inter-project interactions, for example the interaction of the offshore infrastructure with the onshore infrastructure which may share the same Zone of Interest.

4.4.9 Monitoring Measures

If monitoring measures are required any time during the lifecycle of Shelmalere Offshore Wind Farm, these will be set out and specified in this section of each chapter of the EIAR.

4.4.10 Residual Impacts

The assessment identifies the likely impacts that will occur after the proposed mitigation measures have been put in place. These residual impacts will be described in detail and assessment of their significance undertaken in this section of each chapter of the EIAR.

4.5 PROPOSED EIAR VOLUME STRUCTURE

The structure proposed for the future EIAR for Shelmalere Offshore Wind Farm is as follows:

- Volume 1: Non-Technical Summary;
- Volume 2: Upfront Chapters;
- Volume 2a: Main EIAR Offshore;
- Volume 2 b: Main EIAR Onshore;
- Volume 3: Summary of Cumulative Effects, Indirect Effects and Interactions;
- Volume 4 a: Appendices of the EIAR Offshore;
- Volume 4 b: Appendices of the EIAR Onshore;
- Volume 5: Photomontages.

4.6 APPROACH TO MAJOR ACCIDENTS AND DISASTERS

Annex IV of the EIA Directive requires the EIAR to include a description of the expected significant adverse effects of The Project on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project.

Two key areas need to be considered namely:

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

In the he Population and Human Health chapter of the EIAR, The Project's vulnerability to major accidents and natural disasters and the potential adverse impacts 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 Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations 2013 with regard to safety management.

The Construction Environmental Management Plan (CEMP) also sets out mitigation in the event of a catastrophic event associated with operational wind turbines.

5 UPFRONT CHAPTERS – ENVIRONMENTAL CONSIDERATIONS

The following section discusses the general contents of each ‘up-front chapter’ of the EIAR as listed in Section 4.3 of this EIAR Scoping Report.

5.1 CHAPTER 1: INTRODUCTION

The Introduction chapter of the EIAR will set out the context of the EIAR including an introduction to The Applicant and a short description of The Project. The requirements for Environmental Impact Assessment will be set out along with the EIAR methodology and the EIAR structure. This chapter will also outline plans and projects in the area where a potential cumulative effect could occur. Contributors to the EIAR will also be detailed in this chapter, along with the relevant expertise of those contributors.

5.2 CHAPTER 2: BACKGROUND TO THE PROJECT

Chapter 2 will set out some context including a discussion on the need for The Project with regard to climate change, renewable energy targets and energy security. The policy context will also be discussed in this chapter. Chapter 2 will summarise International, European, National and Local Energy and Planning Policy, as applicable to Shelmalere Offshore Wind Farm.

5.3 CHAPTER 3: CONSIDERATION OF REASONABLE ALTERNATIVES

This chapter of the EIAR will set out the alternatives considered throughout the development phase of Shelmalere Offshore Wind Farm. The requirement in relation to alternatives in the EIA process is set out in Directive 2011/92/EU, amended by Directive 2014/52/EU, in Article 5 (1)(d), which states that an EIAR should include:

“a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment”

Article 5(1)(f) of the EIA Directive requires that the EIAR contains *“any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.”*

Annex IV of the EIA Directive states that the information provided in an EIAR should include a:

“description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

This chapter will have particular regard to the environmental considerations which influenced the selection of alternatives and detail the evolution of The Project through alternatives considered, indicating the main reasons for selecting the chosen option taking into account the effects of The Project on the receiving environment and considering the comparison of environmental effects of each alternative.

The alternatives considered will be described in line with the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022). The Guidelines state that:

“It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or ‘mini-EIA’) of each alternative is not required.”

Furthermore, the guidelines note the following with regard to high level plans and strategies which may influence or pre-determine decisions in the development process:

“Higher level alternatives may already have been addressed during the strategic environmental assessment of relevant strategies or plans. Assessment at that tier is likely to have taken account of environmental considerations associated... Thus, these prior assessments of strategic alternatives may be taken into account and referred to in the EIAR.”

The chapter will also detail non-environmental elements of the development process where they are relevant to the evolution of The Project.

5.4 CHAPTER 4: DESCRIPTION OF THE PROJECT

This chapter of the EIAR will describe all offshore and onshore elements of The Project as introduced in Section 3 of this EIAR Scoping Report. It will describe the key features of The Project including details of the construction works required.

5.4.1 Offshore Infrastructure

The offshore infrastructure components of Shelmalere Offshore Wind Farm will include:

- Wind Turbine Generators (WTGs);
- Foundations;
- Inter-array cables;
- Export cables(s);
- Scour protection works;
- External cable protection;
- Offshore substation(s).

5.4.2 Onshore Infrastructure

The onshore infrastructure components of Shelmalere Offshore Wind Farm will comprise of the following:

- Onshore underground grid connection cabling, and associated Joint Bays;
- Cable Landfall infrastructure;
- Transition Joint Bays (TJB);
- Onshore Gas Insulated Switchgear / Air Insulated Switchgear substation;
- Potential Battery Energy Storage System (BESS);
- Onshore construction compounds;
- Supporting infrastructure and ancillary works which will include: operation and maintenance base and any EirGrid grid upgrade works that may be required.

5.5 CHAPTER 5: POPULATION AND HUMAN HEALTH

5.5.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential effects of Shelmalere Offshore Wind Farm on Population and Human Health (including Socio-Economic, Tourism and Recreation). This chapter sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. The assessment will be undertaken under the following headings.

- Population;
- Employment and Economic Activity;
- Land and Marine Use;
- Recreation, Amenity and Tourism;
- Human Health and potential for The Project to cause accidents and/or natural disasters and the vulnerability of The Project to potential disaster/accidents.

This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Population and Human Health. A preliminary review of the receiving environment relevant to this EIAR topic within the Population and Human Health Topic-specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR will deal with potential effects on Population and Human Health from both the onshore and offshore components of The Project.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Population and Human Health chapter of the EIAR is based on the expert judgement of FT and precedence from previous projects in Ireland of this nature and scale. The Population and Human Health Topic-specific Study Area is the same as the Potential Onshore Infrastructure Zone shown in Figure 1-1. However, the Population and Human Health Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which will be defined as the design develops throughout the EIAR process. For example, the study area for onshore buried grid connection cables will encompass an overall minimum corridor width of 500 m, i.e. a minimum of 250 m from the centreline of a cable route alignment and 1km around Cable Landfall and Onshore Project Substation locations. The Population and Human Health Topic-specific Study Area will also be influenced by other chapters which may have an impact on population and human health such as Landscape, Seascape and Visual, Onshore Noise and Vibration, Onshore Air Quality and Climate, Shipping and Navigation and Traffic and Transportation. Settlements within the wider environs of The Project will also be included for the purpose of assessment. Therefore the Topic-specific Study Area will change based on the specific sub-topic being assessed in the Population and Human Health Chapter.

5.5.2 Relevant, Policy and Guidance

In addition to the Guidance outlined in Section 4.4 of this EIAR Scoping Report, the following policy and guidance documents will be used in preparation of the Population and Human Health chapter of the future EIAR for Shelmalere Offshore Wind Farm:

Table 5-1 Relevant Policy and Guidance Documents (Population and Human Health)

Policy / Guidance	Reference	Geographic Coverage
Policy		
Wicklow County Development Plan (2016 -2022)	WWCC	Ireland
Wexford County Development Plan 2013 - 2019 (as extended)	WXCC	Ireland
Waterford City and County Development Plan 2011 – 2017 (as extended)	WCCC	Ireland
Guidance		
Guidelines on the Treatment of Tourism in an Environmental Impact Statement	Fáilte Ireland (2011)	Ireland

A number of the specialist chapters (both offshore and onshore) cover aspects which relate to population and human health, including Landscape, Seascape and Visual, Noise and Vibration, Air Quality and Climate, and Traffic and Transportation. These will be referenced in the Population and Human Health chapter of the EIAR as relevant.

5.5.3 Receiving Environment

5.5.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

The receiving environment will be established for the EIAR using a desktop study which will review national guidance documents, publicly available datasets and resources to assess the potential impacts of Shelmalere Offshore Wind Farm and to identify mitigation and monitoring measures where required. Relevant datasets will include the following:

- An Bord Pleanála (2020), Case Search (online);
- Wexford County Council Planning Enquiry System;
- Wicklow County Council Planning Enquiry System;
- Waterford City and County Council Planning Enquiry System;
- Central Statistics Office (2016), Small Area Population Statistics;
- Central Statistics Office (2021), Live Register Data;
- Central Statistics Office, Census 2006, 2011, 2016;
- Corine land cover data;
- Eircode data sets;

- Open Street Mapping;
- Deloitte, Irish Wind Energy Association (2009), Jobs and Investment in Irish Wind Energy;
- Climate and Health Alliance (2012), Position Statement on Health and Wind Turbines;
- EirGrid (2014), EMF and You: Information about Electric and Magnetic Fields and the electricity transmission system in Ireland;
- EirGrid (2019), The Electricity Grid and Your Health;
- ESB (2017), EMF and You: Information about Electric and Magnetic Fields and the electricity network in Ireland, April 2017;
- European Wind Energy Association (EWEA) (2009), Wind at Work, - Wind Energy and Job Creation in the EU;
- Fáilte Ireland (2008, 2012), Wind Farms – Visitor Attitudes on the Environment, National Tourism Development Authority, 2012/No.1;
- Fáilte Ireland (2019), Key Tourism Facts 2018;
- Fáilte Ireland (2021), Preliminary Key Tourism Facts 2019;
- Front Public Health (2014), Wind Turbines and Human Health;
- Institute of Sustainable Futures (2015), Calculating Global Energy Sector Jobs;
- Sustainable Energy Authority Ireland (SEAI) (2019), Renewable Energy in Ireland – 2019 Report;
- Sustainable Energy Authority of Ireland (SEAI) (2020), Renewable Energy in Ireland – 2020 Update;
- Sustainable Energy Authority of Ireland (SEAI) (2020), Energy-Related CO₂ Emissions in Ireland 2005 – 2018 – 2020 Report;
- Sustainable Energy Authority Ireland (SEAI) (2020), Energy in Ireland 2020 Report;
- Sustainable Energy Ireland (SEI) (2003), Attitudes towards the Development of Wind Farms in Ireland.

5.5.3.2 Overview of receiving environment

The Potential Onshore Infrastructure Zone is located across counties Wexford, Wicklow and Waterford.

A baseline study of all available information within the Population and Human Health Topic-specific Study Area will be undertaken using relevant datasets.

Relevant data from the Central Statistics Office as well as relevant information from local development plans, will be used to identify existing and future Population and Human Health trends, Employment and Economic Activity, Land Use and Recreation, and Amenity and Tourism activity within the Population and Human Health Topic-specific Study Area.

Within the Potential Onshore Infrastructure Zone, there are a number of settlements including Enniscorthy, Ballygarrett, Courtown, Gorey and Arklow. With New Ross, Wexford Town, Waterford City and Rosslare Harbour located outside the Potential Onshore Infrastructure Zone.

The main-land uses in the area will be described using Corine 2012 land cover data and this data will be verified by subsequent walkovers and drive-by surveys. All areas of scenic beauty in addition to heritage, culture and leisure facilities in the area will be identified. A review of the main recreational activities in the Population and Human Health Topic-specific Study Area likely to be affected will be conducted.

A baseline study of all available information, including other plans and projects within the Population and Human Health Topic-specific Study Area will be undertaken. Data from the Central Statistics Office, Fáilte Ireland, local and regional plans (RSES and county development plans), as well as other local authority database information will be used to define the socio-economic baseline.

An assessment will be conducted to ascertain any potential impacts that may arise which could directly or indirectly affect land use, tourism, recreational activity or amenity. This assessment will be prepared giving cognisance to other disciplines such as cultural heritage, infrastructure and other users, hydrology and ecology.

5.5.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR. Ground truth surveys will also be undertaken to validate desktop data where necessary.

5.5.5 Proposed EIAR Assessment Methodology

Population

Demographic data has been sourced from the Central Statistics Office (CSO) Census of Ireland (2006 to 2016) records. Demographic information relating to the Population and Human Health Topic-specific Study Area will be assessed to establish the existing demographic trends. The demographic analysis of the study area will be defined in terms of Electoral Divisions (EDs), with which the Population and Human Health Topic-specific Study Area overlaps.

Eircode data (2021), Geodirectory data, and planning application lists sourced from Wexford County Council (WXCC), Waterford City and County Council (WCCC), Wicklow County Council (WWCC), An Bord Pleanála and the Department of Housing and Local Government's EIA Portal will be assessed to identify any commercial or residential receptors in proximity to The Project. Eircode and Geodirectory data provide locations (geographic coordinates) for registered addresses.

This information will be ground-truthed with a house survey where a surveyor travels within the Population and Human Health Topic-specific Study Area and identifies locations of all residential receptors in proximity to The Project.

The data gathered will inform the consideration of impacts on the existing population within the immediate environs of The Project, allowing for a comprehensive assessment of the potential effects on population trends which may occur during the construction, operational, and decommissioning phases of The Project.

Socio Economic

A socio-economic profile of the receiving environment will be established using live register data (2018 to 2022) and Census (2016) data to outline an employment profile of the Population and Human Health Topic-specific Study Area. Peer reviewed research data will be referenced in order to estimate the employment which Shelmalere Offshore Wind Farm has the potential to create through the construction, operation and decommissioning phases of The Project, and the impact this employment will have on the Population and Human Health Topic-specific Study Area.

Land and Marine Use

Land use in the area will be examined to determine potential impacts on existing land use patterns which may arise as a result of Shelmalere Offshore Wind Farm.

Corine Land Cover data (2018) will be studied, and observation will be carried out throughout the ground-proofing survey to determine land uses in the study area. The impact of Shelmalere Offshore Wind Farm will then be considered with regard to these land uses. Potential impacts on marine use will be summarised from the Shipping and Navigation chapter of the EIAR and the potential effects and mitigation measures discussed.

Recreation, Amenity and Tourism

With regard to Recreation, Amenity and Tourism, Fáilte Ireland published a guideline document on tourism and environmental impacts in 2011 entitled 'Guidelines on the Treatment of Tourism in an Environmental Impact Statement'. The document will inform the methodology used in assessing potential impacts on Recreation, Amenity and Tourism. A profile of tourism in the region will be established through examination of Fáilte Ireland Statistics in order to indicate the strength of Recreation, Amenity and Tourism in the surrounding region. Recreation and amenity facilities and attractions in the area will be identified through desktop studies and consultation. Potential impacts as a result of The Project will then be considered in relation to the tourism profile, amenity and recreation facilities and attractions of the area for both land and marine based activities.

Human, Health and Safety

The assessment on human health and safety will have regard to the Environmental Protection Agency's (EPA US) Human Health Risk Assessment process which provides information on potential human health impacts. CSO data (2016) and reports published by the Department of Health will be examined to establish a baseline health profile of the study area. Criteria of potential impacts on human health will be extracted from this literature in order to assess potential effects on human health as a result of the The Project. A desktop examination of potential hazardous land uses in the study area will be carried out and vulnerability of The Project to natural disaster will be assessed through a desktop geographical study and literature review. The assessment will be further informed by other onshore and offshore EIAR topics such as lands, soils and geology, hydrology, coastal processes, shipping and navigation, aviation, air quality, noise, traffic.

5.5.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect impacts will be examined in the EIAR and potential significant effects will be identified and set out in the EIAR. Where the potential for significant cumulative effect is identified in the EIAR, such effects and interaction of effects will be included and addressed in the Receiving Environment and Potential Impacts sections of the Population and Human Health Chapter of the EIAR.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to Population and Human Health.

5.5.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed with respect to the potential effects on Population and Human Health.

5.5.6 Proposed Consultees

Table 5.2 summarises the proposed consultees for Population and Human Health that will be consulted as part of this EIAR Scoping Exercise and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 5-2 Proposed Consultees (Population and Human Health)

Proposed Consultee	Objective of Consultation
Wexford County Council, Waterford County Council and Wicklow County Council	To discuss and agree approach to assessment and to identify significant tourism, recreation and land-uses to be considered.
Local Community Groups identified through Public Consultation events.	To discuss recreation and amenity facilities within the Topic-Specific Study area and key concerns relating to human health impacts.
Local Population identified during Public Consultation events.	To discuss recreation and amenity facilities within the Topic-Specific Study area and key concerns relating to human health impacts.
Fáilte Ireland	To identify key tourism and recreation assets in the area.

5.5.7 Potential Impacts to be Assessed within the EIAR

The potential impacts on Population and Human Health are shown in Table 5.3. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

Other impacts relevant to human wellbeing such as noise, vibration, air quality and visual impacts, will also be considered when classifying impacts, but will be addressed in more detail in the relevant assessment chapters of the EIAR as detailed above. Impacts on amenity will be considered in the Landscape, Seascape and Visual chapter of the EIAR, with impacts on Commercial Fisheries also addressed in the relevant chapter of the EIAR.

Table 5-3 Potential Impacts to be Assessed within the EIA (Population and Human Health)

Potential Impacts	Project Phase where Impact will Potentially Occur			Scoped In/Out of the EIA
	Construction	Operation	Decommissioning	
Population Potential to change population in the area due to the development will be considered in the context of employment and potential environmental impacts associated with The Project.	Yes	Yes	No	In
Socio Economic: Potential for investment in the area will be examined and the impact on employment.	Yes	Yes	Yes	In
Land and Marine Use: Potential impacts arising from the change of land use and marine use will be examined.	Yes	No	Yes	In
Recreation, Amenity and Tourism: Potential impact on amenities and tourism will be examined both due to the onshore cable infrastructure and offshore turbine array and ECC infrastructure.	Yes	N	Yes	In
Human Health and Safety Potential health impacts from electromagnetic fields will be examined along with other environmental effects such as noise.	No	Yes	No	In
Major Accidents and or Natural Disasters: Potential impact on and from Shelmalere Offshore Wind Farm due to natural disasters and the risk of major accidents will be examined and summarised.	Yes	Yes	Yes	In

5.5.8 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Population and Human Health topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Population and Human Health chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Population and Human Health Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Population and Human Health chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Population and Human Health chapter of the EIAR for Shelmalere Offshore Wind?
- Are there any other potential effects you believe could be significant and you wish to see assessed in the Population and Human Health chapter of the EIAR for Shelmalere Offshore Wind Farm?

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5.6 CHAPTER 6: LANDSCAPE, SEASCAPE AND VISUAL

5.6.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential impacts of Shelmalere Offshore Wind Farm on Landscape, Seascape and Visual receptors. It sets out the methodology and approach to be taken to assessing potential effects within the future EIAR. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Landscape, Seascape and Visual assessment.
- A preliminary review of the receiving environment relevant to this EIAR topic within the Landscape, Seascape and Visual Topic-specific Study Area.
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group.
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process.
- Key data sets that it is proposed to be used to inform the EIAR for this topic.
- Potential surveys proposed to inform the EIAR for this topic.
- A summary of potential impacts on this receptor group that will be fully assessed within the EIAR.

This chapter deals with potential impacts from the onshore and offshore components of The Project.

This chapter of the EIAR Scoping Report has been completed by Macroworks who have extensive experience in preparing EIAR's for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Landscape, Seascape and Visual chapter of the EIAR is based on the expert judgement of Macroworks and precedence from previous projects in Ireland. The Landscape, Seascape and Visual Topic-specific Study Area will be defined based on the positioning of onshore infrastructure elements and the offshore Wind Turbine Generators described in Chapter 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process. However for the purpose of this EIAR Scoping Report, the Landscape, Seascape and Visual Topic-specific Study Area for the Potential Turbine Array Infrastructure Zone, is a 60 km radius from the extent of the Potential Turbine Array Infrastructure Zone. This will be refined during the design process to reference the position of the external turbine positions within the Potential Turbine Array Infrastructure Zone.

It is important to note that the peripheral extents from 40km to 60km will be considered a 'cumulative search area' for the purposes of determining if relevant cumulative projects occur within the broader setting.

This approach to determining the Landscape, Seascape and Visual Topic-specific Study Area accords with the relevant SNH guidance for such assessments. The SNH Guidance is considered by UK regulators as the best practice approach to defining study areas for offshore wind farms in the UK. The Landscape, Seascape and Visual Topic-specific Study Area for the Potential Onshore Infrastructure Zone will be refined as the design develops throughout the EIAR process and will likely consist of a buffer of 500 m either side of the alignment of the onshore underground grid connection cabling, however a wider corridor of up to 1 km either side of an alignment may be used at options selection stage. For the Onshore Project Substation and BESS, a circular study area of up to 3km radius are most likely depending on the scale and likely visibility of the particular aspect of the above ground infrastructure once their location is identified.

5.6.2 Relevant Policy and Guidance

In addition to the Guidance outlined in Section 4.3 above the following policy and guidance documents will be used.

Table 5-4: Relevant Policy and Guidance Documents (Landscape, Seascape and Visual)

Policy / Guidance	Reference	Geographic Coverage
Policy		
Wicklow County Development Plan 2016 – 2022	Wicklow County Council	Ireland
Wexford County Development Plan 2013 - 2019 (as extended)	Wexford County Council	Ireland
Waterford County Development Plan 2011 – 2017 (as extended)	Waterford County Council	Ireland
'National Landscape Strategy for Ireland 2015-2025	DAHG (2015)	Ireland
A Regional Seascape Character Assessment for Ireland	DAFM (2020)	Ireland
Guidance		
Guidance on Landscape/Seascape Capacity for Aquaculture	SNH (2008)	UK
Visual representation of wind farms: Best Practice Guidelines	SNH (version 2.2 - 2017)	UK
Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape	SNH (2012)	UK
'Guidelines for Landscape and Visual Impact Assessment – Third Edition'	IEMA (2013)	UK and Ireland
Wind Energy Development Guidelines	DEHLG (2006)	Ireland

- The 'National Landscape Strategy for Ireland 2015-2025' was published in 2015 by the Department of Arts, Heritage and the Gaeltacht;
- A Regional Seascape Character Assessment for Ireland was published in December 2020;
- Wexford County Development Plan (2013-2019 (as extended));
- Wicklow County Development Plan (2016-2022);
- Waterford City and County Development Plan 2011 – 2017 (as extended);
- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006/2019 revision);
- 'Guidelines for Landscape and Visual Impact Assessment – Third Edition', Landscape Institute and the Institute of Environmental Management and Assessment (2013);
- Scottish Natural Heritage (SNH) Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape (2012);
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017);
- Scottish Natural Heritage (SNH) Guidance on Landscape/Seascape Capacity for Aquaculture (2008).

5.6.3 Receiving Environment

5.6.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

A baseline condition will be established using a desktop study which reviews national guidance documents, publicly available datasets and resources to assess the potential impacts of Shelmalere Offshore Wind Farm and to identify mitigation and monitoring measures where required. Relevant data sets will include the following:

- An Bord Pleanála (2020), Case Search (online);
- Wexford County Council Planning Enquiry System;
- Wicklow County Council Planning Enquiry System;
- Waterford City and County Council Planning Enquiry System;
- Corine land cover data;
- Eircode data sets;
- Open Street Mapping.

5.6.3.2 Overview of receiving environment

The Potential Turbine Array Infrastructure Zone for Shelmalere Offshore Wind Farm is located off the south Wexford coastline and extends from Cahore Point at its northern end to Greenore Point at its southern end.

The coastline in the vicinity of The Project is a combination of large estuarine bays, long straight sandy beaches and low sea cliffs with plateau farmland above. This coastal context is well described in the recently published 'Regional Seascape Character Assessment for Ireland' (2020):

The 'South Celtic Sea' "forms the juncture between the Celtic and Irish Seas; the imaginary boundary between St George's Channel extending from Cansore Point to St David's Head, Pembrokeshire. Ireland's most southeasterly island Tuskar Rock is within this SCA.

The coastal form comprises an interplay of broad, moderate scale bays and estuaries. Long, relatively narrow beaches are a key characteristic in this SCA and are punctuated by Carnsore Point, Cahore Point, Kilmichael Point and Wicklow Head. From Raven Point north to Cahore Point a spectacular series of strands are present including Curracloe, Ballinesker and Morriscastle Beach.

The hinterland is primarily agricultural with tillage and pasture; holiday homes, caravan parks associated with the beaches are present particularly around Curracloe and Courtown. Coastal and inland topography is generally low in elevation along this SCA, even at headland such as Greenore Point (22mOD) and Cahore Point (35mOD). Tara Hill (253mOD), to the north east of Gorey, is the only noticeable elevated feature along the coastal plain. The rocks at Greenore Point, south of Rosslare are the oldest bedrock in the south east of Ireland, and are associated with the Avalonia continent, when the Iapetus Ocean was in existence around 600 million years ago.

The SCA includes historical towns and harbours including Wexford with long established tourism and fishing bases. The Slaney River Estuary empties freshwater into the harbour. The low-lying coastal area around the harbour comprises the shallow estuarine waters, reclaimed polders known as the North and South 'Slobs', and the tidal section of the River Slaney".

The Potential Onshore Infrastructure Zone includes a broad coastal zone from Arklow south to Kilmichael Point and this includes some diverse land uses including golf courses, quarries and coastal caravan parks.

Inland from the coast, the Potential Onshore Infrastructure Zone narrows and heads south-west through a landscape of predominantly rolling patchwork farmland. The landscape is also strongly influenced by the corridor of the M11 motorway and the significant settlements of Gorey and Enniscorthy. The southern end of the Potential Onshore Infrastructure Zone includes the broad estuarine confluence of the River Barrow and River Nore around the industrial areas of Great Island and Belview Port.

The Landscape Character Assessment set out in Volume 7 of the Draft Wexford County Development Plan 2022 - 2028 identifies only four Landscape Character Units. The Landscape Character Unit of relevance to the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone is the 'Coastal' Landscape Character Unit. For the Potential Onshore Infrastructure Zone, the main Landscape Character Unit of relevance is 'Lowlands' but with the 'River Valley' Landscape Character Unit encountered for the Slaney River corridor and the Barrow / Suir River corridor. The 'Lowlands' Landscape Character Unit is considered the most robust, with all other Landscape Character Units being considered sensitive. In addition to the four broad scale Landscape Character Units, Landscapes of Greater Sensitivity are also identified in Volume 7 of the Draft Wexford County Development Plan 2022 - 2028. The Landscapes of Greater Sensitivity within the Draft Wexford County Development Plan are associated with scenic amenity (views to and from), as designated scenic views / routes are not specifically identified. The Landscapes of Greater Sensitivity most relevant to the Potential Onshore Infrastructure Zone are:

- Cahore Point;
- Screen Hills;
- Wexford Slob North;
- The Raven;
- Rosslare Point;
- Wexford Slob North.

Further Inland the most relevant Landscapes of Greater Sensitivity for the Potential Onshore Infrastructure Zone are:

- Oulart Hill;
- Slievenagorea;
- Bree Hill;
- Raheennahoon Hill;
- Camaross Hill;
- Carrickbyrne Hill;
- Slieve Coiltia.

The southern end of the Potential Onshore Infrastructure Zone, whilst still primarily within County Wexford, does encroach into the County Waterford borders which follow the River Nore and River Barrow. It is also proximate to Co. Kilkenny and to the North extends into Co. Wicklow.

Consequently, the Waterford City and County Development Plan, Kilkenny County Development Plan and Wicklow County Development (2016 – 2022) Plan will be relevant to the southern section and northern section respectively.

The nearest portion of County Kilkenny is contained within the ‘South-eastern Hills’ Landscape Character Area and the River Barrow corridor is identified as being within a Highly scenic / Visually pleasing designation within the Kilkenny County Development Plan. There are also a series of designated scenic views identified in relation to westward views across the River Barrow. Within the soon to be adopted Waterford County Development Plan (2022 – 2028), the nearest point to the Potential Onshore Infrastructure Zone is identified as being within the ‘Coastal’ Landscape Type and within the ‘Lowland Soils’ Landscape Character Area, subcategory ‘2C East Waterford Lowlands’. The immediate coastal fringe is identified as being ‘Most’ sensitive to development but is abutted by a ‘Low’ Sensitivity Landscape just back from the shore.

In County Wicklow the Potential Onshore Infrastructure Zone is contained within the Southern Coastal Area Landscape Category which is identified as an Area of Outstanding Natural Beauty in the Draft Wicklow County Development Plan 2021-2027. Further inland the Potential Onshore Infrastructure Zone is contained in the Eastern Corridor Landscape Category. The Potential Onshore Infrastructure Zone is also located in the South East Mountain Lowlands Landscape Category which is an area of High Amenity. To the South of Arklow the Potential Onshore Infrastructure Zone extends into the Rolling Lowlands Landscape Category.

There are a number of Prospects of Special Amenity Value or Special Interest north and west of Arklow which predominantly seek to protect views of the sea and coast.

In terms of non-designated receptors within the Potential Turbine Array Infrastructure Zone, the main coastal settlements consist of (from north to south) Courtown, Cahore, Kilmuckeridge, Blackwater, Castlebridge, Wexford Town and Rosslare / Rosslare Harbour. For the Potential Onshore Infrastructure Zone the significant settlements of Arklow, Gorey and Enniscorthy are relevant. The most notable road is the M11 motorway, which will be most relevant receptor to the Potential Onshore Infrastructure Zone, whilst the R742 coast road will be the most relevant receptor to Potential Turbine Array Infrastructure Zone. Other sensitive visual receptors of note for both the Potential Onshore Infrastructure Zone and the Potential Turbine Array Infrastructure Zone include golf courses at Seafeld, Courtown, Tara Glen, Rosslare and Tuskar Rock and the popular beaches of Courtown, Morriscastle and Curracloe.



Other tourism, heritage and amenity features include Wells House and Gardens, the Irish National Heritage Park, Johnstown Castle Estate and Our lady's Island. These are examples of sensitive visual receptors; the list of receptors will be continuously updated following consultation with stakeholders and the community.

5.6.4 Potential Additional Data and Proposed Surveys Assessment Methodology

The data sources listed in Section 5.6.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

5.6.5 Proposed EIAR Assessment Methodology

The Landscape, Seascape and Visual assessment in the EIAR will be informed by a desktop study and fieldwork.

The desktop study will comprise:

- Zones of Theoretical Visibility (ZTV) maps, which indicate areas from which The Project is potentially visible in relation to terrain within the Potential Onshore and Turbine Array Infrastructure Topic-specific Study Area, will be prepared and reviewed;
- Review of relevant County Development Plans which may include the Waterford City and County Development Plan, Kilkenny County Development Plan, Wicklow County Development Plan and Wexford County Development Plan;
- Online review of tourism, recreational and heritage features within the Potential Onshore and Turbine Array Infrastructure Zone Topic-specific Study Area that may be potential visual receptors.

Fieldwork surveys will comprise:

- Examination of the salient landscape/ seascape character of the Potential Onshore and Turbine Array Infrastructure Zone Topic-specific Study Areas.
- On-site investigation of potential VRP locations identified at the desk study stage and selection / rejection of each;
- Selection of other relevant View Points that may not have been apparent from the desk study (local monuments, walkways etc.);
- Capture high resolution base photography in clear weather from which to prepare photomontages of The Project in accordance with best practice guidelines including the SNH Guidelines for Wind Farm Development.
- Examination of potential Cable Landfall and onshore cable route options;
- Preparation of a View Point Selection Report and associated map for consultation purposes indicating the intended View Point selection set and the Topic-specific Study Area to be used for the preparation of photomontages.

In accordance with the Landscape Institute's 'Guidelines for Landscape and Visual Impact Assessment' (2013), the method for estimating the significance of Landscape/Seascape impacts and visual impacts is very similar. This is summarised in Figure 5-1 below:

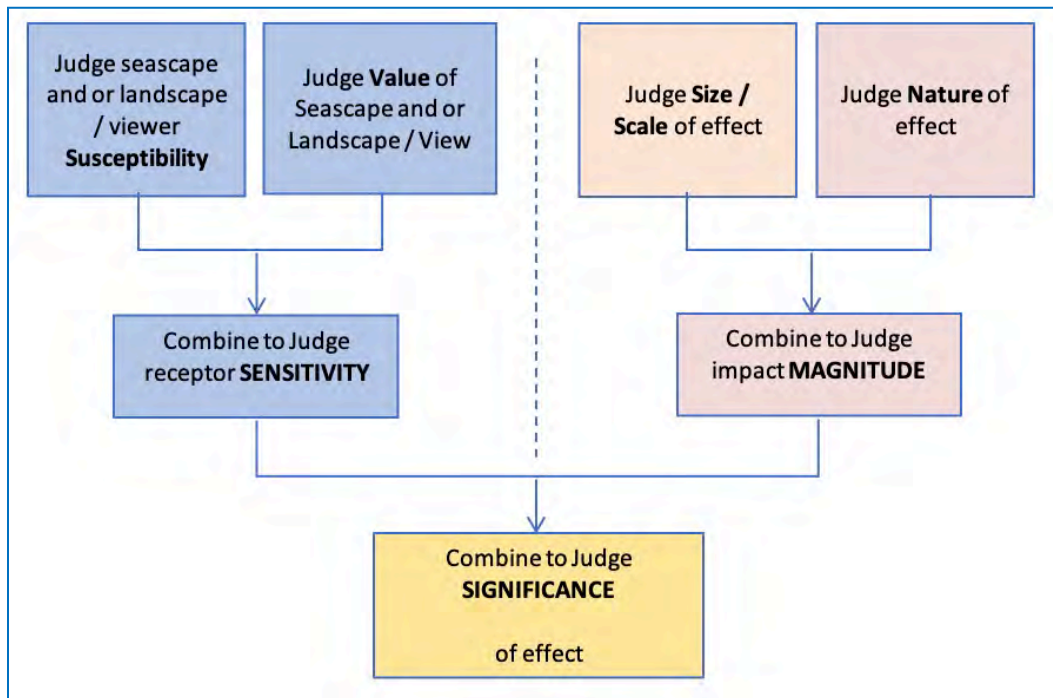


Figure 5-1 Method for assessing Landscape, Seascape Impact Significance and Visual Impact Significance (based on the Guidelines for Landscape and Visual Impact Assessment (2013) published by the Landscape Institute.)

5.6.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect impacts will be examined in the EIAR and potential significant effects will be identified and set out in the future EIAR. Where the potential for significant cumulative effect is identified in the EIAR, such effects and interaction of effects will be included and addressed-in the Potential Impacts sections of the Chapter.

A transboundary screening exercise will be undertaken at an early stage of the future EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to Population and Human Health.

5.6.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed with respect to the potential effects on Landscape, Seascape and Visuals.

5.6.6 Proposed Consultees

Table 5-5 summarises the proposed consultees for the Landscape, Seascape and Visual chapter of the EIA that will be consulted as part of this EIA Scoping Exercise and over the duration of the EIA process. Specific points that are proposed to be consulted on are also included in the table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIA process, up to the point of submission.

Table 5-5: Proposed Consultees (SLVIA)

Proposed Consultee	Proposed Timing of Consultation	Objective of Consultation
An Bord Pleanála	Design/ Options selection stage / Viewpoint selection	To discuss and agree relevant study areas for onshore offshore elements as well as visual receptors and representative viewpoint locations
Wexford County Council	Design/ Options selection stage / Viewpoint selection	To discuss and agree relevant study areas for onshore offshore elements as well as visual receptors and representative viewpoint locations
Kilkenny County Council	Design/ Options selection stage / Viewpoint selection	To discuss and agree relevant visual receptors and representative viewpoint locations
Waterford County Council	Design/ Options selection stage / Viewpoint selection	To discuss and agree relevant visual receptors and representative viewpoint locations
Wicklow County Council	Design/ Options selection stage / Viewpoint selection	To discuss and agree relevant visual receptors and representative viewpoint locations

5.6.7 Potential Impacts to be Assessed within the EIAR

The potential impacts on SLVIA are shown in Table 5-6. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table:

Table 5-6 Potential Impacts to be Assessed within the EIAR (SLVIA)

Potential Impact	Construction	Operational	Decommissioning
Physical Landscape impacts from Cable Landfall and grid connection works Landform and land cover disturbance will result from construction of onshore infrastructure and cable routes.	Yes	Yes	Yes
Landscape Seascape Character change The visible presence of the offshore turbines and associated infrastructure may result in a change to seascape character. Likewise, the visible onshore grid infrastructure may generate landscape character changes	Yes	Yes	Yes
Visual impacts from changes to views The visible presence of the offshore turbines and associated infrastructure may result in changes to views. Likewise, the visible onshore grid infrastructure may also generate changes to views	Yes	Yes	Yes

5.6.8 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Landscape, Seascape and Visual Impact Assessment as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Landscape, Seascape and Visual chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Landscape, Seascape and Visual Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Landscape, Seascape and Visual chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the SLVIA of the EIAR for Shelmalere Offshore Wind?
- Are there any other potential effects that you believe could be significant and you wish to see assessed in the Landscape, Seascape and Visual chapter of the EIAR for Shelmalere Offshore Wind Farm?

5.6.9 References

Environmental Protection Agency (EPA) (2022) 'Guidelines on the Information to be contained in Environmental Impact Statements Available at: <https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment.php>

Landscape Institute and the Institute of Environmental Management and Assessment (2013) 'Guidelines for Landscape and Visual Impact Assessment – Third Addition'. Available at: <https://www.routledge.com/Guidelines-for-Landscape-and-Visual-Impact-Assessment/Institute-IEMA/p/book/9780415680042>

Scottish Natural Heritage (SNH) (2012) Guidance Note: Cumulative Effect of Wind Farms. Available at: www.nature.scot

Scottish Natural Heritage (SNH) (2017) Visual representation of wind farms: Best Practice Guidelines (version 2.2) Available at: www.nature.scot

Department of Arts, Heritage and the Gaeltacht (2015), The 'National Landscape Strategy for Ireland 2015-2025'. Available at: www.gov.ie

Department of Agriculture Food and the Marine (2020) 'A Regional Seascape Character Assessment for Ireland'. Available at: <https://emff.marine.ie/blue-growth/definition-and-classification-ireland%E2%80%99s-seascapes#outputs>

Department of the Environment, Heritage and Local Government (2006) Wind Energy Development Guidelines. Available at: www.gov.ie

Scottish Natural Heritage (2012) Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape. Available at: www.nature.scot

Scottish Natural Heritage (2017) 'Visual representation of wind farms: Best Practice Guidelines (version 2.2). Available at: www.nature.scot

Scottish Natural Heritage (2018); 'Guidance on Landscape/Seascape Capacity for Aquaculture'. Available At: www.nature.scot

Wicklow County Council (2016), Wicklow County Development Plan 2016-2022. Available at: <https://www.wicklow.ie/Living/Services/Planning/Development-Plans-Strategies/National-Regional-County-Plans/Wicklow-County-Development-Plan/Wicklow-County-Development-Plan-2016-2022>

Wexford County Council (2013), Wexford County Development Plan 2013-2019. Available at: <https://www.wexfordcoco.ie/planning/development-plans-and-local-area-plans/current-plans/wexford-county-development-plan-2013>



Waterford County Council (2011), Waterford County Development Plan 2011-2017. Available at: <https://www.waterfordcouncil.ie/media/plans-strategies/development-plan/county/index.htm>

Kilkenny County Council (2021) Kilkenny County Development Plan 2021 - 2027 Available at: www.Kilkenn.ie

6 VOLUME 2A OFFSHORE CHAPTERS ENVIRONMENTAL CONSIDERATION

6.1 CHAPTER 1: MARINE GEOLOGY, OCEANOGRAPHY AND PHYSICAL PROCESSES

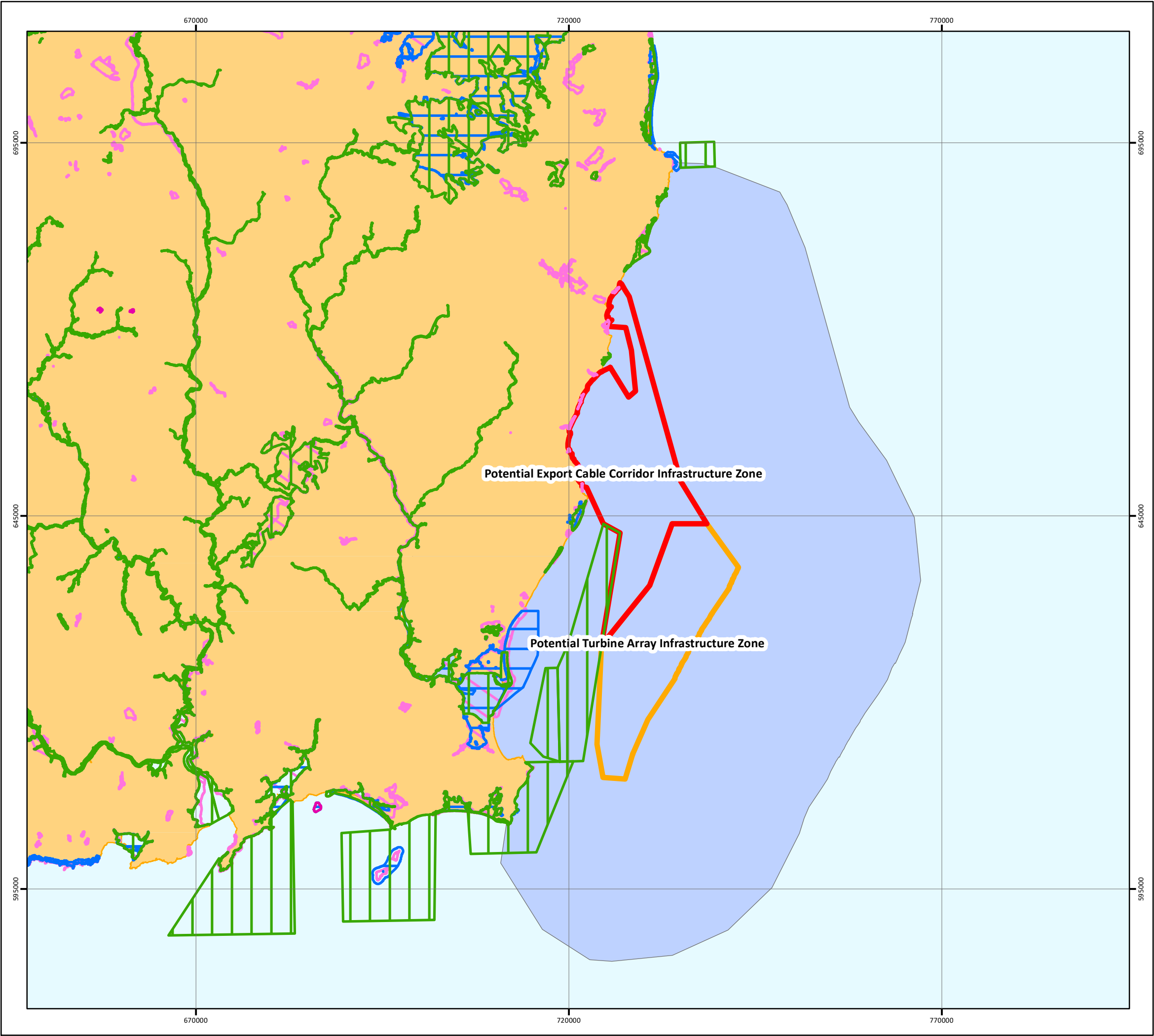
6.1.1 Introduction

This chapter of the EIAR will address the potential impacts of Shelmalere Offshore Wind Farm on Marine Geology, Oceanography and Physical Processes. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing potential significant effects within the future EIAR for Shelmalere Offshore Wind Farm and includes the following:

- A list of legislation, policy and guidance documents relevant to the Marine, Oceanography and Physical Processes topic;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Marine Geology, Oceanography and Physical Processes Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential impacts on Marine Geology, Oceanography and Physical Processes;
- A list of topic-specific stakeholders that it is proposed to consult with over the duration of the future EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Marine Geology, Oceanography and Physical Processes;
- Potential surveys proposed to inform the future EIAR for Marine Geology, Oceanography and Physical Processes;
- A summary of potential impacts on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been completed by Intertek, with specialist input from Cooper Marine Advisers, both of whom have extensive experience of this topic from previous offshore wind farm EIAs (EIARs).

The Marine Geology, Oceanography and Physical Processes Topic-specific Study Area can be conservatively established as the buffer of 24.5 km around the Potential Turbine Array and Export Cable Corridor Infrastructure Zones. This area encapsulates potential effects on marine processes and related receptors (e.g. sediment plumes and attenuation of waves to leeward coastline). The Marine Geology, Oceanography and Physical Processes study area represents the anticipated Zone of Influence (ZoI) that will be relevant to EIAR topics such as Benthic Ecology and Fish and Shellfish Ecology. The adjacent coastline included in the Marine Geology, Oceanography and Physical Processes Topic-specific Study Area extends from Carnsore Point to Wicklow Head.



SHELMALERE OWF EIAR SCOPING REPORT

COASTAL PROCESSES
Protected Sites

Drawing No: P2497-CP-007	A
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Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone
- Study Area

Protected Sites

- SAC
- SPA
- NHA
- pNHA

Figure 6-1 Marine Geology, Oceanography and Physical Processes Topic-specific Study Area

Map showing the location of the study area within the Irish coastline. Includes a north arrow and a note: NOTE: Not to be used for Navigation.

Date	08 June 2022
Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; DP ENERGY; EPA; NPWS
File Reference	J:\P2497\Mxd\04_CP\ P2497-CP-007.mxd
Created By	Lewis Castle
Reviewed By	Emma Kilbane
Approved By	Paul Evans

Logos for DP ENERGY, MarineSpace, and intertek. Includes a scale bar (0 to 20 km) and copyright information: © Metoc Ltd, 2022. All rights reserved.

6.1.2 Relevant Policy and Guidance

Relevant policies and guidance documents relevant to the Marine Geology, Oceanography and Physical Processes EIAR topic are detailed below. Where certain guidance documents have been produced in relation to UK offshore wind farm projects, i.e. not strictly applicable to Irish offshore wind farm projects, these will be reviewed as part of the EIAR process and due consideration will be given to how this guidance is applied for to Shelmalere Offshore Wind Farm.

Table 6-1 Relevant Policy and Guidance Documents (Marine Geology, Oceanography and Physical Processes)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Guidelines on the information to be contained in Environmental Impact Assessment Reports	EPA, 2022	Ireland
Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2	CIEEM, 2022	UK and Ireland
Coastal Process Modelling for Offshore Wind Farm Environmental Impact Assessment: Best Practice Guide. COWRIE Coast-07-08	COWRIE, 2009	UK
Guidance on EIS and NIS Preparations for Offshore Renewable Energy Projects	DCCAE, 2017	Ireland
Guidance on Marine Baseline Ecological Assessments and Monitoring Activities for Offshore Renewable Energy Projects Parts 1 and 2 April 2018	DCCAE, 2018	Ireland
Assessment of Impact of Offshore Wind Energy Structures on the Marine Environment	Marine Institute, 2000	Ireland
Advice to Inform Development of Guidance on Marine, Coastal and Estuarine Physical Processes Numerical Modelling Assessments. Report No 208.	NRW, 2017	Wales
Guidance on Best Practice for Marine and Coastal Physical Processes Baseline Survey and Monitoring Requirements to Inform EIA of Major Development Projects. Report No 243.	NRW, 2018	Wales
Guidance Note. Marine Physical Processes Guidance to inform Environmental Impact Assessment (EIA). GN041.	NRW, 2000	Wales
Assessment of the environmental impacts of cables	OSPAR, 2009	Europe

6.1.3 Receiving Environment

6.1.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

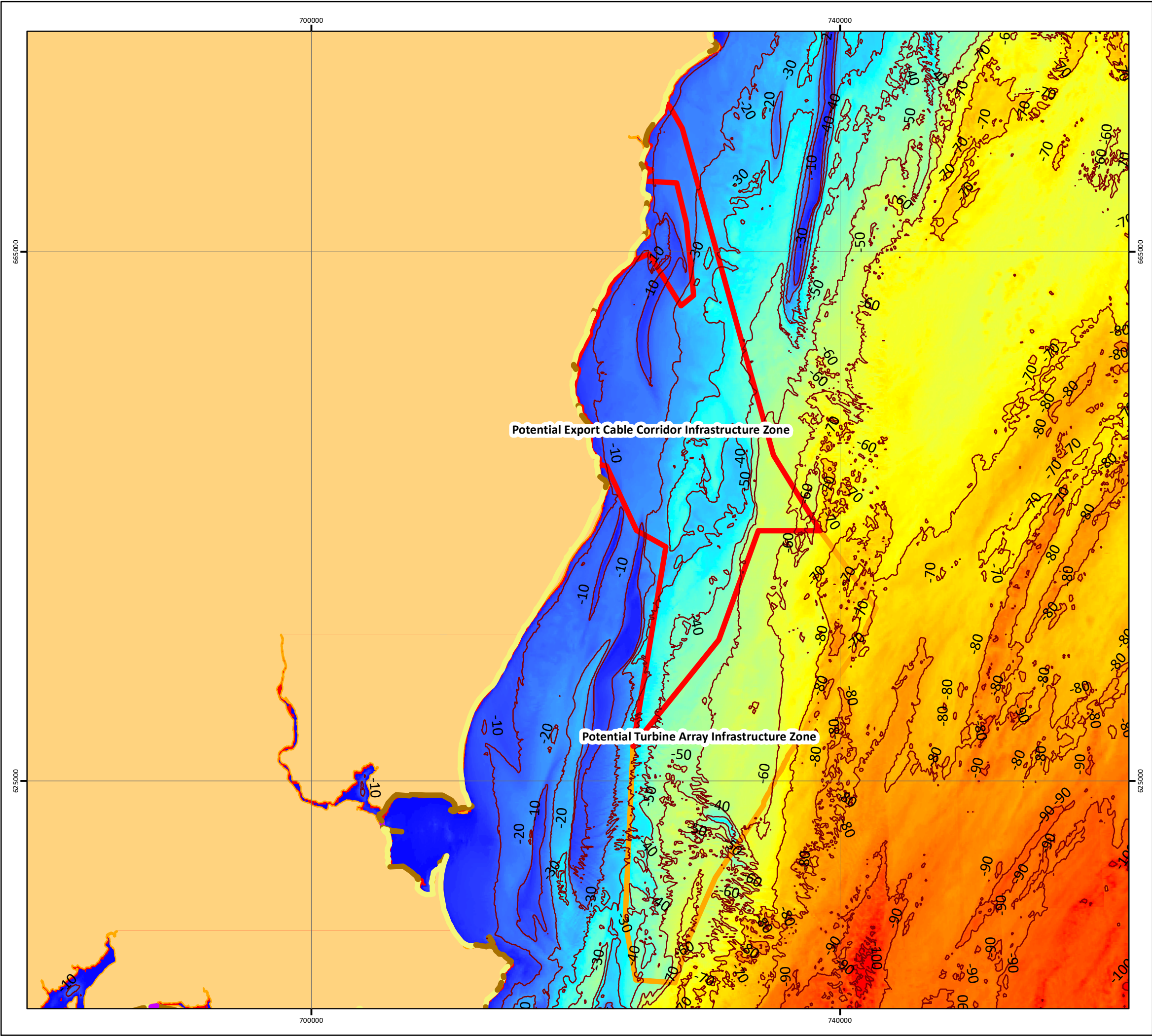
The description of the receiving environment considers the conditions that exist at the present time and over an equivalent period of the lifetime of the development. Accordingly, climate change influences on the present conditions are also considered over this period.

The main sources of data and information considered in this review, and which will be used to inform the EIAR include, amongst others:

- Integrated Mapping for the sustainable development of Ireland's marine resource (INFOMAR);
- Geological Survey Ireland (GSI);
- Office of Public Works (OPW);
- Environment Protection Agency (EPA);
- Climate Ireland;
- Copernicus Marine;
- European Marine Observation and Data Network (EMODnet);
- British Geological Survey (BGS);
- British Oceanographic Data Centre (BODC);
- Centre for Environment, Fisheries, and Aquaculture Science (Cefas);
- UK Hydrographic Office (UKHO).

6.1.3.2 Coastline

The offshore components of The Project (Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone) are located off the south-east coast of Ireland at the southern end of the Irish Sea, close to the boundary with the Celtic Sea. Water depths across the Potential Turbine Array Infrastructure Zone vary from approximately 80 m (below LAT) in the north-east (furthest offshore position) shallowing to approximately 30 m (below LAT) in the west (towards the coast) with the majority of the area between 50 to 60 m (below LAT) (Figure 6-2).



SHELMALERE OWF EIAR SCOPING REPORT

COASTAL PROCESSES Bathymetry

Drawing No: P2497-CP-001

A

Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone
- Bathymetry Contour (10 m interval)

Coastal Type

- Hard Coast
- Sandy or soft beach area
- Unclassified

EMODnet Bathymetry 2022

Depth m (LAT)

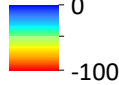


Figure 6-2 Bathymetry and coastline morphology type. Source: EMODnet



NOTE: Not to be used for Navigation

Date	08 June 2022
Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; DP ENERGY, EPA, EMODnet
File Reference	J:\P2497\Mxd\04_CP\ P2497-CP-001.mxd
Created By	Lewis Castle
Reviewed By	Emma Kilbane
Approved By	Paul Evans



6.1.3.3 Coastline

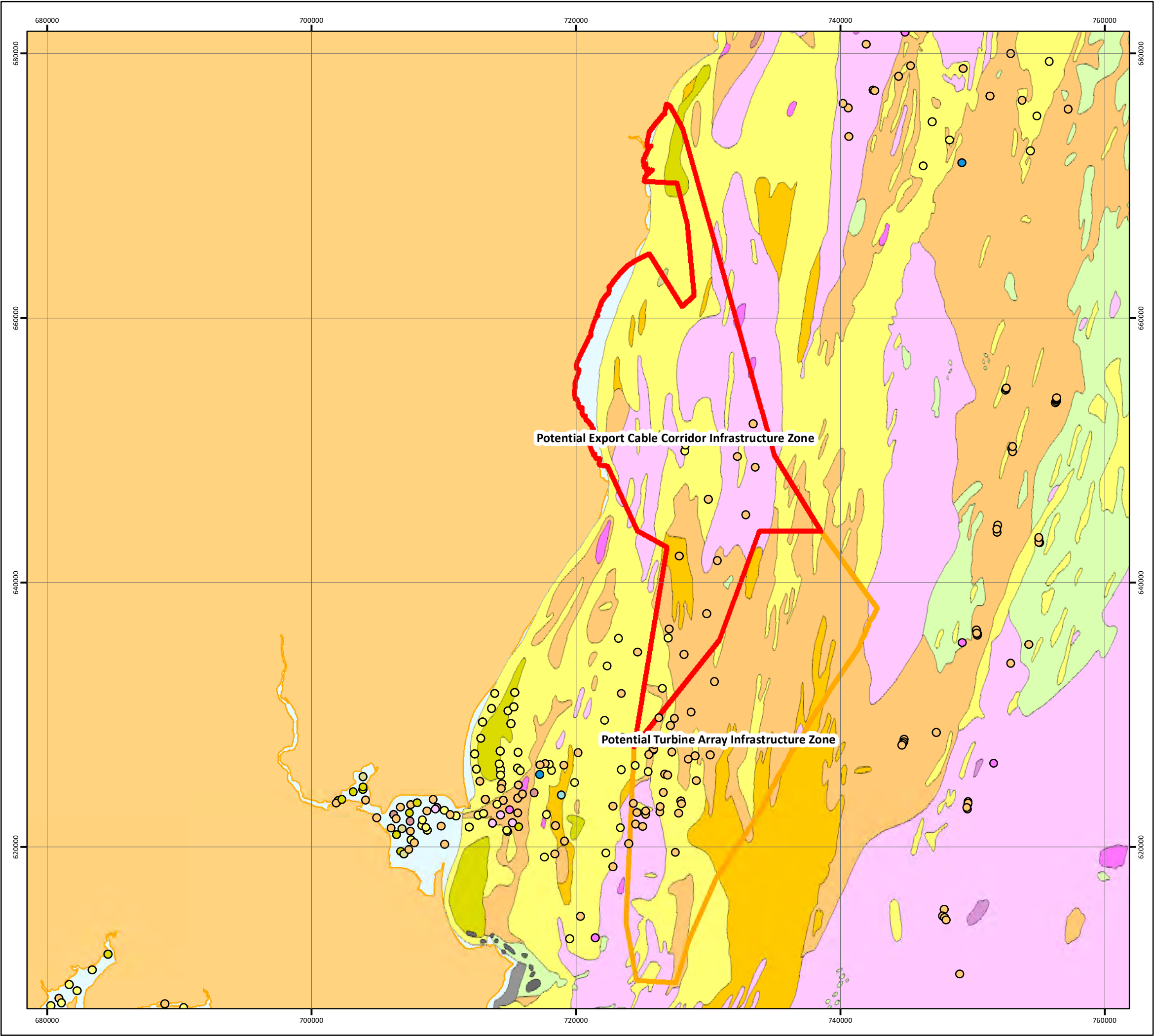
The adjacent coastline is largely buffered from the Potential Turbine Array Infrastructure Zone by a series of nearshore sandbanks (including Long Bank, Lucifer Bank, Blackwater Bank and Money Weights Bank). North of Wexford Harbour there is a long section of sandy beach with occasional areas of defended coastline (e.g. Blackwater Head) terminating at Cahore Point (an erosion resistant rocky headland). From Cahore Point the orientation of the coastline changes with a series of small sandy beaches between rocky headlands (e.g. Glascarring Point, Honey Point, Pollshone Head) up to the entrance of Courtown Harbour which is bounded by training walls. From Courtown Harbour, the coastline continues in a north-north-easterly direction up to Castletown.

Kilmichael Point is a further protruding headland where the orientation of the coastline turns north again followed by small beaches between further rocky headlands up to Roadstone Jetty and onto Arklow Harbour where the entrance is sheltered by training walls.

The net drift of longshore drift along the long beaches is considered to be to the north-north-east, driven by the influence of prevailing Atlantic waves, from the south, reaching this coastline, diffracting around Carnsore Point and refracting into shallow water. These beaches appear to be wider at their northern ends, supporting this direction of drift, with accumulating sediment against updrift headlands which are also occasionally developed with a system of dunes.

6.1.3.4 Seabed substrate

The local seabed is formed mainly of sands and gravels (Figure 6.3). The coarser sediments are interpreted as a glacial lag deposit (Coughlan *et al.*, 2020) (1). Areas around Carnsore Point are scoured to a rocky seabed by faster flows. This headland is formed of granite rock which is resistant to erosion. Inshore, there are patches of finer sediment (muddy sand) toward Wexford Harbour reflecting an area with more benign wave and tidal conditions suitable for deposition.



SHELMALERE OFFSHORE WIND FARM

COASTAL PROCESSES
Substrate

Drawing No: P2497-CP-002

A

Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone

Seabed Substrate

- Sand
- muddy Sand
- Diamictin
- gravelly Sand
- (gravelly) Sand
- sandy Gravel
- Gravel
- muddy sandy Gravel
- Palaeozoic or quaternary rock or diamicton
- Undifferentiated Rock

Grab Sample

- (gravelly) Sand
- (gravelly) muddy Sand
- Sand
- gravelly Sand
- gravelly muddy Sand
- muddy Sand
- sandy Gavel
- sandy Mud

Figure 6-3 Seabed
substrates. Source: BGS



NOTE: Not to be used for Navigation



Date	08 June 2022
Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; DP ENERGY; EPA; BGS; INFOMAR
File Reference	J:\P2497\Mxd\04_CP\ P2497-CP-002.mxd
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Approved By	Paul Evans



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6.1.3.5 Macro bedforms

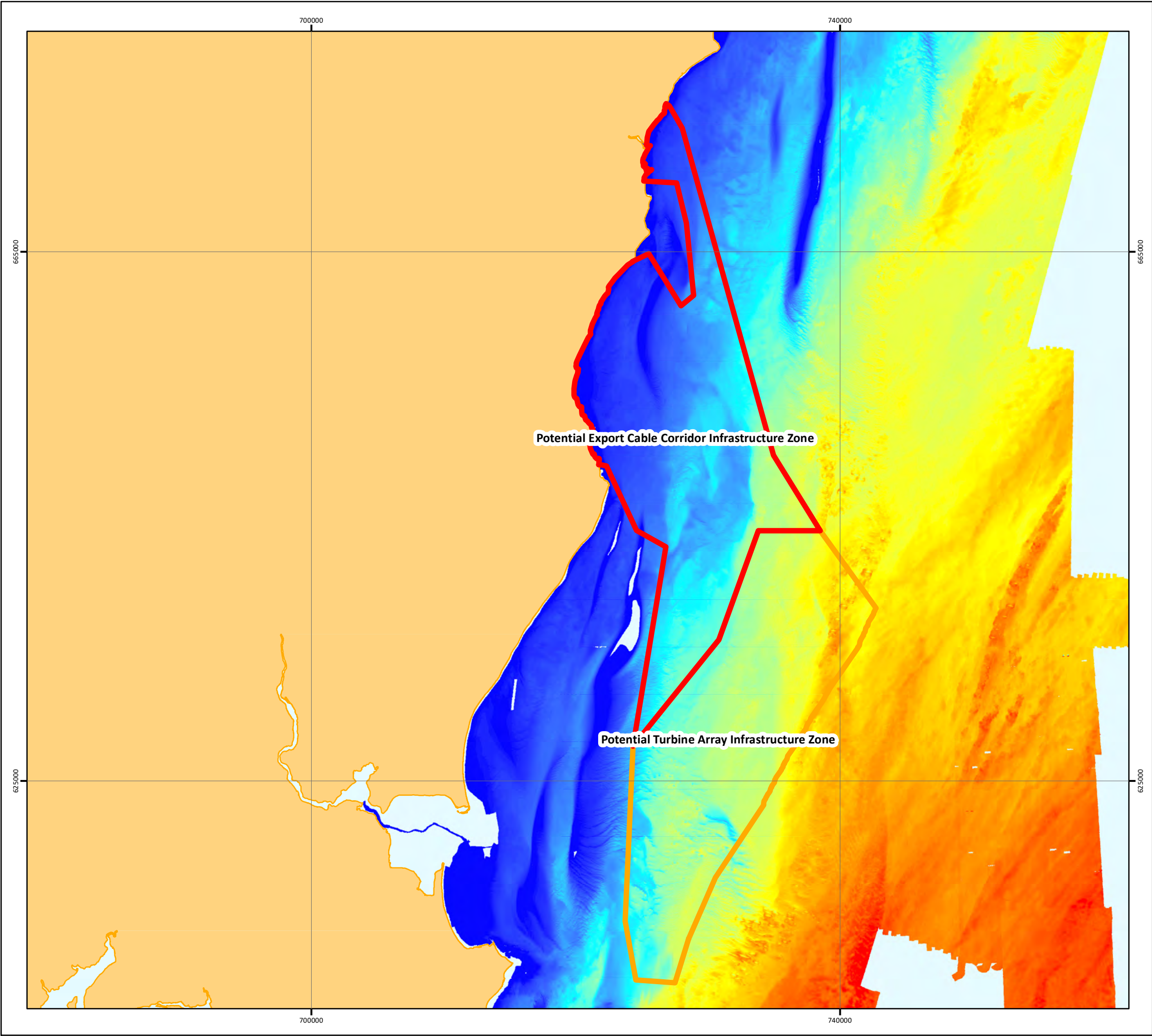
Occasional large bedforms (sand waves and gravel waves) which are indicators of potential sediment mobility are present along the western boundary of the Potential Turbine Array Infrastructure Zone (associated with seaward flanks of adjacent inshore sandbanks of Lucifer Bank and Blackwater Bank) and at the southern end of the Potential Turbine Array Infrastructure Zone (an area influenced by faster headland flows around Carnsore Point and past Tuskar Rock) (Figure 6-4).

The majority of larger bedforms show some level of asymmetry in their cross-sectional profile, generally with steeper slopes on their southern flanks. This asymmetry is an important indicator of net sediment transport of coarse bedload sediments.

6.1.3.6 Waves

Carnsore Point provides sheltering from long period Atlantic swells from the south-west, with the eastern portion of the Potential Turbine Array Infrastructure Zone considered most exposed (least sheltered), as demonstrated by the spatial variation in the mean annual wave height (Figure 6-5), published by the Marine Institute (Marine Institute, 2005).

Figure 6-6 illustrates the variation in (resultant) wave heights in the form of wave roses (developed from a meso-scale wave model hindcast with data obtained from Copernicus Marine) for three representative locations (Site A, B and C) shown in Figure 6-5.



SHELMALERE OWF EIAR SCOPING REPORT

COASTAL PROCESSES
High Resolution Bathymetry

Drawing No: P2497-CP-003	A
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Legend

Potential Export Cable Corridor Infrastructure Zone

Potential Turbine Array Infrastructure Zone

INFOMAR Bathymetry

Depth m (LAT)

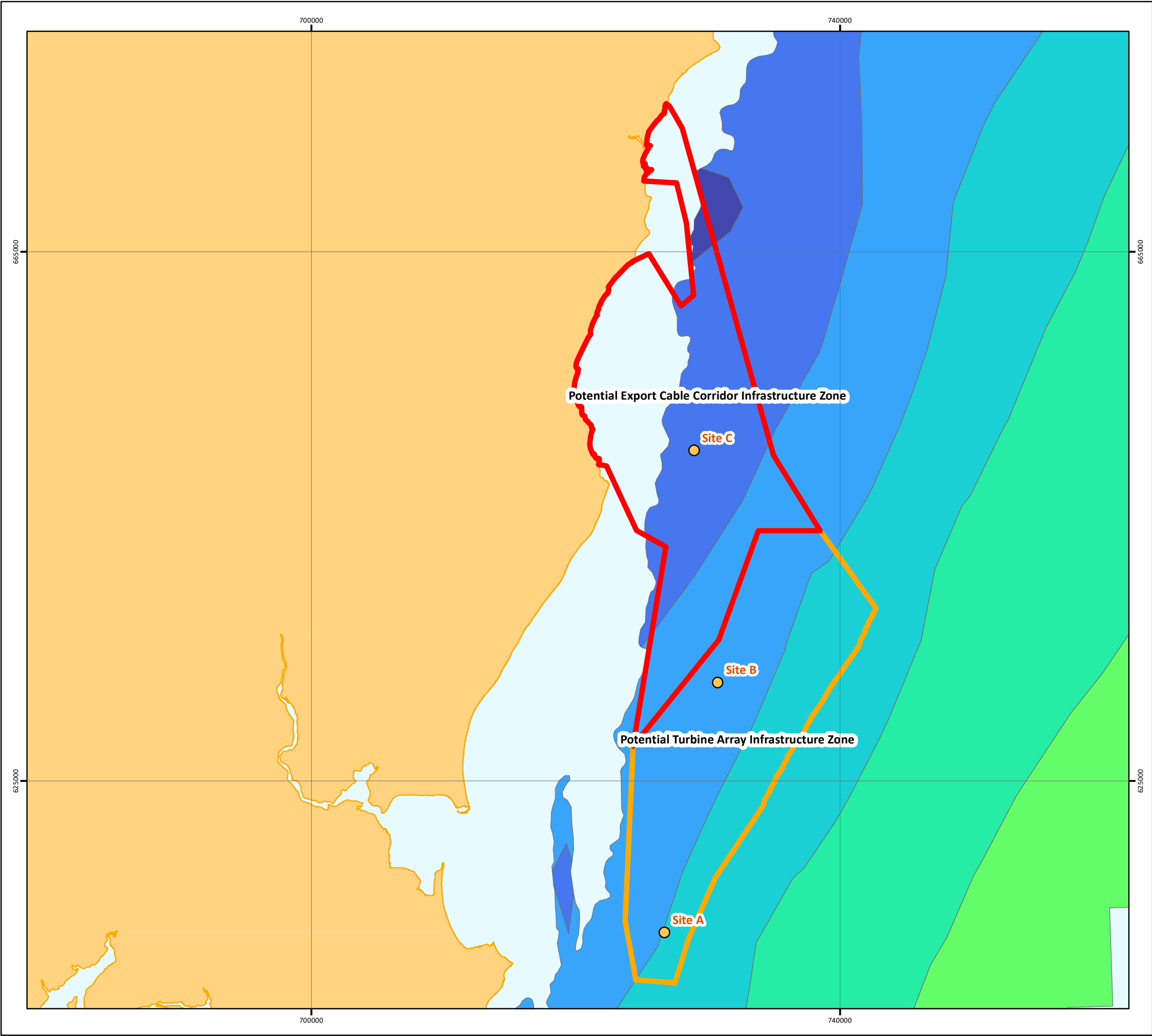
0
-100

Figure 6-4 Shaded relief of bathymetry indicating bedform features. Source: INFOMAR

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Date	09 June 2022
Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; DP ENERGY; EPA; INFOMAR
File Reference	J:\P2497\Mxd\04_CP\ P2497-CP-003.mxd
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SHELMALERE OWF EIAR SCOPING REPORT

COASTAL PROCESSES
Mean Annual Wave Height

Drawing No: P2497-CP-004	A
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Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone
- Metocean Deployments

Mean Annual Wave Height (m)

- 0.25
- 0.5
- 0.75
- 1
- 1.25
- 1.5

Figure 6-5 Mean annual wave heights. Data source: Irish Marine Energy Atlas (Marine Institute, 2005)

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Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; DP ENERGY, EPA, MII
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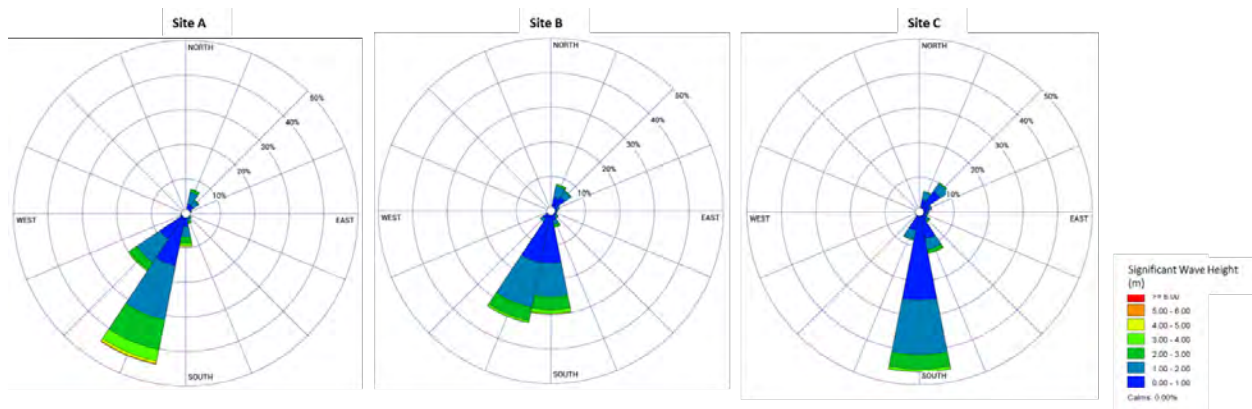


Figure 6-6 Wave roses for three representative locations across the Potential Turbine Area Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone offshore development. Data source: Copernicus Marine

Site A	Site B	Site C (within ECC)
Mean annual wave height: 1.35 m Max. annual wave height = 6.68 m	Mean annual wave height: 1.06 m Max. annual wave height = 5.28 m	Mean annual wave height: 0.90 m Max. annual wave height = 4.51 m

In each case, the dominant mean wave direction is from the south-south-east to south representing waves from the Atlantic. Waves from other directions are possible, but appear less frequent, noting waves from north-north-west directions in the wave roses represent the longest fetch across the Irish Sea for locally generated wind-waves.

Water depths across the Potential Turbine Array Infrastructure Zone are likely to be sufficient so that wave driven influences on sediment transport are minimal, meaning tidal flows are the dominant driving process for this location.

6.1.3.7 Water Levels

Water levels will vary across the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone, according to tidal and non-tidal influences with the main spatial variation expected to be north to south. The northern end of the Potential Export Cable Corridor Infrastructure Zone is coincident with a (degenerate) tidal amphidrome around Courtown, County Wexford, where the tidal influence is effectively nil (i.e. zero tidal range). The tidal range increases with distance away from this amphidrome to the south and south-east leading to the largest tidal range at the southern end of the Potential Turbine Array Infrastructure Zone. Standard tidal levels at Rosslare (Table 6-2) are likely to be representative for the mid-section of the Potential Turbine Array Infrastructure Zone with larger tidal ranges to the south and lower tidal ranges to the north.

Table 6-2 Standard tidal levels for Rosslare (source: UKHO, 2022) (3)

Tidal level		Value (m above LAT)
Mean High Water Spring	MHWS	2.3
Mean High Water Neap	MHWN	1.8
Mean Low Water Neap	MLWN	1.1
Mean Low Water Spring	MLWS	0.7
Mean Spring Range	MSR	1.6
Mean Neap Range	MNR	0.7

Standard variations in water levels will be used to define tidal scenarios to investigate advection of sediment plumes over representative spring and neap tides. Climate change effects are expected to increase mean sea level rather than modify tidal range.

6.1.3.8 Tidal Flows

Flows will vary across the site according to tidal and non-tidal influences with the main spatial variation created by shallow water influences (e.g. sandbanks) and coastal features (e.g. headlands and islands). A typical pattern of flow speeds across the Potential Turbine Array Infrastructure Zone and Export Cable Corridor Infrastructure Zone is shown in Figure 6-7, based on a meso-scale hydrodynamic model (source: Copernicus Marine).

Presently, observational flow data within the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone is limited to a single location towards the eastern boundary of the Turbine Array Infrastructure Zone in a water depth of around 65 m (data from BODC). In 1974, observations were recorded at a fixed depth of 20 m below sea surface for a period of 31 days, which encompasses a full lunar cycle of spring and neap tides (new moon and full moon). The timeseries variation of flows over this period is shown in Figure 6-8. Peak flows during neap tides reach around 0.6 to 0.8 m/s and springs reach around 1.4 to 1.7 m/s.

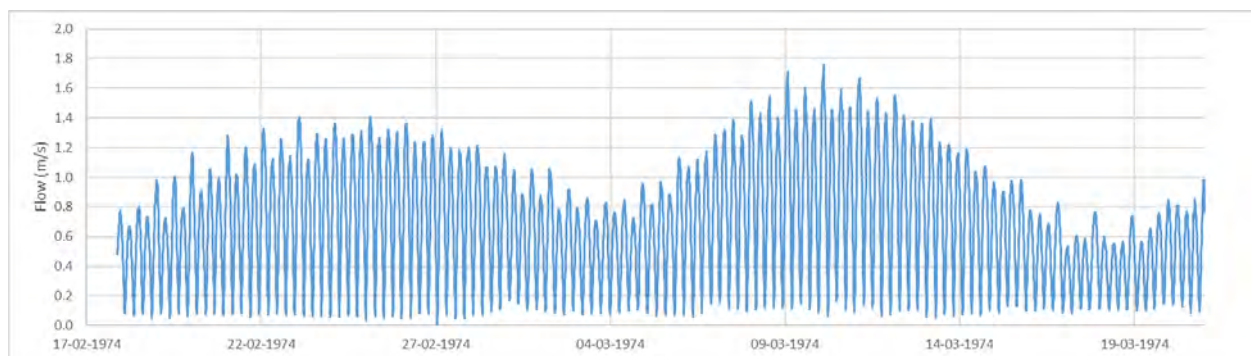
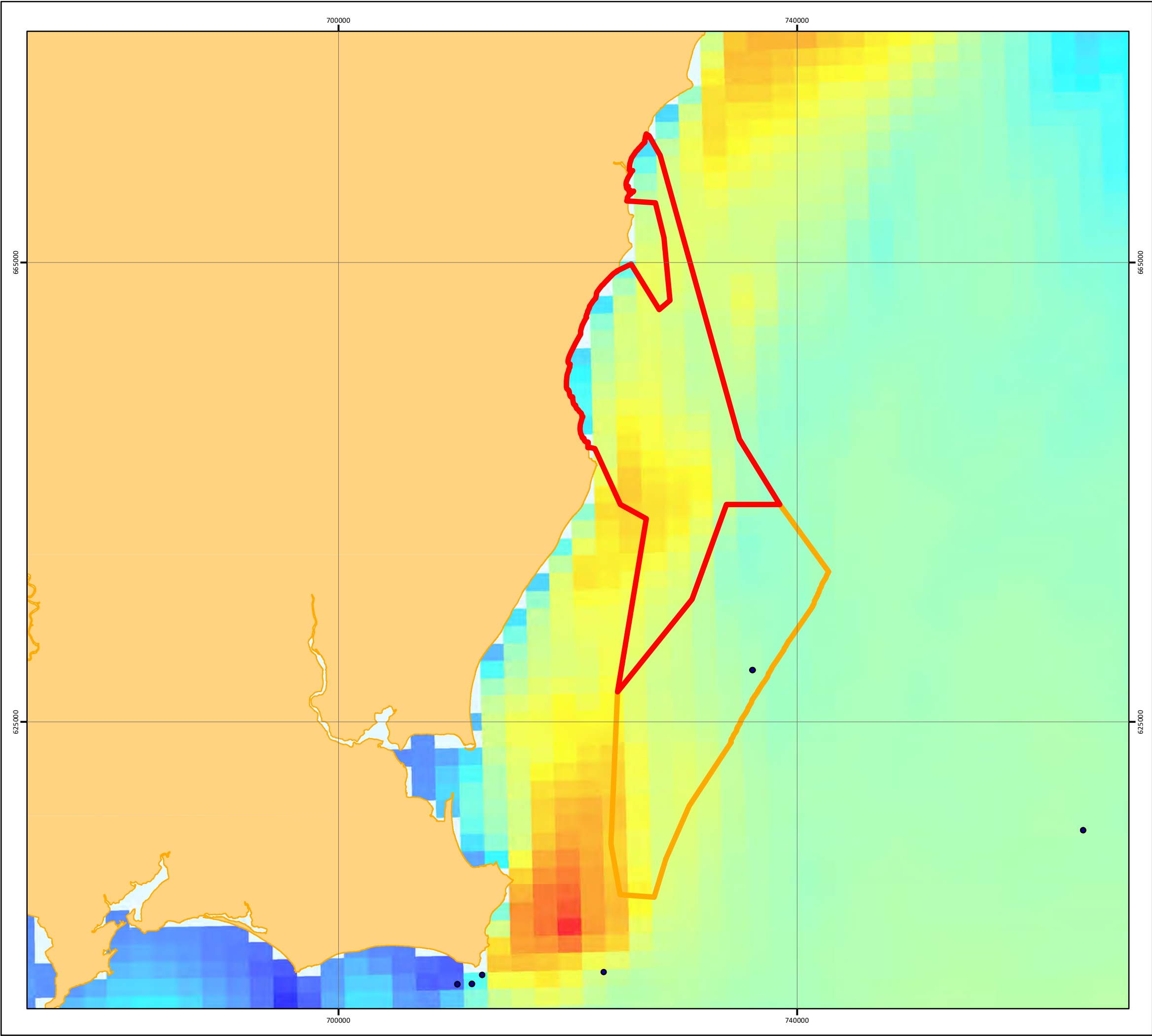


Figure 6-7 Representative flows within the Potential Turbine Array Infrastructure Zone (data source: BODC)



SHELMALERE OFFSHORE WIND FARM

COASTAL PROCESSES
Current Meter Records

Drawing No: P2497-CP-005

A

Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone
- Current Mooring
- Flow Speeds**
 - High : 1.416
 - Low : -0.234

Figure 6-8 Indicative spatial variation of flows.
Data Source: Copernicus Marine



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Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; DP ENERGY, EPA, BODC, Copernicus Marine
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Approved By	Paul Evans



0 2.5 5 7.5 10 km

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Figure 6-9 presents the same flow observations as a current rose to help visualise the axis of tidal flows and variations between ebb and flood tides. The flood tide flows to the north-north-east and the ebb to the south-south-west as a rectilinear reversing flow. Notably, stronger flows occur on the ebb phase of the tide. This tidal asymmetry is important for determining the direction of net sediment transport.

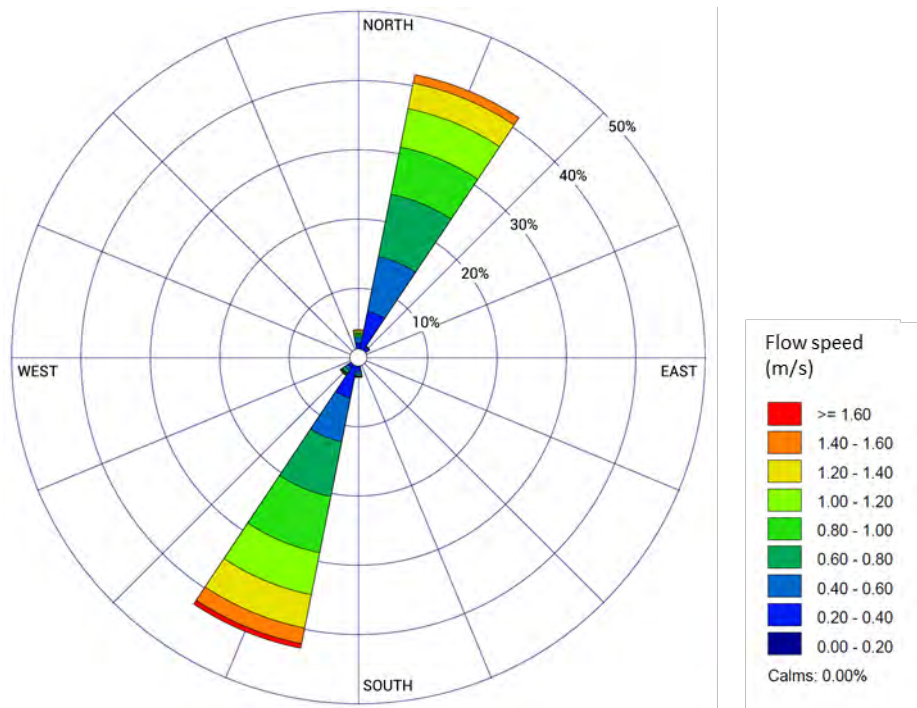


Figure 6-9 Current rose for Array Investigation Area (data source: BODC).

The same flow information provides a useful indicator of the scale of tidal excursion, which in turn offers a basis for setting the extents of the Marine Geology, Oceanography and Physical Processes Topic-specific Study Area, as described in the Introduction to this Chapter, i.e. it is based on the potential reach of sediment plumes on flood and ebb phases of the tide. During the period of observations, the largest spring tide event developed peak ebb flows up to 1.76 m/s. For this tide, the total ebb tidal excursion is estimated as 24.5 km to the south-south-east with the equivalent flood tide having an excursion of 19 km to the north-north-east.

6.1.3.9 Seabed sediment transport

Based on the interpreted influences of waves and tidal flows on the seabed substrates, as well as indicators from bedform asymmetry, the general pattern of net sediment transport as bedload is considered to be in a south-south-west direction driven by periods of strong ebb flows (Figure 6-10). This direction of net sediment transport originates with a bedload parting zone further to the north around a large shallow shoal off Wicklow Head. The influence of prevailing Atlantic waves from southerly directions is expected to be minimal in the deeper water but increasing towards the coastline to drive net longshore drift to the north-north-east.

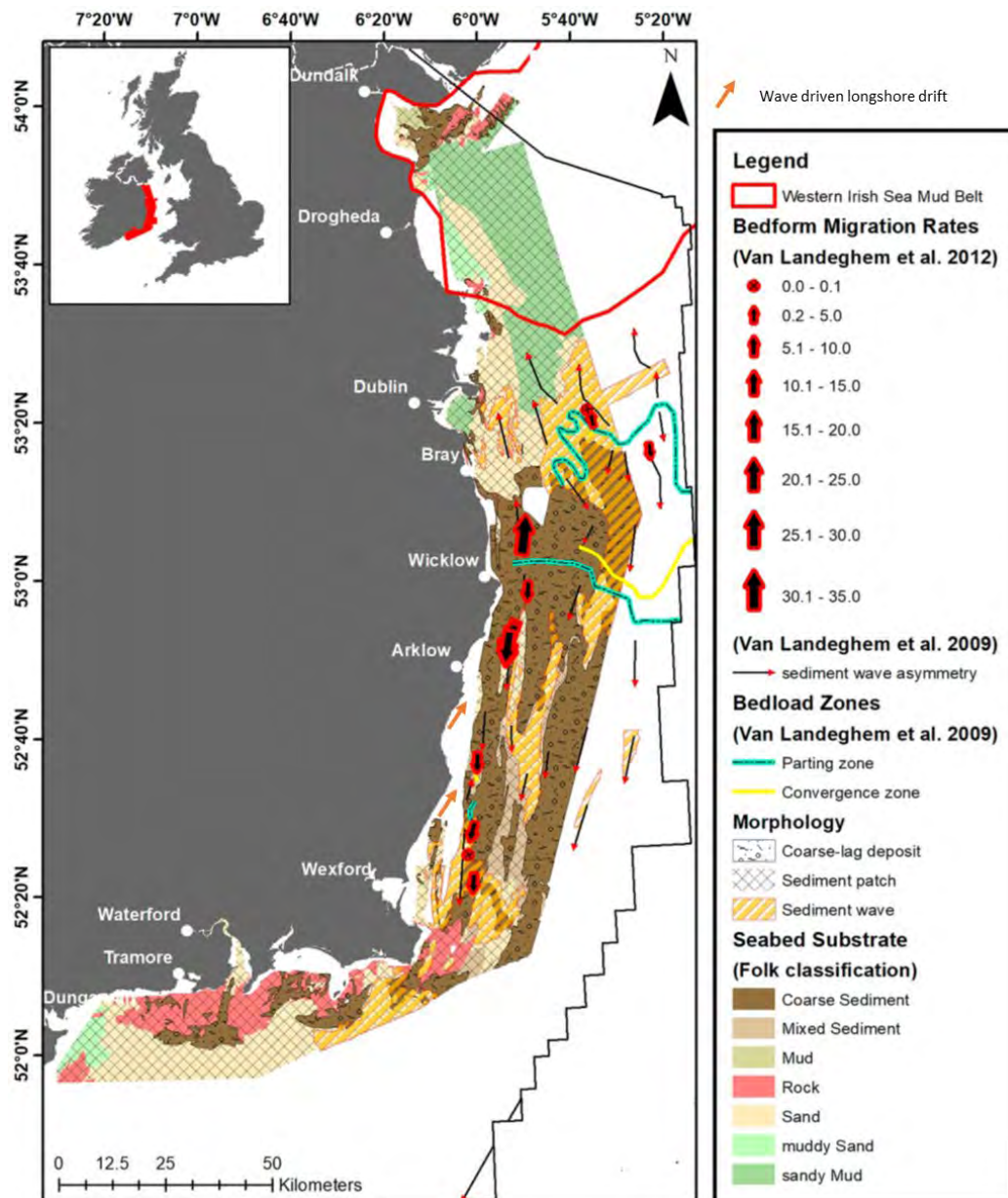


Figure 6-10 Net direction of bedform transport; adapted from Van Landeghem, 2009

6.1.3.10 Suspended sediments

Apart from bedload sediment transport, there is also a potential for fine sediments to be suspended in the water column for a sufficient duration to lead to increased turbidity and become advected by tidal flows. Understanding the background load of suspended particulate matter (SPM) sets a context for assessing the effect of any sediment plumes which might occur during the construction phase of Shelmalere Offshore Wind Farm (e.g. seabed levelling for foundations, cable laying, etc.).

Figure 6-11 provides a representation of average SPM concentration for the month of February (month with highest concentrations) deduced from 18-years of satellite data from January 1998 to December 2015 (CEFAS, 2016).

Highest SPM concentrations are associated with the nearshore areas due to inputs from rivers and increased mixing from waves in shallow water. Lowest concentrations are present further offshore away from the nearshore sources and influences.

6.1.3.11 Stratification and fronts

The Irish Sea is a shallow, tidally well-mixed water body with a southern boundary (taken to be between Carnsore Point, Ireland to St David's Head, Wales) which joins with deeper water of the Celtic Sea. The shallower water in the Irish Sea becomes seasonally stratified during the summer period due to increased solar radiation. The junction between these two water bodies forms a seasonal front which is associated with increased concentrations of chlorophyll and primary production. This front is referred to as the Celtic Sea Front.

Recent analysis of satellite data over the period 1998 to 2008 (Miller and Christodoulou, 2014) indicates that seasonal fronts may also form close to the Potential Turbine Array Infrastructure Zone which could have an associated influence in the pelagic environment through wake effects and increased mixing.

6.1.3.12 Effect due to climate change

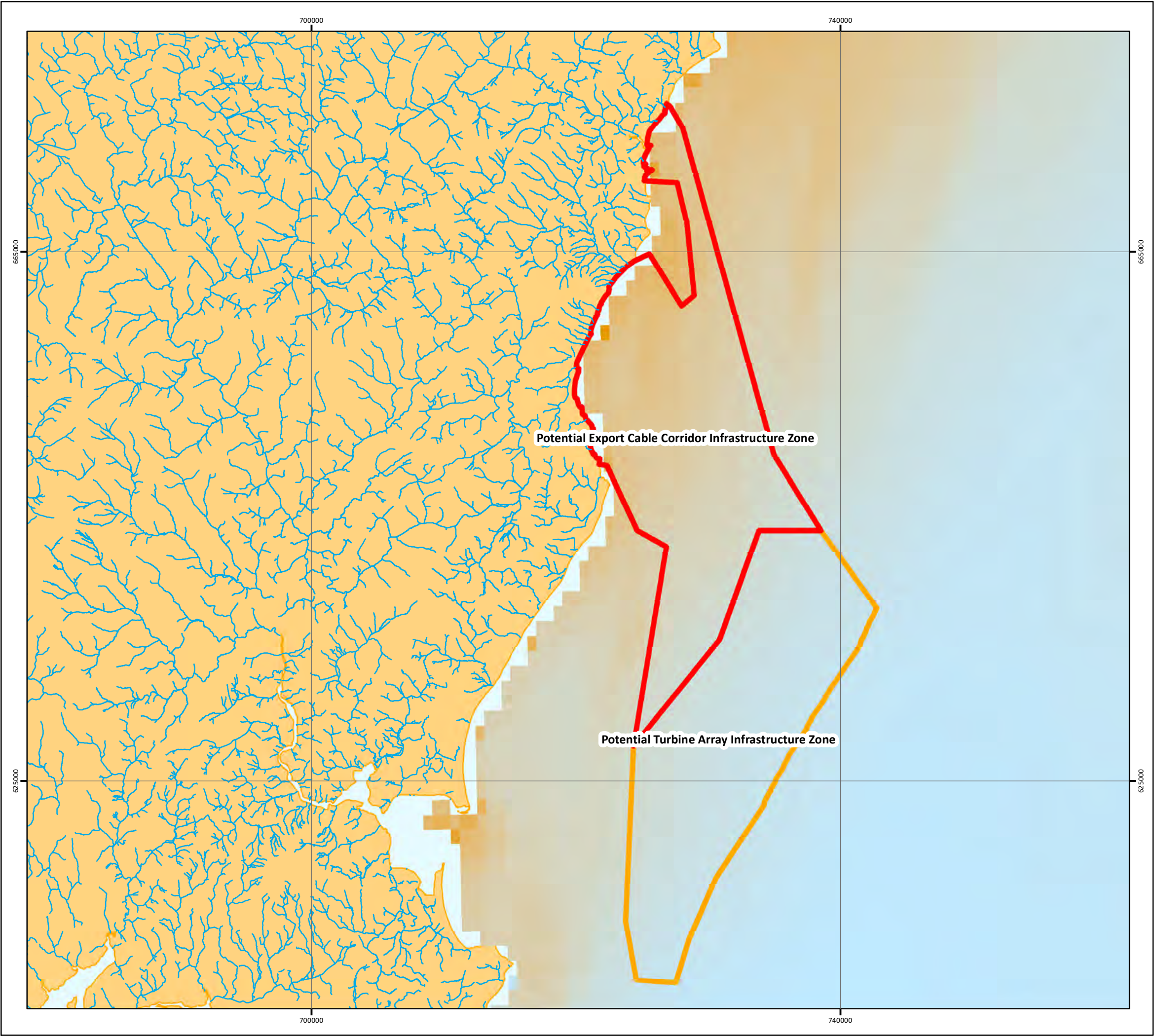
Over the operational lifetime of Shelmalere Offshore Wind Farm, climate change has the potential to (slightly) modify the present baseline, although the exact type and scale of such modifications remains uncertain. The future EIAR will provide consideration to latest publications to establish potential regional changes in mean sea level and wave climate.

At present, OPW base their flood risk allowances for sea level rise on evidence from the Intergovernmental Panel on Climate Change (IPCC). Two projections are considered to offer a range of possible outcomes:

- Mid-Range Future Scenario (MRFS) with sea levels increasing by 500 mm by 2100;
- High-End Future Scenario (HEFS) with sea levels increasing by 1,000 mm by 2100.

In addition, glacial isostatic adjustments for land movement applicable for the southern half of Ireland are estimated to be -0.5 mm/year.

The likely consequences of an increasing mean sea level are for progressively higher surge events (and extreme water levels), a marginal landward movement of the high-water line, and for wave shoaling effects to commence slightly closer to the shore. Climate Ireland suggest surge levels for events with a 20-to-30-year return period are likely to increase by up to 0.09 m by 2100.



SHELMALERE OWF EIAR SCOPING REPORT

COASTAL PROCESSES
Suspended Particulate Matter

Drawing No: P2497-CP-006	A
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Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone
- River

Mean Suspended Particulate Matter (1998-2015)

µm

- High : 20.8886
- Low : 2.22625

Figure 6-11 Average monthly (February) concentration of SPM (1998 to 2015). Data source: Cefas, 2016

NOTE: Not to be used for Navigation

09 June 2022

IRENET95 Irish Transverse Mercator

Transverse Mercator

IRENET95

ESRI; DP ENERGY; EPA; EEA; CEFAS

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DP ENERGY MarineSpace intertek

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Climate Ireland also provide an overview for climate change effects on waves, suggesting projected changes in wave heights remain uncertain with latest research suggesting a (slight) decrease in average and extreme wave heights by 2100. The more notable variability of wave conditions within the lifetime of an offshore wind farm project is mainly due to interannual variability due to natural climatological variations rather than climate change.

6.1.4 Potential Additional Data and Proposed Surveys

Presently available baseline evidence (i.e. broad-scale mapping, regional seabed surveys, meso-scale modelling and metocean observations) enables a suitable high-level qualitative description of the features of interest and the prevailing marine processes to establish the relevant Marine Geology, Oceanography and Physical Processes Topic-specific Study Area study area and identify associated receptors.

Notably, the existing evidence typically offers a description of individual marine processes rather than providing a fully integrated view of process interactions. In addition, meso-scale models do not include local validation and their data may not fully represent all local scale effects (e.g. flows around headlands or small island features such as Tuskar Rock, or shallow water processes related to sandbanks processes or towards the coastline).

Metocean surveys may be undertaken to obtain suitable data across the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone to improve on the baseline understanding and support the development and validation of marine process modelling tools.

A key data gap in existing geophysical evidence is detailed particle size distributions of seabed sediments. Presently available grab sample data is limited to providing relative contributions of muds, sands and gravels which is only sufficient to developing a qualitative description of sediment type, based on the Folk classification.

During construction, there are expected to be various activities that disturb seabed sediments which may lead to sediment plumes, notably of the fine sediment fraction. The composition and fate of any sediment plume depends on the particle sizes involved as well as the metocean properties of the receiving water.

Table 6-3 summarises project-specific surveys which are proposed to enable the identified data gaps to be filled and for the site to be fully characterised for EIAR purposes.

Table 6-3 Summary of site investigations activities to inform Marine Geology, Oceanography and Physical Processes

Survey Method	Summary Approach
Geophysical survey	<p>Survey coverage of the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone with a range of sensors to collect site-specific data:</p> <p>Multibeam Echosounder (MBES) – to generate detailed topographical information of the seabed and mapping of near seafloor sediment types.</p> <p>High resolution side-scan sonar (SSS) – to identify key seabed sediment types and bedforms, as well as to identify any features of note, including but not limited to wrecks, debris or other man-made objects.</p>

Survey Method	Summary Approach
	Sub-bottom profiling (SBP) – to allow for assessment of variations in thickness and sediment cover of the seabed sediments and shallow geology to a depth of 5 m or greater, for inter array cable and export cable design cable design purposes and development of the ground model.
Grab sampling	Sub-tidal seabed locations across the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone will be sampled, with multiple samples taken at each location. Subsequent analysis will include detailed particle size distributions. Site-specific geophysical data will be reviewed to identify potential sub-tidal habitats of conservation importance, i.e. Annex I habitats. DDV will be deployed to identify, classify and delineate the spatial extent of any such features.
Metocean survey	Deployment of metocean buoys to obtain site-specific wave, water levels, flows and turbidity data may be needed to inform the EIAR and wider engineering studies.

6.1.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Marine Geology, Oceanography and Physical Processes receptors.

The assessment of potential effects will be established using the standard Source-Pathway-Receptor (S-P-R) approach. The relevance of these potential effects will be considered against the receiving environment conditions which would be expected to occur if no development took place.

The sources of potential impacts will be established from specific project activities within the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone which may disrupt marine processes. These specific project activities will be presented in the Project Description chapter of the EIAR.

The main type of impacts 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;
- Blockage effects – medium to long-term impacts from structures placed on the seabed (e.g. a layout of foundations across the Potential Turbine Array Infrastructure Zone occurring over the operational phase) which can locally modify wave energy transmission to the leeward coastline or develop flow wakes which can increase mixing in the near-field leading to local scouring and/or disruption to stratification of the water body.

The capacity for these impacts to translate over a wider area (far-field) relates to the marine processes which can develop a pathway, e.g., tidal advection to carry a plume or wave energy transmission.

Where other physical features (e.g. adjacent sandbanks and leeward coastline, etc.) may be impacted by these effects, then they are considered by this topic as physical process receptors. Some impacts may also be relevant to other EIAR chapters (e.g. 'Benthic, Epibenthic and Intertidal' and 'Fish and Shellfish Ecology')), and where this is the case, the potential impacts on associated receptors will be considered by the relevant chapter, informed by relevant sources and pathways established by this chapter.

The magnitude, extent and duration of seabed disturbance and blockage impacts will be described using a combination of industry standard coastal process modelling tools (e.g. MIKE-21, or similar) and an evidence-based approach. Model scenarios will consider representative wave and tidal events that are relevant to the development period for baseline and scheme related scenarios.

The model will incorporate the entire Marine Geology, Oceanography and Physical Processes Topic-specific Study Area (Figure 6-1), providing a sufficient level of detail to resolve key influences on Marine Geology, Oceanography and Physical Processes, such as headlands, islands, sandbanks, and coastline, etc. Existing survey data from INFOMAR will be supplemented by project-specific geophysical survey data to define an up to date and detailed description of bathymetry. Any metocean survey undertaken will potentially provide important data within the development area to demonstrate the performance of the model (through calibration and validation) in representing relevant marine processes, such as ebb dominance in the tidal flows.

Modelling may not be required to assess all potential effects and in certain cases, an evidence-based approach (based on existing information from other projects) may provide a more suitable assessment approach. It is important to note that the accepted premise for the evidence-based approach is that a comparable project in a comparable setting can be expected to produce a comparable effect.

The approach to assessing significance of any effects will adopt the project-wide assessment matrix. Where appropriate, mitigation measures will be proposed, and residual effects presented.

6.1.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works.

As additional plans, project and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the eventual Cumulative Impact Assessment to be included in the future EIAR fully considers other Projects.

Once the list of other plans, projects and activities to be assessed within the Cumulative Impact Assessment in the EIAR has been agreed, as many details from these other plans, projects, and activities relevant to the assessment of potential effects on Marine Geology, Oceanography and Physical Processes will be collated and reviewed.

This will include as many details that can be collated with respect to proposed timing of construction phases on other plans, projects and activities in the region to determine if scope exists for impacts such as potential for increased SSC plumes from Shelmalere Offshore Wind Farm and other plans, projects and activities to interact spatially and temporally. Presently, the first and second phases of Arklow Bank Wind Park represents are the only offshore wind farm within the Marine Geology, Oceanography and Physical Processes Topic-Specific Study Area.

In addition to this, as much information on other plans, projects and activities that have not yet submitted full EIARs will also need to be collated and reviewed to inform the Cumulative Impact Assessment of the future EIAR.

With respect to potential transboundary impacts, based on current understanding, potential impacts on Marine Geology, Oceanography and Physical Processes receptors are expected to be restricted to areas within Irish waters only, i.e. not on any international territory. No impacts are also expected on any interests of another State, i.e. fishing/shipping which occurs within the Irish EEZ as a result of potential impacts on Marine Processes receptors. Therefore, as there is no pathway for transboundary impacts it is currently proposed to scope out transboundary impacts on Marine Geology, Oceanography and Physical Processes from consideration in the future EIAR. This will be confirmed via the formal Transboundary Screening exercise that will be undertaken post EIAR Scoping.

6.1.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR, with respect to the potential effects on Marine Geology, Oceanography and Physical Processes receptors.

6.1.5.3 Proposed Consultees

Table 6-4 summarises the proposed consultees for the Marine Geology, Oceanography and Physical Processes chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objectives of this consultation are also included in [Table 6-4](#).

It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of the Development Permission application.

Table 6-4 Summary of Key Consultees (Marine Geology, Oceanography and Physical Processes)

Proposed Consultee	Objective of Consultation
Marine Institute	1. To confirm available data holdings, including INFOMAR
Geological Survey Ireland	1. To confirm available data holdings, including INFOMAR
National Parks and Wildlife Service	1. To discuss and agree the approach to impact assessment and potential embedded mitigation measures. 2. To discuss preliminary outcomes of assessment and potential mitigation measures with specific reference to designated features / sensitive benthic and/or fish receptors.
Environment Protection Agency	1. To discuss and agree approach to impact assessment and potential embedded mitigation measures. 2. To discuss preliminary outcomes of assessment and potential mitigation measures with specific reference to marine dredging and dumping at sea.
Office of Public Works	1. To discuss and agree approach to impact assessment and potential embedded mitigation measures. 2. To discuss preliminary outcomes of assessment and potential mitigation measures.
Wicklow County Council	1. To discuss and agree approach to impact assessment and potential embedded mitigation measures. 2. To discuss preliminary outcomes of assessment and potential mitigation measures with specific reference to the Wicklow coastline.
Wexford County Council	1. To discuss and agree approach to impact assessment and potential embedded mitigation measures. 2. To discuss preliminary outcomes of assessment and potential mitigation measures with specific reference to the Wexford coastline.

6.1.6 Potential Impacts to be Assessed within the EIAR

Table 6.5 outlines the potential impacts on Marine Geology, Oceanography and Physical Processes receptors which may arise within the Marine Geology, Oceanography and Physical Processes Topic-specific Study Area as a result of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table. The approach to how these potential effects will be assessed within the EIAR is set out in 6.10.5. This process is aimed at delivering a proportionate approach to the EIAR.

Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant impact effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

In some cases, a change in Marine Geology, Oceanography and Physical Processes due to Shelmalere Offshore Wind Farm may lead to a potential impact on a biological receptor (e.g. benthic ecology). In these cases, the Marine Geology, Oceanography and Physical Processes EIAR Chapter will describe the source of such impacts and the pathways which may lead to an effect on that type of receptor.

These actual potential effects will then be assessed and presented within the EIAR chapter in question, i.e. Benthic, Epibenthic and Intertidal Ecology.

Table 6-5 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Marine Processes)

Potential Impact (Pathway)	Project Phase where Impact may potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Increased turbidity and settlement (pathway) Sediment disturbance arising from construction activities, such as cable laying and foundation installation, operational activities (such as cable remedial works) and decommissioning may result in sediment plumes increasing turbidity and settlement with potential adverse effects on benthic communities (including reefs) through smothering.	Yes	Yes	Yes	In
Wake effects (pathway) Foundations across the array will develop a series of wake effects on passing flows and waves that will lead to increased turbulence and mixing during the operational phase. These effects may lead to local scouring around foundations, changes to sediment pathways and a leeward modification on wave energy transmission to the adjacent coastline.	No	Yes	No	In
Increased coastal erosion (impact on coastline) If modifications in wave energy transmission extend to the adjacent coastline, then this may lead to associated changes in littoral drift and the potential for coastal erosion.	No	Yes	No	In
Destabilisation of stratification and fronts (impact on front) Increased mixing due to foundations may destabilise seasonal stratification and affect fronts.	No	Yes	No	In
Changes in offshore sediment pathways (impact on sandbanks) The wake effects around foundations may lead to local modifications in sediment pathways in area important to the morphological behaviour of adjacent sandbanks.	No	Yes	No	In
Changes in shoreline sediment pathways (impact on coastline) Cable Landfall construction options include open cut trenching which may lead to a short-term disruption to shoreline sediment pathways and an impact on the updrift coastline (reduced sediment supply leading to erosion).	Yes	No	No	In
Cumulative Impacts	Yes	Yes	Yes	In
Transboundary Impacts	No	No	No	Out

6.1.7 EIAR Scoping Questions

The following questions are designed to assist stakeholders in providing feedback to the EIAR Team on the Marine Processes topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Marine Geology, Oceanography and Physical Processes chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Marine Geology, Oceanography and Physical Processes Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Marine Geology, Oceanography and Physical Processes chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Marine Geology, Oceanography and Physical Processes chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Marine Geology, Oceanography and Physical Processes chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.1.8 References

- Cefas. Suspended Sediment Climatologies around the UK. Report for the UK Department for Business, Energy and Industrial Strategy offshore energy Strategic Environmental Assessment programme. 2016.
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K.J.J. Van Landeghem *et al.* Reversed sediment wave migration in the Irish Sea, NW Europe: A reassessment of the validity of geometry-based predictive modelling and assumptions. *Marine Geology: Volumes 295–298*, 15 February 2012, Pages 95-112.

6.2 CHAPTER 2: MARINE WATER AND SEDIMENT QUALITY

6.2.1 Introduction

This chapter of the EIAR will address the potential effects of Shelmalere Offshore Wind Farm on Marine Water and Sediment Quality. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the future EIAR for Shelmalere Offshore Wind Farm includes the following:

- A list of policy and guidance documents relevant to the Marine Water and Sediment Quality topic;
- A preliminary review of the receiving environment within the Marine Water and Sediment Quality Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential impacts on Marine Water and Sediment Quality receptors;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the future EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Marine Water and Sediment Quality;
- Potential surveys proposed to inform the future EIAR for Marine Water and Sediment Quality;
- A summary of potential impacts on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been completed by Intertek which has an extensive experience of Marine Water and Sediment Quality assessments from previous offshore wind farm EIAs (EIARs).

The Marine Water and Sediment Quality Topic-specific Study Area is defined by the tidal ellipses present in this region (currently estimated to be approximately 24.5 km to the north and south of the Potential Turbine Array and Export Cable Corridor Infrastructure Zones). This is the extent over which potential far-field impacts may arise on Marine Water and Sediment Quality receptors.

6.2.2 Relevant Policy and Guidance

Policies and guidance documents relevant Marine Water and Sediment Quality are detailed below. Where certain guidance documents have been produced in relation to UK offshore wind farm projects, i.e. not strictly applicable to Irish offshore wind farm projects, these will be reviewed as part of the future EIAR process and due consideration will be given to how this guidance is applied for Shelmalere Offshore Wind Farm.

Table 6-6 Relevant Policy and Guidance Documents (Marine Water and Sediment Quality)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland

Policy / Guidance	Reference	Geographic Coverage
Guidance		
Bathing Water Quality in Ireland: A Report for the Year 2021.	(EPA, 2022a)	Ireland
Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2	CIEEM, 2022	UK and Ireland
Pollution Prevention Guidelines.	EA, EHHSNI, SEPA, 2007	UK and Ireland
Guidance on EIS and NIS Preparations for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland
Guidelines for the assessment of dredge material for disposal in Irish waters.	Cronin, M et al, 2006 (Marine Institute)	Ireland
Shellfish Stocks and Fisheries Review 2021: an assessment of selected stocks.	Marine Institute, 2022	Ireland
Review of Cabling Techniques and Environmental Effects applicable to the Offshore Windfarm Industry.	BERR, 2008	UK and Ireland
Guidance on Best Practice for Marine and Coastal Physical Processes Baseline Survey and Monitoring Requirements to inform EIA of Major Development Projects.	Brooks, AJ., Whitehead, PA., Lambkin, DO., 2018	UK and Ireland

6.2.3 Receiving Environment

6.2.3.1 Data Sources used for EIAR Scoping Report and TO BE USED FOR EIAR

Table 6-7 lists the primary data sources that will be considered for the Marine Water and Sediment Quality chapter to be included in the future EIAR (this list is not exhaustive and other sources may also be identified for the EIAR, including through consultation on this EIAR Scoping Report). Where available, data from the past ten years will be utilised to inform the receiving environment for the purposes of the EIAR.

Figure 6-12 below highlights the sensitive receivers, the WFD waterbodies and protected areas of the Topic-specific Study Area for Marine Water and Sediment Quality.

Table 6-7 Key datasets to inform EIAR Scoping Report and EIAR (Marine Water and Sediment Quality)

Data Type	Source	Link/Reference
Water Framework Directive		
Ireland's Marine Atlas – various WQ data	Marine Institute	http://atlas.marine.ie/#?c=53.9000:-15.9000:6
Shellfish water characterisation reports	Government of Ireland	https://www.gov.ie/en/collection/fb234-designated-shellfish-waters-wexford-waterford/
Water quality in Ireland (2013 to 2018)	EPA	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/Water-Quality-in-Ireland-2013-2018-(web).pdf

Data Type	Source	Link/Reference
Bathing water data	EPA	https://www.beaches.ie/find-a-beach/#/
Bathing water quality in Ireland – A report for the year 2020	EPA	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/Bathing_Water_Quality_in_Ireland_2020.pdf
Irish bathing water quality in 2021	EPA	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/Bathing-water-quality-in-Ireland-in-2021.pdf
Bathing water quality	EPA	https://www.beaches.ie/
WFD	Marine Institute	https://www.marine.ie/Home/site-area/areas-activity/marine-environment/water-framework-directive
Chemical Properties		
Initial characterisation of the marine environment for the Marine Strategy Framework Directive (MSFD), 2012	Marine Institute	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69632/pb13860-marine-strategy-part1-20121220.pdf
Sediment Type		
Contaminants in sediments in the marine environment	Ireland's Open Data Portal	https://data.gov.ie/dataset/contaminants-in-sediments-in-the-marine-environment
Ireland's Marine Atlas	Marine Institute	http://atlas.marine.ie/#?c=53.9108;-15.8862;6
Seabed sediments	British Geological Society Geological Survey of Ireland	https://map.bgs.ac.uk/arcgis/services/Offshore/Products_WMS/MapServer/WmsServer?
Suspended sediment climatologies around the UK	Cefas, 2016	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/584621/CEFAS_2016_Suspended_Sediment_Climatologies_around_the_UK.pdf

As required for both the Water Framework Directive (WFD) and Marine Strategy Framework Directive (MSFD), the baseline Marine Water and Sediment Quality has been reviewed up to one Nautical Mile (nm) offshore, which includes the Potential Export Cable Corridor Infrastructure Zone stretching from Arklow in the north to just north of Cahore to the south. A number of coastal and transitional waterbodies exist along this stretch of coastline, each of which has a different ecological status. The coastal waterbodies along this stretch of coastline include the Southwestern Irish Sea - Brittas Bay (HA 10) waterbody, which extends from just north of Potter's River (in the north), to Kilgorman River (in the south).

Immediately south of the aforementioned coastal waterbody is the Southwestern Irish Sea (HAs 11 and 12) waterbody, which extends southwards to immediately south of Rosslare Harbour (EPA, 2022b).

The Marine Water Quality in Ireland 2013-2018 report (EPA, 2019) states that the ecological status of the Wicklow and Wexford coastal waterbodies are High and Moderate, respectively. Neither WFD waterbody is deemed to be at risk.

Within the Potential Export Cable Corridor Infrastructure Zone, there are two designated bathing waters: Ballymoney North Beach and Courtown North Beach. The Marine Water Quality of both bathing waters is classed 'Excellent' (EPA, 2022c), which is the highest, cleanest water quality classification for a bathing water based on routine sampling of *Escherichia coli* (EC) and Intestinal enterococci (IE). This confirms that the Marine Water Quality along this section of coast is of a high standard.

There are no designated shellfish waters in the vicinity of the Potential Export Cable Corridor Infrastructure Zone. The closest designated shellfish waters are located approximately 13 km west of the Potential Turbine Array Infrastructure Zone within Wexford Harbour.

Suspended Sediment Concentrations (SSC) in the Irish Sea vary both spatially and temporally (annually and inter-annually). The annual average inorganic Suspended Particulate Material (iSPM) varies widely, generally decreasing with distance from the coastline. iSPM is generally derived from fluvial inputs (from both erosion in 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 (UKMMAS, 2010). These are also highly dependent on energy inputs (e.g. storms).

Average measured iSPM for the period 1998-2015 in the vicinity of the Potential Turbine Array Infrastructure Zone is approximately 10 mg/l (CEFAS Report, 2016), which is relatively turbid for an open coastline. Furthermore, as shown in Figure 6-11, the highest iSPM concentrations occur in the nearshore regions due to river inputs and increased mixing from waves in shallow water with lower concentrations further offshore.

6.2.4 Potential Additional Data and Proposed Surveys

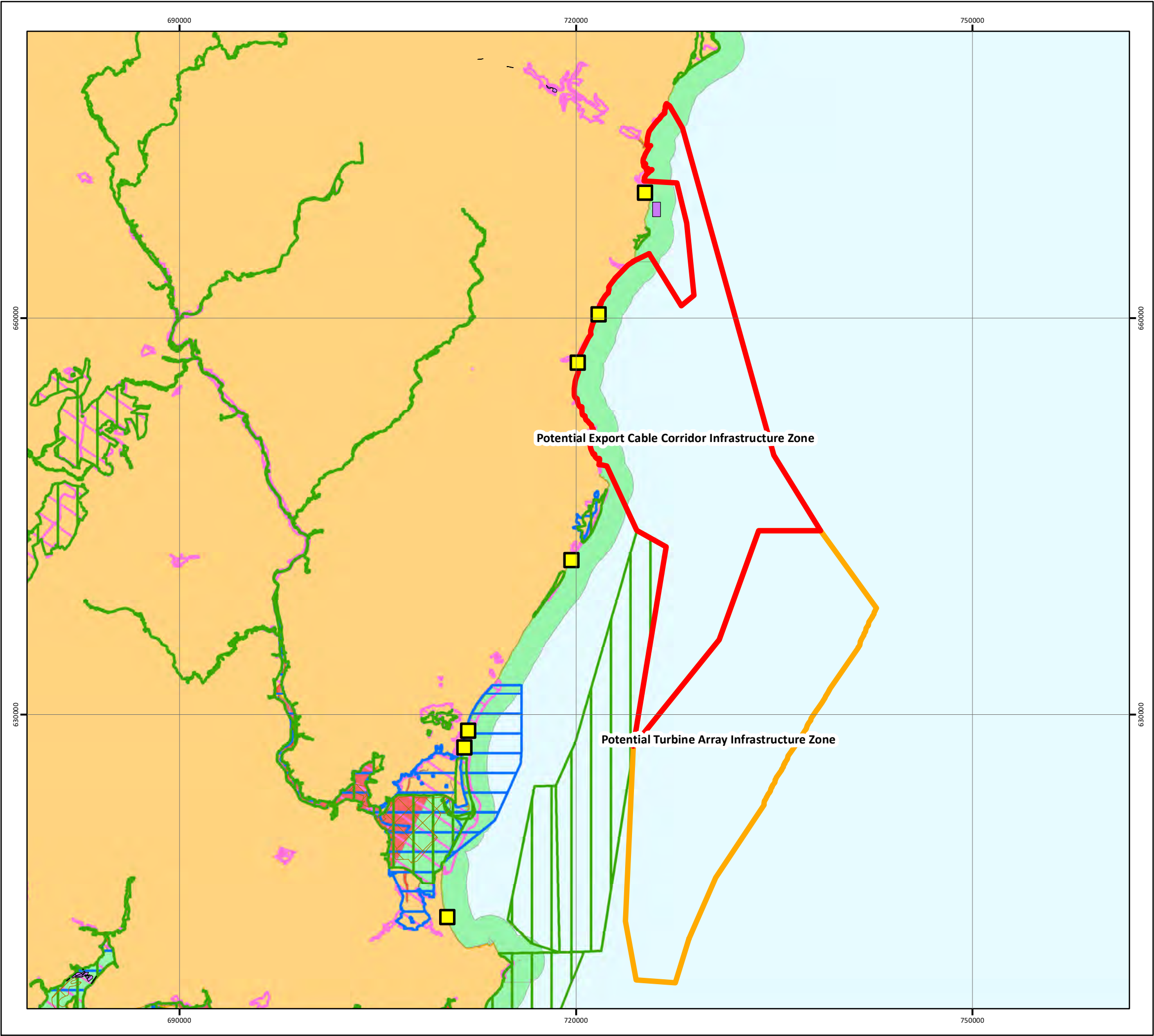
A high-level Marine Water Quality data review has been undertaken to inform this EIAR Scoping Report and the future EIAR. The findings of this review are summarised below:

- Some Marine Water Quality data is publicly available (e.g. bathing water sampling data held by the EPA);
- Sediment collected through grab sampling should also be analysed to determine whether any contaminants exist within the surficial seabed sediments;
- Typical suspended sediment concentration should be determined prior to any construction. These data are required as it will provide a baseline measure which will ascertain the extent of sediment plumes released from construction activities and aid in determining where concentrations return to background levels.

These gaps will be filled via the site-specific Geophysical, Benthic and Geotechnical surveys currently scheduled to commence in April 2023. As part of these surveys, it is intended to collect grab samples which will be analysed for sediment contaminants.



These surveys should follow industry best practice for quantifying contaminant levels in sediments, such as the Cefas Action Levels (MMO, 2018) and Guidelines for the Assessment of Dredged Material for Disposal in Irish Waters. Marine Institute MEFS Series, No.24. (Cronin, M. et al. 2006).



SHELMALERE OFFSHORE WIND FARM

MARINE WATER QUALITY Key Sensitive Receptors

Drawing No: P2497-LOC-002

A

Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone

Sensitive Receivers

- Bathing Water Location
- Aquaculture Site
- Shellfish Water

Protected Sites

- SAC
- SPA
- pNHA

WFD Body

- Coastal Water
- Lake
- Transitional Water
- EPA_Ireland_Mainland_Polygon

Figure 6-12 WFD waterbodies and Water Quality Protected Areas



NOTE: Not to be used for Navigation



Date	09 June 2022
Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	ESRI; NPWS, DP ENERGY, EPA, DAFM, DHPCLG, EEA
File Reference	J:\P2497\Mxd\01_LOC\ P2497-LOC-002.mxd
Created By	Lewis Castle
Reviewed By	Chris Carroll
Approved By	Paul Evans



0 2.5 5 7.5 10 km

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6.2.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential impacts of Shelmalere Offshore Wind Farm on Marine Water and Sediment Quality receptors.

A literature review of the baseline data and information will be undertaken to characterise the receiving environment in the Marine Water and Sediment Quality Topic-specific Study Area in terms of the naturally occurring levels of contamination in marine water and concentrations of suspended sediment (water quality), and physical properties and contamination (sediment quality).

The data and information collected during the desk-based literature review will be supplemented by Geophysical, Benthic and Geotechnical surveys results relating to Marine Water and Sediment Quality, e.g. the sampling of contaminants collected during grab sampling as part of the Geophysical, Benthic and Geotechnical surveys currently scheduled to commence in 2023. A comparison of the potential effects on marine water and sediment quality will subsequently be carried out against the receiving environment conditions.

Typical SSC should be determined prior to any construction. More information on this subject is provided Section 1.1.5.

The approach to assessing the significance of any potential effects will adopt the project-wide assessment matrix. Where appropriate, mitigation measures will be proposed, and residual potential effects presented.

6.2.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), subsea cable projects, maintenance and capital dredging schemes and coastal defence works.

As additional plans, projects or activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the list of other plans, projects and activities to be included within the Cumulative Impact Assessment of the EIAR has been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Marine Water and Sediment Quality will be collated and reviewed. This will include as many details that can be collated with respect to proposed timing of construction phases on other projects in the region to determine if scope exists for impacts such as potential for increased SSC plumes from Shelmalere Offshore Wind Farm and other plans, projects and activities to interact spatially and temporally. Presently, the first and second phases of Arklow Bank Wind Park represents are the only OWF within the Marine Water and Sediment Quality Topic-Specific Study Area.

In addition to this, as much information on other plans, projects and activities that have not yet submitted full EIARs will also need to be collated and reviewed to inform the Cumulative Impact Assessment of the future EIAR.

With respect to potential transboundary impacts, based on current understanding, potential impacts on Marine Water and Sediment Quality receptors are expected to be restricted to areas within Irish waters only, i.e. not on any international territory. No impacts are also expected on any interests of another State, i.e. fishing/shipping which occurs within the Irish EEZ as a result of potential impacts on Marine Water and Sediment Quality receptors. Therefore, as there is no pathway for transboundary impacts it is currently proposed to scope out transboundary impacts on Marine Water and Sediment Quality from consideration in the future EIAR. This will be confirmed via the formal Transboundary Screening exercise that will be undertaken post EIAR Scoping.

6.2.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR, with respect to the potential effects on Marine Water and Sediment Quality receptors.

6.2.6 Proposed Consultees

Table 6-8 summarises the proposed consultees for the Marine Water and Sediment Quality chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objectives of this consultation are also included in Table 6-8. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of the Development Permission application.

Table 6-8 Summary of Proposed Consultees (Marine Water and Sediment Quality)

Proposed Consultee	Objective of Consultation
Marine Institute	<ol style="list-style-type: none"> 1. To discuss status of/access to relevant Marine Water and Sediment Quality data. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Environment Protection Agency	<ol style="list-style-type: none"> 1. To discuss status of/access to relevant Marine Water and Sediment Quality data. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures with specific reference to any marine dredging and dumping at sea activities that may be required.
Office of Public Works	<ol style="list-style-type: none"> 1. To discuss status of/access to relevant Marine Water and Sediment Quality data. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Wicklow County Council	<ol style="list-style-type: none"> 1. To discuss status of/access to relevant Marine Water and Sediment Quality data. 2. To discuss the approach to the assessment of impacts.

Proposed Consultee	Objective of Consultation
	3. To discuss preliminary findings of the assessment and potential mitigation measures specific to Marine Water and Sediment Quality receptors on the Wicklow coastline.
Wexford County Council	1. To discuss status of/access to relevant Marine Water and Sediment Quality data. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures specific to Marine Water and Sediment Quality receptors on the Wexford coastline.

6.2.7 Potential Impacts to be Assessed within the EIAR

Table 6-9 outlines the potential impacts on Marine Water and Sediment Quality receptors which may arise within the Marine Water and Sediment Quality Topic-specific Study Area as a result of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in 6.1.4. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-9 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Marine Water and Sediment Quality)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Deterioration in Marine Water and Sediment Quality due to re-suspension of sediments (pathway) 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 of water clarity and the potential re-suspension of nutrients and contaminants.	Yes	Yes	Yes	In
Accidental spills (pathway) Accidental spill of materials or chemicals during all phases of Shelmalere Offshore Wind Farm has the potential to reduce Marine Water and Sediment Quality in the vicinity of the Topic-specific Study Area for Marine Water and Sediment Quality.	Yes	Yes	Yes	In
Cumulative Impacts	Yes	Yes	Yes	In
Transboundary Impacts	No	No	No	Out

6.2.8 EIAR Scoping Questions

The following questions are designed to assist stakeholders in providing feedback to the EIAR Team on the Marine Water and Sediment Quality topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Marine Water and Sediment Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Marine Water and Sediment Quality Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Marine Water and Sediment Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Marine Water and Sediment Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Marine Water and Sediment Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.2.9 References

EPA, 2019. Water Quality in Ireland 2013-2018.

EPA. 2022a. Bathing Water Quality in Ireland – A Report for the Year 2021. <https://www.beaches.ie/wp-content/uploads/2022/05/Bathing-water-quality-in-Ireland-in-2021-1.pdf>.

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MMO. 2018. Marine Licensing: Sediment Analysis and Sample Plan. <https://www.gov.uk/guidance/marine-licensing-sediment-analysis-and-sample-plans>.

6.3 CHAPTER 3: UNDERWATER NOISE AND VIBRATION

6.3.1 Introduction

It is proposed that there will not be a stand-alone chapter within the future EIAR dedicated to Underwater Noise and Vibration. Rather, it is proposed that there will be an Underwater Noise and Vibration Technical Report which will be used to inform the EIAR for other key topics, i.e. Marine Mammals and Reptiles; Fish and Shellfish Ecology.

Specific details on the potential impacts of underwater noise and vibration on these receptors are discussed in the respective Chapters of this EIAR Scoping Report.

This chapter of the EIAR Scoping Report, therefore, details the approach to the characterisation and prediction of effect of underwater noise and vibration that could occur as a result of the construction, operation and decommissioning of Shelmalere Offshore Wind Farm.

This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to the Underwater Noise and Vibration topic;
- A preliminary review of the receiving environment within the Underwater Noise and Vibration Topic-specific Study Area;
- The methodology that is proposed to be used within the future EIAR to assess potential impacts from Underwater Noise and Vibration;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the future EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Underwater Noise and Vibration;
- Potential surveys proposed to inform the future EIAR for Underwater Noise and Vibration;
- A summary of potential impacts on this receptor group that will be fully assessed within the EIAR.

This Chapter has been prepared by Subacoustech Ltd. who have extensive experience of subsea noise assessment for offshore wind farm projects.

There is no Topic-specific Study Area for Underwater Noise and Vibration. Rather, the relevant Study Area(s) are those defined for marine mammals and fish as the relevant receptors that will be potentially affected by Underwater Noise and Vibration.

6.3.2 Relevant Policy and Guidance

Relevant policies and guidance documents relevant to Underwater Noise and Vibration are detailed below. As many of these relate to marine mammal and fish receptors, these are also detailed in the respective Chapters of this EIAR Scoping Report.

Where certain guidance documents have been produced in relation to UK offshore wind farm projects, i.e. not strictly applicable to Irish offshore wind farm projects, these will be reviewed as part of the future EIAR process and due consideration will be given to how this guidance is applied for Shelmalere Offshore Wind Farm.

Table 6-10 Relevant Policy and Guidance Documents (Underwater Noise and Vibration)

Relevant Policy /Guidance	Reference	Geographic Coverage
Policy		
Irish Whale and Dolphin Group (IWDG) Policy on Offshore Windfarm Development	IWDG, 2020	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Assessment and Monitoring of Ocean Noise in Irish Waters.	EPA, 2011	Ireland
Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.	DAHG, 2014	Ireland
Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals, 33 (4), pp 411-509.	Southall <i>et al</i> , 2007	Global
Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232, DOI 10.1578/AM.45.2.2019.125	Southall <i>et al</i> , 2019 ¹³	Global
Revisions to: Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (version 2.0): Underwater thresholds for onset of permanent and temporary threshold shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59.	NMFS, 2018	Global
Sound exposure guidelines for Fishes and Sea Turtles. Springer Briefs in Oceanography, DOI 10.1007/978-3-319-06659-2.	Popper <i>et al</i> , 2014	Global
Guidance on EIS and NIS Preparations for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland

6.3.3 Receiving Environment

As set out within the Introduction to this Chapter, Underwater Noise and Vibration does not represent a true receptor group in the context of EIAR. The key receptor groups that Underwater Noise and Vibration is relevant to are marine mammals, fish and shellfish. Details of the receiving environment for these two receptors are provided in the topic-specific Chapters of this EIAR Scoping Report.

¹³ As Southall *et al.* (2019) is published in an international peer reviewed journal it is used as a preference to NMFS (2018).

The Potential Turbine Array Infrastructure Zone is located from 9-22.5 km from the Irish east coast. Any underwater noise and vibration generated via the construction, operation and decommissioning of Shelmalere Offshore Wind Farm will contribute to the existing background noise environment.

The greater the level of existing underwater noise, the less overall relative influence any introduced underwater noise will have. However, some potential noise sources, especially during construction, are expected to be significantly louder than the existing noise levels. .

The Irish Sea is a region of significant marine traffic, making it a relatively noisy environment. A high-density of shipping traffic passes approximately 1 km to the east of the Potential Turbine Array Infrastructure Zone, running between Ireland and Wales. Underwater noise from cargo vessels, tankers and recreational vessels active in this area will, therefore, lead to relatively high pre-existing background underwater noise in this region.

6.3.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

No specific underwater noise or vibration data exists for the Potential Turbine Array Infrastructure Zone or the Potential Export Cable Corridor Infrastructure Zone. Existing (background) underwater noise data is known to exist around the west coast of Wales, although the oceanographic conditions are suitably different such that these levels would not be considered representative of the Potential Turbine Array Infrastructure Zone and/or Potential Export Cable Corridor Infrastructure Zone. However, the proposed assessment methodologies for marine mammals and fish are based on absolute underwater noise level criteria, which do not require a baseline noise level for comparison. Therefore, this will not impede the assessment of potential effects. Potential disturbance or other behavioural changes will also be considered with respect to available thresholds, or qualitatively where these are not available.

6.3.4 Potential Additional Data and Proposed Surveys

There are limited, known background underwater noise levels in this part of the Irish Sea. Additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process.

No specific surveys to obtain underwater noise surveys/measurements are currently proposed to characterise the site and/or undertake the assessment of potential effects within the future EIAR. The potential need for such surveys will be discussed via consultation related to this EIAR Scoping Report and further consultation over the duration of the future EIAR process.

6.3.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to inform potential effects of Shelmalere Offshore Wind Farm on key receptors.

Construction, operation and decommissioning of an offshore wind farm will necessarily lead to the generation of underwater noise, which has the potential to adversely affect marine fauna in the vicinity of the noise source.

The magnitude of any potential impact relates primarily to the noise level at the noise source, its attenuation with distance and its effect on key receptor species, relative to their individual sensitivities to noise.

The lower the potential noise level, depending on the source of noise and the vicinity of the receptor to this source, the lesser will be the potential effect. Depending on the degree of exposure to noise and specific receptor sensitivities, potential effects can range from mortality or hearing effects (temporary and enduring) to disturbance and displacement of species.

Over the lifetime of an offshore wind farm a number of underwater noise and vibration sources have the potential to occur:

- Construction noise: including installation of foundations for WTGs and offshore substations; rock cutting, installation of underground grid connection cabling and any dredging required; clearance of unexploded ordnance (UXO) and additional vessel movements. Typically, piling for installation of fixed foundations and/or UXO clearance leads to the greatest underwater noise impacts that may occur;
- Operational noise: including the ongoing operation of the WTGs. The noise produced relates to the size of the WTGs and speed of blade rotation, as well as maintenance operations;
- Decommissioning noise: primarily as a result of noise generated by the technology used to remove the WTG foundations.

It is proposed that the assessment of underwater noise, which will inform the subsequent assessment of potential effects on marine mammals and fish, will be undertaken using modelling software that enables the prediction of noise levels with range around the noise source. Modelling of piling, which typically causes the most significant underwater noise effect during the construction and operation of offshore wind farms, will be undertaken using Subacoustech's INSPIRE underwater noise model. This model has been developed and utilises over 80 datasets of subsea noise produced by impact piling, including in the Irish Sea. INSPIRE utilises a series of piling parameters, including the pile diameter, depth of water hammer blow energy and the surrounding area to calculate the instantaneous and cumulative noise level against key noise impact thresholds for both marine mammals and fish. The model has been used for the accurate prediction of noise impacts at most of the offshore wind farm developments in England, Scotland and Wales over the last ten years, as well as currently for the Ireland offshore wind projects Dublin Array, Codling Wind Park and North Irish Sea Array.

A selection of piling and environmental parameters contributes to the potential underwater noise levels produced via piling. The INSPIRE modelling will take into account the following:

- Size of the pile;
- Hammer energy (including the effect of soft start);
- Duration of piling;
- Strike rate;

- Bathymetry at and around the foundation pile (existing INFOMAR/EMODnet bathymetry data will be utilised in the first instance. Project-specific bathymetry data, due to be collected in 2023, may then be used to complement these existing datasets).

Critically, it will also take into account the sensitivities of key species of fish (e.g. herring, sprat and mackerel) and marine mammal (e.g. harbour porpoise, minke whale and harbour seal) present at and in the surrounding region of Shelmalere Offshore Wind Farm, based on the weightings and criteria from the Southall *et al.* (2019) guidelines for marine mammals, and Popper *et al.* (2014) guidelines for fish. Other species, such as shellfish (including whelk) and other invertebrates will be considered only where accepted data for sensitivity to noise exists as without such information, any form of assessment is not possible.

Instantaneous noise levels and cumulative noise exposures will be identified, and the ranges at which onset effects on hearing (Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS)) for affected individuals may be expected based on these guidelines. Potential disturbance as a consequence of any underwater noise produced will also be fully considered.

The key species of marine fauna that are proposed to be included in the underwater noise assessment will be cetaceans (e.g. minke whale, bottlenose dolphin, common dolphin and harbour porpoise), pinnipeds (e.g. harbour seal and grey seal), herring, sprat, mackerel and a variety of other species of fish.

At the time of writing, no accepted noise thresholds or quantitative criteria exist for the assessment of noise impacts on non-fish benthos or cephalopods, or shellfish. These will be referenced in the EIAR to the extent that data on underwater noise effects is available.

The locations where modelling will be undertaken will be identified in relation to zones of receptor sensitivity (e.g. Marine Protected Areas or Special Areas of Conservation) and particularly water depth, as deeper water tends to lead to greater sound propagation and, therefore, an increased spatial extent of potential noise exposure. As modelling will not be undertaken at every single potential piling location, consultation will be undertaken with key stakeholders, i.e. IWDG for the marine mammal assessment; BIM and potentially commercial fishing organisations for the fish assessment, to agree the most appropriate representative locations that will ensure a robust assessment within the EIAR.

For lower-level noise sources such as dredging, additional shipping, or WTG operational noise, it is proposed that a simpler modelling methodology (the SPEAR model) will be utilised, which will provide sufficient detail to predict effects on marine mammals, fish and shellfish. The SPEAR modelling approach does not take bathymetry or other environmental conditions into account, and as such can be applied to any location in or around the Potential Turbine Array Infrastructure Zone or the Potential Export Cable Corridor Infrastructure Zone.

A detailed UXO survey would be undertaken post-consent ahead of construction activities commencing. This detailed UXO survey would involve the deployment of Unmanned Autonomous Vehicles (UAVs) to investigate magnetic anomalies located adjacent to planned construction locations. The detailed UXO survey will not therefore have been completed at the time of submission of the Development Permission application. Some data on potential UXO will be obtained via the geophysical and magnetometer survey planned to commence in 2023. Therefore, it is proposed that the assessment of potential underwater noise produced by UXO detonation is based upon a single, nominal event and that activity (UXO detonation) be part of the project activities included in the eventual consent application.

For this aspect of the assessment, it is proposed that the attenuation of the noise from UXO detonation will be accounted for in calculations using geometric spreading and a sound absorption coefficient, primarily using the methodologies cited in Soloway and Dahl (2014), which establishes a trend based on measured data in open water.

These equations give a relatively simple calculation which can be used to give an indication of the range of potential effect. The equation does not consider variable bathymetry or seabed type, and thus calculation results will be the same regardless of where it is used.

The outputs of the modelling will feed into the marine mammal and fish impact assessments. Results of the underwater noise modelling will be reported in a Technical Appendix to the EIAR rather than a dedicated EIAR chapter and referenced in specialist topics that rely on the data.

6.3.5.1 Cumulative and Transboundary Effects

As detailed in the Introduction section to this chapter, for Underwater Noise and Vibration, potential effects (including cumulative) could affect ecological receptors, in particular marine mammals and fish. Therefore, reference should be made to the proposed approach to assessment of cumulative effects within these two chapters of this EIAR Scoping Report.

The same principle applies with respect to potential transboundary effects. Please refer to the Fish and Shellfish Ecology and Marine Mammal and Reptiles Chapters of this EIAR Scoping Report for detail on the assessment of potential transboundary effects.

6.3.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the potential significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed within the future EIAR, with respect to the potential effects on Underwater Noise and Vibration receptors (noting that these are actually marine mammal, fish and shellfish receptors).

6.3.5.3 Proposed Consultees

Table 6-11 summarises the proposed consultees for the Underwater Noise and Vibration of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objectives of this consultation are also included in that table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 6-11 Summary of Proposed Consultees (Underwater Noise and Vibration)

Proposed Consultee	Objective of Consultation
BIM	<ol style="list-style-type: none"> 1. To discuss and agree approach to underwater noise modelling and subsequent impact assessment on fish. 2. To discuss outputs of underwater noise modelling and potential impacts on sensitive fish and invertebrate species and potential mitigation measures.
Marine Institute	<ol style="list-style-type: none"> 1. To discuss and agree approach to underwater noise modelling and subsequent impact assessment on fish, invertebrate and marine mammal species. 2. To discuss outputs of underwater noise modelling and potential impacts on sensitive fish, invertebrate and marine mammal species and potential mitigation measures.
IWDG	<ol style="list-style-type: none"> 1. To discuss and agree approach to underwater noise modelling and subsequent impact assessment on marine mammal species. 2. To discuss outputs of underwater noise modelling and potential impacts on marine mammal species and potential mitigation measures.
ORCA Ireland	<ol style="list-style-type: none"> 1. To discuss and agree approach to underwater noise modelling and subsequent impact assessment on marine mammal species. 2. To discuss outputs of underwater noise modelling and potential impacts on marine mammal species and potential mitigation measures.

6.3.6 Potential Impacts to be Assessed within the EIAR

The potential impacts from increased underwater noise will affect receptors including marine mammals, fish and shellfish. These potential impacts are considered in these specific topic sections of this EIAR Scoping Report and will be fully assessed within the EIAR. However they are summarised here in Table 6-12. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in 6.2.4. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-12 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Underwater Noise and Vibration)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Piling Impulsive noise during construction of turbine foundations with the potential to cause auditory injury or disturbance.	Yes	Yes	No	In
UXO Should UXO be present in the region, controlled detonation via detonation or deflagration may be required. This has the potential to cause direct injury, and injury via associated underwater noise.	Yes	Yes	Yes	In
Other continuous construction noise sources These include dredging, vessel movement and rock cutting	Yes	Yes	Yes	In
Operational turbine noise During full operation of the wind farm, noise from the turbines, variable depending on the wind speed, has the potential to cause disturbance to species in the vicinity.	No	Yes	No	In
Cumulative Impacts – see other related EIAR Chapters	NA ¹⁴	NA	NA	NA
Transboundary Impacts – see other related EIAR Chapters	NA	NA	NA	NA

6.3.7 EIAR Scoping Questions

The following questions are designed to assist stakeholders in providing feedback to the EIAR Team on the Underwater Noise and Vibration topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Underwater Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Underwater Noise and Vibration Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Underwater Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?

¹⁴ Potential impact not applicable for this topic.

- What additional guidance and policy should the EIAR team have regard to in the preparation of the Underwater Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and you wish to see assessed in the Underwater Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.3.8 References

Department of Arts, Heritage and the Gaeltacht (2014). *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*.

National Marine Fisheries Service (NMFS) (2018). *Revisions to: Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (version 2.0): Underwater thresholds for onset of permanent and temporary threshold shifts*. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59

O'Brien, J. (2011). *Assessment and Monitoring of Ocean Noise in Irish Waters*. Associated datasets and digital information objects connected to this resource are available at: Secure Archive for Environmental Research Data (SAFER) managed by Environmental Protection Agency Ireland

<http://erc.epa.ie/safer/resource?id=44aa4dad-8f1a-11e3-b233-005056ae0019> (Accessed: May, 2021).

Popper A N, Hawkins A D, Fay R R, Mann D A, Bartol S, Carlson T J, Coombs S, Ellison W T, Gentry R L, Halvorsen M B, Løkkeborg S, Rogers P H, Southall B L, Zeddies D G, Tavalga W N (2014). *Sound exposure guidelines for Fishes and Sea Turtles*. Springer Briefs in Oceanography, DOI 10.1007/978-3-319-06659-2.

Solway A G and Dahl P H (2014). *Peak sound pressure and sound exposure level from underwater explosions in shallow water*. The Journal of the Acoustical Society of America 136, EL218 (2014); doi: 10.1121/1.4892668

Southall B L, Bowles A E, Ellison W T, Finneran J J, Gentry R L, Green Jr. C R, Kastak D, Ketten D R, Miller J H, Nachtigall P E, Richardson W J, Thomas J A, Tyack P L (2007). *Marine mammal noise exposure criteria: Initial scientific recommendations*. Aquatic Mammals, 33 (4), pp 411-509.

Southall B L, Finneran J J, Reichmuth C, Nachtigall P E, Ketten D R, Bowles A E, Ellison W T, Nowacek D P, Tyack P L (2019). *Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects*. Aquatic Mammals 2019, 45(2), 125-232, DOI 10.1578/AM.45.2.2019.125.

6.4 CHAPTER 4: BENTHIC, EPIBENTHIC AND INTERTIDAL

6.4.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential effects of Shelmalere Offshore Wind Farm on Benthic, Epibenthic and Intertidal Ecology receptors and sets out the methodology and approach to be taken to assessing these effects within the future EIAR for Shelmalere Offshore Wind Farm. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to the Benthic, Epibenthic and Intertidal Ecology topic;
- A preliminary review of the receiving environment within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential impacts on Benthic, Epibenthic and Intertidal receptors;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the future EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Benthic, Epibenthic and Intertidal Ecology;
- Potential surveys proposed to inform the future EIAR for Benthic, Epibenthic and Intertidal Ecology;
- A summary of potential impacts on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been prepared by MarineSpace which has extensive experience of this topic from previous offshore wind farm EIAs (EIARs).

The Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area is defined by the tidal ellipses present in this region (currently estimated to be approximately 24.5 km to the north and south of the Potential Turbine Array and Export Cable Corridor Infrastructure Zones. This is the extent over which potential far-field impacts may arise on Benthic, Epibenthic and Intertidal Ecology receptors via sediment plumes and deposition.

6.4.2 Relevant Policy and Guidance

Policies and guidance documents relevant to the Benthic, Epibenthic and Intertidal Ecology EIAR topic are detailed below. Where certain guidance documents have been produced in relation to UK offshore wind farm projects, i.e. not strictly applicable to Irish offshore wind farm projects, these will be reviewed as part of the EIAR process and due will be consideration given to how this guidance is applied for Shelmalere Offshore Wind Farm.

Table 6-13 Relevant Policy and Guidance Documents (Benthic Ecology)

Policy /Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Scottish National Heritage (SNH) - Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland Volume: Benthic Habitats.	SNH, 2011	Scotland (UK)
Chartered Institute of Ecology and Environmental Management (CIEEM) - Guidelines for EIA in Britain and Ireland. Marine and Coastal, Final Document.	CIEEM, 2018	UK and Ireland
Centre for Environment, Fisheries and Aquaculture Science (Cefas) – Guidance Note for Environmental Impact Assessment in Respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act (CPA) Requirements.	Cefas <i>et al.</i> , 2004)	UK
Cefas - Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects.	Cefas, 2011	UK
OSPAR - Guidance on Environmental Considerations for Offshore Wind Farm Development.	OSPAR, 2008	UK and Ireland
Guidance on Marine Baseline Ecological Assessment and Monitoring Activities for Offshore Renewable Energy Projects (Part 1 and 2).	DCCAE, 2018a; 2018b	Ireland
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland
Decommissioning of Offshore Renewable Energy Installations: Guidance Notes for Industry.	BEIS, 2019	UK

6.4.3 Receiving Environment

6.4.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

A high-level desk-based review has been undertaken to describe the receiving environment that may be expected to be present within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area. This section has been informed using the available benthic baseline data for the region. No project specific surveys have been undertaken to date to inform this EIAR Scoping Report. However, following project-specific geophysical and benthic ecological surveys (expected to commence in 2023 – see 6.4.5 below), this current baseline will be updated to further inform the development of the Benthic Ecology EIAR chapter.

Key documents and online data sources consulted in compiling this Chapter of the EIAR Scoping Report have included the following:

Table 6-14 Key datasets to inform EIAR Scoping Report and EIAR (Benthic, Epibenthic and Intertidal Ecology)

Summary and Source
Foras na Mara / Marine Institute (MI) Ireland's Marine Atlas and Open Access Repository
National Parks and Wildlife Service (NPWS): Maps and Data (Designated site data; NPWS Designations View)
The European Marine Observation and Data Network (EMODnet)
European Nature Information System (EUNIS)
Shelmalere Offshore Wind Farm Foreshore Licence Application: Supporting Information of Screening for Appropriate Assessment
Habitat Mapping (HABMAP) 2005 surveys of the southern Irish Sea
The South-West Irish Sea Survey (SWISS) of benthic biodiversity
National Biodiversity Data Centre

6.4.3.2 Intertidal Benthic Ecology

Whilst Cable Landfall location is not yet determined, a review of typical intertidal habitats in the County Wexford and County Wicklow regions has been undertaken. Generally, the coastline in this region comprises long sandy beaches and "soft cliffs", both of which are subject to wind and erosion, and are characterised by extensive sand dunes habitats, and many of these features are protected Natural Heritage Areas (NHA) (see Section 7.1, Chapter 1 Land, Soils and Geology for description of coastal dunes and vegetation) (Neff, 1999). Coastal defences such as stone revetments also feature along parts of this coast.

Benthic invertebrate specimen collections undertaken across the sedimentary sandy shores of County Wexford by Healy and McGreath (1998) determined those taxa that were both abundant, present all year round and likely to typical of communities regionally, and thus those that can be assumed to characterise sediments at intertidal Cable Landfall locations. Overall, the most diverse and abundant group of the dominant sandy shores were infaunal annelids and amphipod crustaceans. Annelid polychaetes included the lugworm *Arenicola marina* and small capitellids *Capitella capitata*, and oligochaetes (Clitellata). Amphipods were abundant and represented by *Bathyporeia* spp. and *Gammarus* sp, along with brown shrimp *Crangon*. Within muddier substrates, polychaetes *A. marina* and the ragworm *Hediste diversicolor* were also present. Bivalve and gastropod molluscs assemblages were diverse but not as abundant overall, and mainly featured mud snails *Peringia ulvae* present in both substrate types.

6.4.3.3 Subtidal Benthic Ecology

Broad-scale benthic habitat data was sourced from EUSeaMap (EMODnet ,2019) with spatial mapping of EUNIS level 2 to 4 classified habitats. Figure 6-13 shows the spatial distribution of the broad scale habitats within the wider region. All subtidal areas of seabed are predominantly comprised of sedimentary habitats, forming a matrix of muddy sands, fine sands, coarse and mixed sediments.

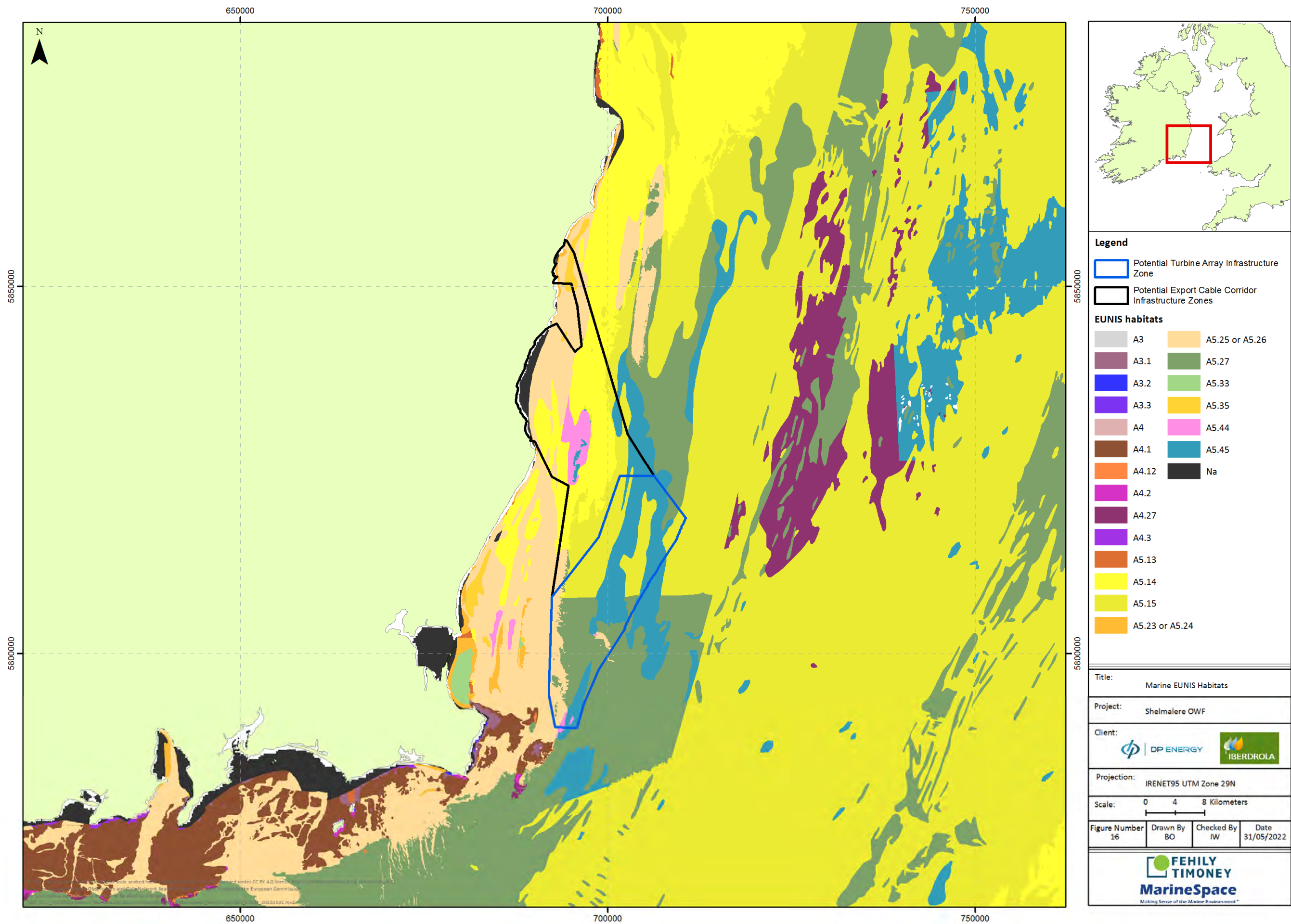


Figure 6-13 Marine habitats in the Potential Turbine Array and Potential Export Cable Corridor Infrastructure Zones and wider Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area (Source: EMODNET, 2019).

Within the nearshore region of the Potential Export Cable Corridor Infrastructure zone, circalittoral fine sands or muddy sands feature (A5.25/A5.26), and moving offshore, circalittoral coarse sediments are dominant (A5.14), with an area of circalittoral mixed sediments (A5.44) also present. The northern region of the Potential Turbine Array Infrastructure Zone mainly features deep circalittoral coarse sediment (A5.15) and deep circalittoral mixed sediments (A5.45), with the southern region characterised by deep circalittoral sand (A5.27).

EMODnet (2019) indicates no significant areas of rocky substrates predicted to be present within either the Potential Turbine Array or Export Cable Corridor Infrastructure Zones, although extensive areas of rock habitat, represented by 'Fauna communities on deep moderate energy circalittoral rock' (A4.27), do exist in the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area, i.e. approximately 6 km east and immediately south-west of the Potential Turbine Array Infrastructure Zone.

6.4.4 Features of Conservation Interest

There are no designated marine Natura 2000 sites located within, or overlapping, the Potential Turbine Array Infrastructure Zone, the Potential Export Cable Corridor Infrastructure Zone and/or the coastline associated with the Potential Onshore Infrastructure Zone.

Within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area there are a number of Special Areas of Conservation (SACs) that are designated for a number of Annex I benthic habitats, and these are summarised below.

6.4.4.1 Annex I Habitats

A number of protected Annex I marine benthic habitats occur within the Benthic, Epibenthic topic-specific study area. These include:

- Sandbanks which are slightly covered by seawater all the time (H1110);
- Mudflats and sandflats not covered by seawater at low tide (H1140);
- Reefs (H1170);
- Coastal Lagoons (H1150) (NWPS, 2019a).

The Annex I habitat features are afforded protection within the boundaries of a number of European marine protected sites that are located in the region. There are 10 SAC's identified within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area. However, none of SACs directly overlap with the Potential Turbine Array and/or Export Cable Infrastructure Zones. The SAC's located within 10 km include:

- Blackwater Bank SAC (0.0 km): designated for the marine Annex I qualifying interest of 'Sandbanks which are slightly covered by sea water all the time';
- Carnsore Point SAC (3.5 km): designated for 'Stony' Reef and 'Mudflats and sandflats not covered by seawater at low tide';
- Long Bank SAC (5.0 km): designated for the marine Annex I qualifying interest of 'Sandbanks which are slightly covered by sea water all the time.

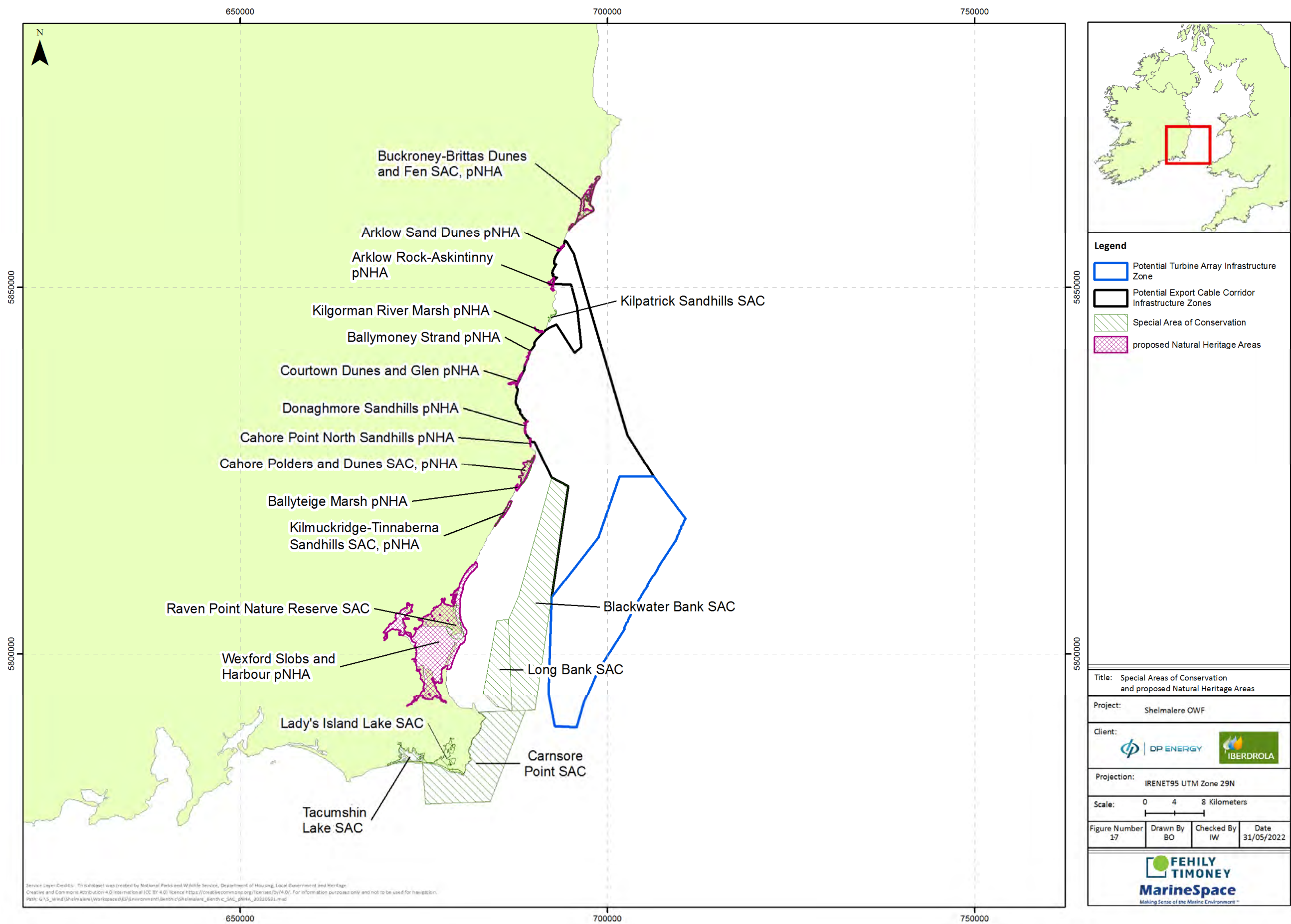


Figure 6-14 Special Areas of Conservation (SAC) and Proposed Natural Heritage Areas (pNHA) within the vicinity of the Benthic, Epibenthic and Intertidal Ecology Topic specific Study

Details of protected coastal ecological features (e.g. dunes and perennial vegetation of stony banks), are presented in Section 7.1: Land, Soils and Geology). See Section 10.4 for more details on SACs with Annex I habitats as qualifying habitats in the wider region.

6.4.4.2 Natural Heritage Areas

There are no Natural Heritage Areas (NHAs) within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area. There are, however, a number of proposed coastal Natural Heritage Areas (pNHA) within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area. Refer to Chapter 1 Land, Soils and Geology for description of these features, which include coastal dune habitats.

6.4.4.3 OSPAR List of Threatened and / or Declining Species and Habitats

OSPAR list of threatened and/or declining benthic species and habitats expected to be present within the region, and potentially within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area include intertidal mudflats; horse mussel beds, and the dog whelk.

6.4.4.4 Invasive and Non-Native Species

As an island, Ireland is at a particular risk from the introduction of marine invasive and non-native species (INNS). Current trends in understanding this, along with any spread and establishment in the island of Ireland waters is generally poorly understood, where there is a requirement to improve the study of and reporting of these taxa (review by O' Flynn et al., 2014). INNS that may be present within the topic-specific study area Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area or, may become introduced and established during the lifetime of Shelmalere Offshore Wind Farm, may include such taxa as: macroalgae (e.g. *Sargassum muticum*); bryozoans (e.g. *Schizoporella japonica* and *Watersipora subtorquata*); and barnacle crustaceans (e.g. *Hesperibalanus fallax*) (Lucy et al., 2020; Loxton et al., 2017; Kelso and Wyse Jackson 2012; Kran, 2008).

6.4.5 Potential Additional Data and Proposed Surveys

The data sources listed in Section 6.4.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

With respect to proposed surveys, site-specific ecological surveys are planned to commence in 2023 as part of a combined geophysical/geotechnical/environmental survey campaign. This survey will enable the subtidal and intertidal benthic habitats within the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone to be fully characterised to inform the future EIAR process. Table 6-15 presents a summary of these proposed surveys.

Table 6-15 Summary of proposed benthic, epibenthic and intertidal ecology site investigations activities

Location	Summary Approach
Intertidal	Unmanned Aerial Vehicle (UAV) (drone) survey of the intertidal region of the Cable Landfall to collect hi-resolution aerial imagery. This will be used to map key intertidal habitat features. A Phase I walkover of the potential Cable Landfall within the Potential Export Cable Corridor Infrastructure Zone with identification and mapping of key habitats and biotopes present will then be undertaken, informed by the UAV imagery. Any features of conservation interest are to be identified such as Annex I habitat and INNS. In addition, intertidal cores or quadrat sampling (pending on substrate) may be undertaken where appropriate, for further detailed information on communities present.
Subtidal	<p>Subtidal sampling locations will be proposed across the Potential Turbine Array and Export Cable Corridor Infrastructure Zones will be sampled, with multiple samples taken at each location to ensure complete coverage of all potential habitats and features expected to be present. Sediment (PSA) and fauna will be sampled for subsequent physiochemical and biological analysis. Advance of sampling, drop-down video (DDV) will be deployed where required.</p> <p>Site-specific geophysical data (SSS) will be reviewed to identify potential subtidal habitats of conservation importance, i.e. Annex I habitats. DDV will be deployed to identify, classify and delineate the spatial extent of any such features.</p>

6.4.6 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Benthic, Epibenthic and Intertidal receptors.

The assessment will follow the general EIA methodology as described in 4.2.2 and will also adhere to relevant guidance documents. The approach to assessing potential effects on benthic receptors within the EIAR will be based on the following stages:

- Review existing relevant data and information;
- Acquisition of additional project-specific data to fill any gaps;
- Formulation of a conceptual understanding of receiving environment conditions;
- Consultation and agreement with the regulators regarding proposed assessment approaches;
- Determination of key Project parameters;
- Consideration of embedded mitigation measures;
- Assessment of effects using data analysis, numerical modelling outputs, and expert-based judgements by the EIAR team;
- Where significant residual effects remain, the identification of mitigation measures to reduce these residual effects to acceptable (non-significant) levels.

Determination of whether predicted potential effects are likely to be significant will be made relating to the sensitivity (tolerance, adaptability and recoverability) of the receptor and an assessment of impact magnitude. Magnitude will be dependent on scale, duration, frequency of occurrence, and reversibility.

Following completion of the site-specific benthic ecological characterisation surveys, a review of the biotopes assigned based on the habitat and species data collected will be undertaken.

Through this review, those habitats that are identified to be similar in terms of their structure and function and sensitivity to potential impacts, will be grouped to form Valued Ecological Receptors (VERs). The process and rationale of developing these VERs will be discussed with relevant stakeholders as part of EIAR technical consultation. It is proposed that this is done prior to the impact assessment work commencing, so that all efforts are made to reach agreement between the EIAR Team and key stakeholders.

Outputs from the Marine Processes assessment, i.e. level and spatial extent of sediment plumes, changes in sediment transport etc., will provide the basis of the benthic impact assessment within the EIAR, along with quantified values of temporary habitat disturbance and habitat loss derived from the final project parameters.

Potential effects in the construction, operation and decommissioning phases will be fully assessed and presented in the EIAR.

6.4.6.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation with relevant stakeholders), an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works.

As additional plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the eventual Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the list of other plans, projects and activities to be included in the Cumulative Impact Assessment of the EIAR has been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Benthic, Epibenthic and Intertidal Ecology receptors will be collated and reviewed. These details will then be assessed in the context of project-specific potential effects associated with Shelmalere Offshore Wind Farm and an assessment of potential cumulative effects will be carried out.

In addition to this, as much information on other plans, projects and activities that have not yet submitted full EIARs will also need to be collated and reviewed to inform the Cumulative Impact Assessment of the future EIAR.

With respect to potential transboundary impacts, based on current understanding, potential impacts on Benthic, Epibenthic and Intertidal Ecology receptors are expected to be restricted to areas within Irish waters only, i.e. not on any international territory. No impacts are also expected on any interests of another State, i.e. fishing/shipping which occurs within the Irish EEZ as a result of potential impacts on Benthic, Epibenthic and Intertidal Ecology receptors.

Therefore, as there is no pathway for transboundary impacts it is currently proposed to scope out transboundary impacts on Benthic, Epibenthic and Intertidal Ecology from consideration in the future EIAR. This will be confirmed via the formal Transboundary Screening exercise that will be undertaken post EIAR Scoping.

6.4.6.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR, with respect to the potential effects on Benthic, Epibenthic and Intertidal Ecology receptors.

6.4.6.3 Proposed Consultees

Table 6-16 summarises the proposed consultees for the Benthic, Epibenthic and Intertidal Ecology chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objectives of this consultation are also presented in that table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of the Development Permission application.

Table 6-16 Summary of proposed consultees (Benthic, Epibenthic and Intertidal Ecology)

Proposed Consultee	Objective of Consultation
Foreshore Unit	1. To discuss and agree the approach for intertidal and subtidal benthic surveys as detailed in the Foreshore Licence Application; with specific focus on technical aspects of data collection and analysis.
Marine Institute	1. To discuss and agree the approach for intertidal and subtidal benthic surveys as detailed in the Foreshore Licence Application; with specific focus on technical aspects of data collection and analysis. 2. To discuss and agree data available to date and to discuss any additional data collection requirements to inform the EIAR process. 3. To discuss and agree the approach to impact assessment for benthic ecological receptors and protected features, and potential embedded and additional mitigation measures.
National Parks and Wildlife Services	1. To discuss and agree the approach for intertidal and subtidal benthic surveys as detailed in the Foreshore Licence Application; with specific focus on technical aspects of data collection and analysis. 2. To discuss and agree data available to date and to discuss any additional data collection requirements to inform the EIAR process. 3. To discuss and agree the approach to impact assessment for benthic ecological receptors and protected features, and potential embedded and additional mitigation measures.
BIM	1. To discuss and agree data available to date and to discuss any additional data collection requirements to inform the EIAR process. 2. To discuss and agree the approach to impact assessment for benthic ecological receptors and protected features, and potential embedded and additional mitigation measures.

6.4.7 Potential Impacts to be Assessed within the EIAR

Table 6-17 outlines the potential impacts on Benthic, Epibenthic and Intertidal Ecology receptors which may arise within the Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area as a result of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in 6.3.5. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-17 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Benthic, Epibenthic and Intertidal Ecology)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operational	Decommissioning	
Temporary habitat disturbance (direct and indirect) - Physical disturbance caused to habitats during installation (foundation installation, cable burial, and trenching), as well as during the operation phase (cable repairs/remediation), and in decommissioning through removal of infrastructure.	Yes	Yes	Yes	In
Temporary increases in increased suspended sediment and turbidity (indirect) - Disturbance of the seabed arising from construction activities, such as cable laying and foundation installation, operational activities (such as cable remedial works), and decommissioning (infrastructure removal) may result in adverse effects on benthic communities from increased turbidity in the water column and resulting in the smothering of sessile fauna and / or clogging of feeding apparatus.	Yes	Yes	Yes	In
Long-term changes in physical processes (indirect) The long-term placement of subsea structures on the seabed (e.g. foundations and scour protection) may result in localised scour around these structures due to changes in seabed morphology and tidal currents. Scour can result in localised loss of sediment, which can physically alter habitats and in turn affect benthic communities.	No	Yes	No	In
Long-term habitat loss (direct) - Following initial placement of infrastructure, there will be a direct long-term loss of benthic habitats arising during the lifetime of The Project through the placement of WTG's in the Turbine Array Infrastructure Zone and the associated foundations and the offshore substation. The placement of scour protection where required for the offshore cables, foundations and at Cable Landfall, will also result in a localised loss under these structures. The direct impact of habitat loss can cause species displacement, injury and mortality.	No	Yes	No	In

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operational	Decommissioning	
Accidental release of pollutants from vessels (direct) - The presence of works vessels during construction and decommissioning, introduces risk of pollutions from leaks or spills of fuels, and from accidental release of construction materials.	Yes	Yes	Yes	In
Accidental release of contaminations through disturbance of the seabed (indirect) - During any works at the seabed (all project phases), this will lead to sediment disturbance, and has the potential to re-mobilise sediments that contain chemical contaminants. The resuspension of contaminants may increase the bioavailability of these compounds to benthic fauna, impacting their physiology and overall fitness, and influencing local community structure (e.g. favouring R-strategists/opportunistic species).	Yes	Yes	Yes	In
Introduction, and colonisation of infrastructure by Invasive and Non-Native Species (INNS) (indirect) - During construction and decommissioning phases, there will be the potential risk of introduction of INNS into the area, via increased vessel activity required for installation and removal. During the lifetime of The Project, there is the potential for long-term colonisation of hard structures (e.g. WTGs) by INNS fauna, whereby these structures provide suitable artificial habitat for settlement.	Yes	Yes	Yes	In
Protection of benthic habitats (indirect) – Should the area surrounding the WTG's become inaccessible to fishing efforts, it may afford protection of benthic habitats and species from direct and indirect impacts from mobile fishing gear on the seabed.	Yes	Yes	Yes	In
Electromagnetic fields (EMF) and heat emissions from electrical cables (direct) Electrical cables from OFW's can emit EMF and heat into the marine environment. For benthic organisms, EMF may trigger development, physiological and behavioural responses in sensitive species.	No	Yes	No	In
Cumulative Impacts	Yes	Yes	Yes	In
Transboundary Impacts	No	No	No	Out

6.4.8 EIAR Scoping Questions

The following questions are designed to assist stakeholders in providing feedback to the EIAR Team on the Benthic, Epibenthic and Intertidal Ecology topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Benthic, Epibenthic and Intertidal Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?

- Are you satisfied the proposed Benthic, Epibenthic and Intertidal Ecology Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Benthic, Epibenthic and Intertidal Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Benthic, Epibenthic and Intertidal Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Benthic, Epibenthic and Intertidal Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?

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6.5 CHAPTER 5: MARINE MAMMALS AND REPTILES

6.5.1 Introduction

This chapter of the EIAR will outline the potential effects of Shelmalere Offshore Wind Farm on Marine Mammals and Reptiles (marine turtles).. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the future EIAR for Shelmalere Offshore Wind Farm and includes the following:

- A list of policy and guidance documents relevant to the Marine Mammals and Reptiles topic;
- A preliminary review of the receiving environment within the Marine Mammals and Reptiles Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential impacts on Marine Mammals and Reptiles;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the future EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Marine Mammals and Reptiles;
- Potential surveys proposed to inform the future EIAR for Marine Mammals and Reptiles;
- A summary of potential impacts on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been completed by MarineSpace, supported by APEM, both of whom have significant experience of this topic from previous offshore wind farm EIAs (EIARs).

The Marine Mammals and Reptiles Topic-specific Study Area will be defined on the basis of the widest reaching effect, namely the spatial extent of the likely most far-reaching underwater noise effects (via piling and UXO), which will be derived from subsea noise modelling presented in the Offshore Chapter 3: Underwater Noise and Vibration. The baseline characterisation presented in the EIAR will identify the species present within both the Marine Mammals and Reptiles Topic-specific Study Area and the wider Irish Sea region, their abundance (including the degree of spatial and temporal variation in abundance), and the activities (foraging, breeding etc.) undertaken by these species.

6.5.2 Relevant Policy and Guidance

Relevant policies and guidance documents relevant to the Marine Mammals and Reptiles EIAR topic are detailed below. Where certain guidance documents have been produced in relation to UK offshore wind farm projects, i.e. not strictly applicable to Irish offshore wind farm projects, these will be reviewed as part of the EIAR process and due consideration will be given to how this guidance is applied for Shelmalere Offshore Wind Farm.

Table 6-18 Relevant Policy and Guidance Documents (Marine Mammals and Reptiles)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Assessment and Monitoring of Ocean Noise in Irish Waters. STRIVE Report Series No. 120;	EPA, 2011	Ireland
Policy on Offshore Windfarm Development.	IWDG, 2020	Ireland
Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.	NPWS, 2014	Ireland
Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects.	Southall <i>et al</i> , 2019	Global
Scottish National Heritage (SNH) - Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland Volume: Benthic Habitats.	SNH, 2011	Scotland (UK)
Chartered Institute of Ecology and Environmental Management (CIEEM) - Guidelines for EIA in Britain and Ireland. Marine and Coastal, Final Document.	CIEEM, 2018	UK and Ireland
Centre for Environment, Fisheries and Aquaculture Science (Cefas) – Guidance Note for Environmental Impact Assessment in Respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act (CPA) Requirements.	Cefas <i>et al.</i> , 2004	UK
Cefas - Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects.	Cefas, 2011	UK
OSPAR - Guidance on Environmental Considerations for Offshore Wind Farm Development.	OSPAR, 2008	UK and Ireland
Guidance on Marine Baseline Ecological Assessment and Monitoring Activities for Offshore Renewable Energy Projects (Part 1 and 2).	DCCAE, 2018a; 2018b	Ireland
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland
Decommissioning of Offshore Renewable Energy Installations: Guidance Notes for Industry.	BEIS, 2019	UK

6.5.3 Receiving Environment

6.5.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

Key data sources identified to date that have been used to inform this EIAR Scoping Report and which will be used within the future EIAR are presented below:

Table 6-19 Key datasets to inform EIAR Scoping and EIAR (Marine Mammals and Reptiles)

Data Type	Source
DAS of Shelmalere Offshore Wind Farm + 4 km buffer (April 2021 to date – ongoing)	APEM
Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2015-2017.	Rogan <i>et al.</i> , 2018
Sightings and strandings data	IWDG, 2022
Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 – 2011.	Wall <i>et al.</i> , 2013
Habitat-based predictions of at-sea distribution for grey and harbour seals in the British Isles.	Carter <i>et al.</i> , 2020
Aerial thermal-imaging survey of seals in Ireland 2017 to 2018. Irish Wildlife Manuals, No. 111, National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.	Morris and Duck, 2019
Acoustic Surveys of Cetaceans in the Irish Atlantic Margin in 2015–2016: Occurrence, distribution and abundance	Berrow <i>et al.</i> , 2018
Distribution maps of cetacean and seabird populations in the North-East Atlantic	Waggitt <i>et al.</i> , 2019
Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys	Hammond <i>et al.</i> , 2017
Updated abundance estimates for cetacean Management Units in UK waters	IAMMWG, 2021
Revised Phase III Data Analysis of Joint Cetacean Protocol Data Resources	Paxton <i>et al.</i> , 2016
The Status of EU Protected Habitats and Species in Ireland - Conservation Status in Ireland of Habitats and Species listed on the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC	NPWS, 2019

6.5.3.2 Species present within the Marine Mammals and Reptiles Topic-specific Study Area

Based on the initial desk-based review undertaken to inform this EIAR Scoping Report, the marine mammal species most likely to be present within the Marine Mammal and Reptiles Topic-specific Study Area include the following cetaceans:

- Bottlenose dolphin *Tursiops truncatus*;
- Common dolphin *Delphinus delphis*;
- Harbour porpoise *Phocoena phocoena*.

And the following pinnipeds:

- Grey seal *Halichoerus grypus*;
- Harbour seal *Phoca vitulina*.

Each of these species are named as qualifying features in one or more SACs within 100 km of the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone.

Based on interim reports from the ongoing site-specific DAS (which commenced in April 2021), preliminary findings of the Year 1 processed data outline that Grey seal, Harbour seal, Common dolphin and Harbour porpoise have been recorded within the Potential Turbine Array Infrastructure Zone and a 4 km buffer. This aligns with information presented in previous reports and literature.

In addition to the marine mammal species identified in the desk-based review and those named as qualifying features of SACs within 100 km, the following species are also known to occur in the Irish/Celtic Sea region at certain times of year (Rogan *et al.*, 2018; Wall *et al.*, 2013):

- White-beaked dolphin *Lagenorhynchus albirostris*;
- Atlantic white-sided dolphin *Lagenorhynchus acutus*;
- Risso's dolphin *Grampus griseus*;
- Humpback whale *Megaptera novaeangliae*;
- Minke whale *Balaenoptera acutorostrata*.

There are limited records indicating that the following species may rarely transit through the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone (Rogan *et al.*, 2018; IWDG, 2022):

- Cuvier's beaked whale *Ziphius cavirostris*;
- Killer whale *Orcinus orca*;
- Northern bottlenose whale *Hyperoodon ampullatus*;
- Long-finned pilot whale *Globicephala melas*;
- Sowerby's beaked whale *Mesoplodon bidens*;
- Striped dolphin *Stenella coeruleoalba*;
- True's beaked whale *Mesoplodon mirus*;
- Beluga whale *Delphinapterus leucas*;
- Fin whale *Balaenoptera physalus*;
- Sei whale *Balaenoptera borealis*;
- Sperm whale *Physeter macrocephalus*;
- Bearded seal *Erignathus barbatus*;
- Hooded seal *Cystophora cristata*;
- Ringed seal *Pusa hispida*.

Modelled estimates of seal usage in Carter *et al.* (2020), presented as the at-sea proportion of the population across the British Isles per 25 km², suggest that the Marine Mammal and Reptiles Topic-specific Study Area is of greater importance to Grey seal compared to Harbour seal.

Whilst seal usage within the Marine Mammal and Reptiles Topic-specific Study Area is indicated to be low when compared to usage of sites across the wider British Isles region, it does indicate that Shelmalere Offshore Wind Farm is located in proximity to one of the few haul-out sites for Harbour seals in Ireland, and one of the most significant within Irish waters for Grey seals. This is further confirmed by findings made in Morris and Duck (2019), with thermal-imaging aerial survey data collected in 2003, 2011/12 and 2017/18 indicating haul-out counts of Grey seals per year averaging 326 when compared to average counts of just 33 Harbour seal individuals (within Area 1 of the south-east region, as defined within Morris and Duck, 2019).

However, the Irish/Celtic Sea region is utilised by both species and, therefore, foraging will be undertaken by both species in surrounding waters. Grey seal typically forages at greater distances from haul out sites than Harbour seal (135 km and 120 km, respectively: SCOS, 2019).

Marine turtles are rare across Ireland and the UK with only Leatherback turtle *Dermochelys coriacea* considered a known resident species. This species passes through the Irish Sea on migratory routes, travelling from the southwest of Ireland up towards the west coast of Scotland (DECC, 2016). It is possible that individuals will pass through the Marine Mammal and Reptiles Topic-specific Study Area and one individual was indeed sighted by the project-specific DAS October 2021 survey.

6.5.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

To ensure current and site-specific marine mammal data is available for the assessment that will be presented within the EIAR, site-specific DAS commenced in April 2021 and are programmed to continue monthly up to and including March 2023 (24-months total). Detailed technical consultation has already been undertaken with key technical consultees to discuss the scope and methodology of these surveys, which complies with the DCCAE Guidance (2018) and follows well-established processes adopted for EIARs on UK and European OWF projects. The proposed surveys will ensure identified data gaps are closed prior to assessment.

The DAS survey area encompasses the Potential Turbine Array Infrastructure Zone plus a 4 km buffer. The transect-based data collection covers approximately 21% of the DAS survey area, a narrower strip-width is then subsequently processed, and observations are recorded for an area equating to approximately 12.5% of the DAS survey area.

This meets / exceeds the industry standard survey area coverage of 12.5% and 10% in Ireland and the UK, respectively.

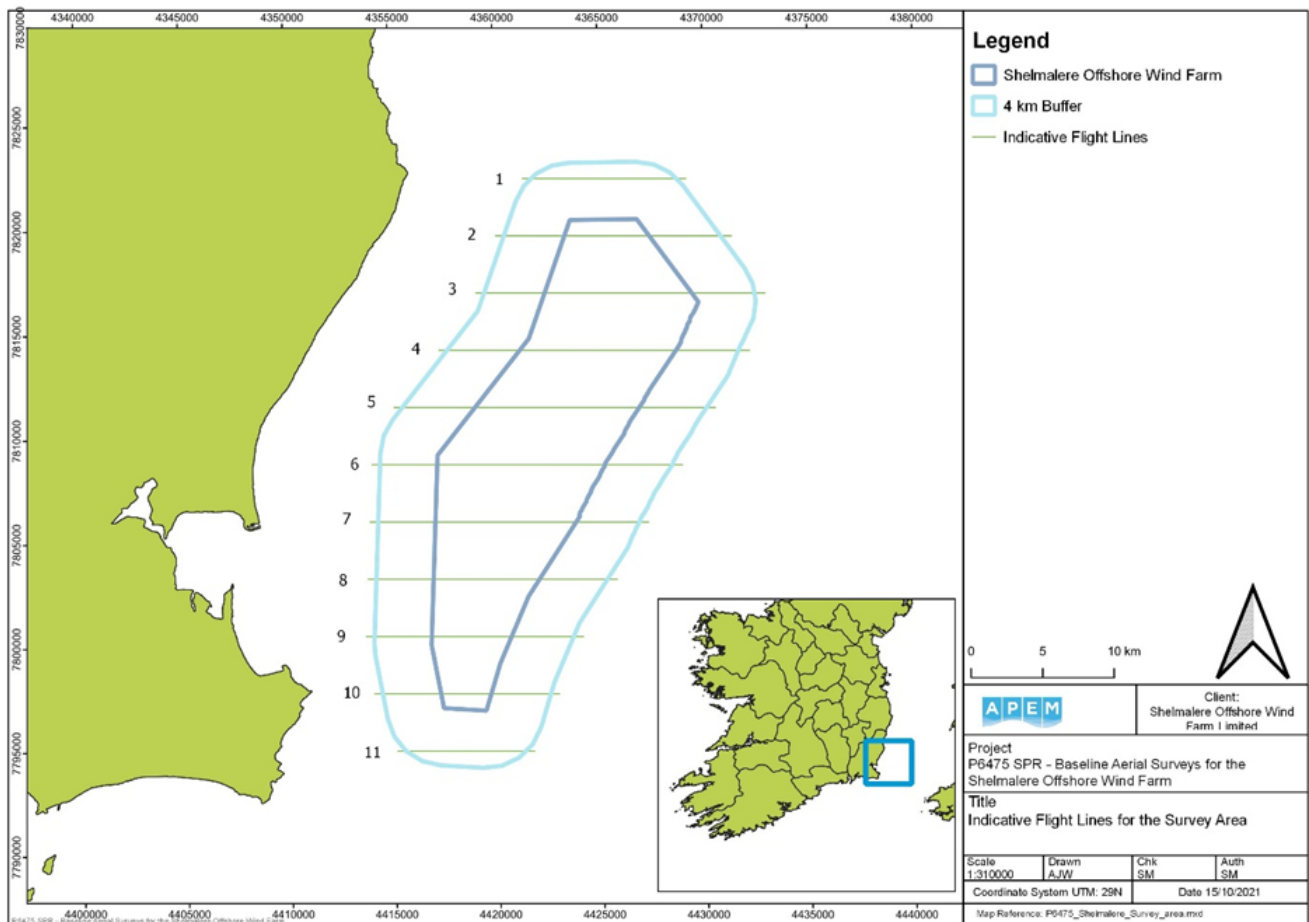


Figure 6-15 Shelmalere Digital Aerial Survey Coverage

6.5.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Marine Mammal and Reptile receptors.

Potential impacts on marine mammals listed as having a known presence within the Marine Mammals and Reptiles Topic-specific Study Area (excluding species stated as only rarely transiting through the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone) within Section 7.5.3 will be assessed in the EIAR using the general methodology described within Section 5.2 of this EIAR Scoping Report. Potential impacts will be identified and defined using expert judgement, guidance and policy documents listed in Section 1.5.2 and consideration of similar projects within the region if available during the EIAR process.

All efforts will be made, via technical consultation throughout the EIAR process with relevant stakeholders, to discuss, and with the aim of agreeing the approach to the assessment of potential impacts on marine mammal receptors, prior to any assessment commencing. This will enable any future discussions to be focused on the results/findings of the assessment, rather than the method of assessment itself. Should agreement not be reached on the method of assessment, then the EIAR team will proceed with the assessment on the basis of industry best practice and experience of methods that have worked on other offshore wind farm projects.

The significance of potential effects will be assessed by consideration of the sensitivity and value of the marine mammal and/or reptile receptor and the magnitude of the potential impact in question. Proposed definitions for effect significance on marine mammals are provided below.

These are definitions that have been developed for such assessments on a number of previous offshore wind farm projects in the UK and proven to be acceptable to key stakeholders. It is proposed that these will be discussed and, if necessary, developed further as part of the technical consultation:

- Major: Very large or large changes (either adverse or beneficial) to a receptor (or receptor group), which is important at a population (national or international) level because of the contribution to achieving national or regional objectives, or a change expected to result in exceedance of statutory objectives and / or breaches of legislation.
- Moderate: Intermediate or large changes (either adverse or beneficial) to a receptor (or receptor group), which may be an important consideration at national or regional population level. Potential to result in exceedance of statutory objectives and / or breaches of legislation.
- Minor: Small changes (either adverse or beneficial) to a receptor (or receptor group), which may be raised as local issues but is unlikely to be important at a regional population level; and
- Negligible: No discernible change in receptor (or receptor group).

The primary impact pathway of concern for marine mammals and reptile receptors during the construction, operation and decommissioning of Shelmalere Offshore Wind Farm will be underwater noise. The greatest source of underwater noise during the life cycle of Shelmalere Offshore Wind Farm is likely to be from piling and/or UXO which is anticipated to occur during the construction phase. Potential impacts arising from operational underwater noise will be assessed by way of a desk-based review of subsea noise assessments produced for other operational offshore wind farm project, where site-specific operational noise data was collected. The industry-standard injury thresholds for impacts to marine mammals will be used (NMFS, 2018; DAHG, 2014; Southall et al., 2019). A review of the behavioural dose response relationships of marine mammals to potential noise sources will also be considered.

Where appropriate, mitigation measures will be proposed, and residual potential effects presented in the future EIAR.

6.5.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation with relevant stakeholders) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment.

It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works.

As additional plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the list of other plans, projects and activities to be included in the Cumulative Impact Assessment of the EIAR has been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Marine Mammals and Reptiles will be collated and reviewed.

Of particular relevance to Marine Mammals and Reptiles will be understanding the proposed construction programmes for other projects in the wider region. The most likely significant cumulative effect on Marine Mammals is underwater noise from multiple sources, i.e. piling taking place concurrently on several projects.

In addition to this, as much information on other plans, projects and activities that have not yet submitted full EIARs will also need to be collated and reviewed to inform the Cumulative Impact Assessment of the future EIAR.

With respect to potential transboundary impacts, based on current understanding, potential transboundary impacts on Marine Mammals receptors may arise on mobile species that form part of the qualifying populations of designated sites in other States/Territories. These potential impacts may affect the integrity of these designated sites. Therefore, it is currently proposed to scope in potential transboundary impacts on (EIAR Topic). The potential for such transboundary impacts to arise will be confirmed via a formal Transboundary Screening exercise that will be undertaken post EIAR Scoping. Where potential transboundary impacts are confirmed, these will be assessed within the final EIAR.

6.5.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR, with respect to the potential effects on Marine Mammal and Reptile receptors.

6.5.5.3 Proposed Consultees

Table 6-20 summarises the proposed consultees for the Marine Mammals and Reptiles chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objectives of this consultation are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of the Development Permission application.

Table 6-20 Proposed consultees (Marine Mammals and Reptiles)

Proposed Consultee	Objective of Consultation
National Parks and Wildlife Services (NPWS)	1. As outlined above, initial consultation was undertaken to discuss and seek to agree the scope, approach and spatial extent for the proposed DAS undertaken to gather marine mammal data (proposed consultees on the DAS data relating to bird species can be found in the relevant chapters).
Irish Whale and Dolphin Group (IWDG)	
Bord Iascaigh Mhara (BIM)	
Ocean Research and Conservation Association Ireland (ORCA Ireland)	
Wexford County Council (WCC)	
Seal Rescue Ireland	
Marine Institute	
All of the above	1. To discuss and seek to agree data available to date and to discuss any additional data collection requirements to inform the EIAR process.
NPWS and IWDG	1. To discuss and seek to agree the approach to impact assessment for marine mammals, and potential embedded mitigation measures. 2. To present preliminary findings on DAS surveys and seek to agree key species of interest. 3. To discuss provisional outputs of assessment and potential mitigation measures.

6.5.6 Potential Impacts to be assessed within the EIAR

Table 6-21 outlines the potential impacts on Marine Mammal and Reptile receptors which may arise within the Marine Mammals Topic-specific Study Area as a result of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in 6.5.5. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-21 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Marine Mammals and Reptiles)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Underwater noise and vibration Underwater noise has the potential to affect marine mammal species and has the potential to be produced during activities associated with The Project. This includes vessel movements, piling, O&M works, operational sound, and decommissioning. Underwater noise associated with UXO will be discussed under the potential impact 'UXO'.	Yes	Yes	Yes	In
UXO Should UXO be present in the region, controlled detonation via detonation or deflagration may be required. This has the potential to cause direct injury, and injury via associated underwater noise.	Yes	Yes	Yes	In
Vessel Collision and Disturbance Increased vessel traffic within The Project area may result in an increased risk of collision or result in increased disturbance to marine mammal receptors.	Yes	Yes	Yes	In
Indirect Impacts Due to Effects on Prey Availability The project operations have the potential to cause indirect effects to marine mammal receptors through impacts to their prey.	Yes	Yes	Yes	In
Reduction and/or increase in foraging success (indirect). Elevated turbidity levels associated with sediment disturbance could impact foraging success in visual foragers / Colonisation of foundations by marine fauna may create feeding habitat for seals.	Yes	Yes	Yes	In
Suspended Sediments Operations associated with The Project may cause sediment resuspension and changes in water quality, which may impact the visual behaviour of marine mammals.	Yes	Yes	Yes	In
EMF Effects Subsea cables may emit electromagnetic fields (EMF), which may impact the navigation of marine mammal species.	No	No	No	Out
Rationale for Scoping Out Based on the data available to date on this specific issue, there is no evidence of EMF related to marine renewable devices having any impact (either positive or negative) on marine mammals (Copping 2018).				

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
<p>Chemical Pollutants</p> <p>Accidental and unplanned release of chemicals and pollutants from vessels used during the lifetime of The Project has the potential to cause harm to marine mammals.</p> <p><u>Rationale for Scoping Out</u></p> <p>The impact of pollution including accidental spills and contaminant releases associated with the construction of infrastructure and use of supply / service vessels may lead to direct mortality of marine mammals/reptiles and/or a reduction in prey availability either of which may affect species' survival rates. Following appropriate construction best practice, it has been agreed with stakeholders on consent applications for other OWFs in the UK and elsewhere that complete mortality within the equivalent extent of the Potential Turbine Array Infrastructure Zone plus buffer area is considered very unlikely to occur, and a major incident that may impact any species at a population level is considered very unlikely e.g. Awel Y Mor and Rampion II EIA Scoping Opinion in Wales and England respectively.</p> <p>It has been predicted for other offshore wind farms that any impact would be of local spatial extent, short term duration, and not significant in EIA terms. This is considered to be equally applicable to Shelmalere Offshore Wind Farm, for which construction will be comparable in scale and operation and within the same environment, whilst implementing an appropriate approach to construction practices. Therefore, subject to consultation with the stakeholders and feedback received on this EIAR Scoping Report, it is intended to scope this impact out of further consideration within the EIAR.</p>	No	No	No	Out
Cumulative Impacts	Yes	Yes	Yes	In
Transboundary Impacts	Yes	Yes	Yes	In

6.5.7 EIAR Scoping Questions

The following questions are designed to assist stakeholders in providing feedback to the EIAR Team on the Marine Mammals topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Marine Mammals and Reptiles chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Marine Mammals and Reptiles Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?

- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Marine Mammals and Reptiles chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Marine Mammals and Reptiles chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Marine Mammal and Reptiles chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.5.8 References

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6.6 CHAPTER 6: OFFSHORE ORNITHOLOGY

6.6.1 Introduction

This chapter of the EIAR will outline the potential impacts of Shelmalere Offshore Wind Farm on Offshore Ornithology. This chapter of the EIAR Scoping Report sets out the methodology and approach proposed to be taken to assess these potential impacts within the future EIAR and includes the following:

- A list of policy and guidance documents relevant to this EIAR topic;
- A preliminary review of the receiving environment within the Offshore Ornithology Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential impacts on Offshore Ornithology, in particular Important Ornithological Features (IOF) (CIEEM, 2018);
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the future EIAR process;
- Key datasets that it is proposed to use to inform the future EIAR for Offshore Ornithology;
- Potential surveys proposed to inform the future EIAR for Offshore Ornithology;
- A summary of potential effects on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been completed by APEM Ltd (APEM) which has extensive experience of Offshore Ornithology assessments from previous offshore wind farm EIAs (EIARs).

The Offshore Ornithology Topic-specific Study Area is based on an area that is considered to represent a realistic maximum spatial extent of potential impacts on IOFs. This Topic-specific Study Area includes the Potential Turbine Array Infrastructure Zone and a 4 km buffer, plus the offshore portion of the Potential Export Cable Corridor Infrastructure Zone seaward of the mean low water spring (MLWS). It should be noted that the proposed Offshore Ornithology Topic-specific Study Area may be subject to review and amendments as a result of such matters as refinement of the Potential Export Cable Corridor Infrastructure Zone and the identification of additional environmental or engineering constraints.

For consideration of potential effects on birds in the intertidal and onshore areas, refer to the Onshore Chapter 5 of this EIAR Scoping Report (Onshore Biodiversity).

6.6.2 Relevant Policy and Guidance

Relevant policies and guidance documents relevant to Offshore Ornithology are detailed below. Where certain guidance documents have been produced in relation to UK offshore wind farm projects, i.e. not strictly applicable to Irish offshore wind farm projects, these will be reviewed as part of the EIAR process and due consideration will be given to how this guidance is applied for Shelmalere Offshore Wind Farm.

Table 6-22 Relevant Policy and Guidance Documents (Offshore Ornithology)

Policy / Guidance	Reference	Geographic Coverage
Policy		
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
Guidance		
Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA)	EPA, 2022	Ireland
Various specific guidance documents from UK Statutory Nature Conservation Bodies (SNCBs) regarding the approaches to assessment of collision and displacement impacts.	Various	UK
Scottish National Heritage (SNH) - Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland Volume: Benthic Habitats.	SNH, 2011	Scotland (UK)
Chartered Institute of Ecology and Environmental Management (CIEEM) - Guidelines for EIA in Britain and Ireland. Marine and Coastal, Final Document.	CIEEM, 2022	UK and Ireland
Centre for Environment, Fisheries and Aquaculture Science (Cefas) – Guidance Note for Environmental Impact Assessment in Respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act (CPA) Requirements.	Cefas <i>et al.</i> , 2004	UK
Cefas - Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects.	Cefas, 2011	UK
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects	DCCAE, 2017	Ireland
Guidance on Marine Baseline Ecological Assessments and Monitoring Activities: Offshore Renewable Energy Projects Parts 1 and 2	DCCAE, 2018	Ireland

6.6.3 Receiving Environment

6.6.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

The data sources listed below provide coverage of the Offshore Ornithology Topic-specific Study Area and the wider region of interest for seabirds, intertidal birds and migratory bird species. It should be noted that the information sources, guidelines, assessment methodologies and reports applied in this EIAR Scoping Report are not comprehensive and not intended to provide all the information required for the future assessment of effects. In addition, ornithological assessment in EIARs for offshore wind farms is a developing field with new and up-to-date information and evidence bases entering the public domain on a regular basis.

Such new information will be considered as and when available and applicable at the relevant stage of the future EIAR process. The key data sources that will be used to inform the future EIAR are presented in Table 6-23.

Table 6-23 Key datasets to inform EIAR Scoping Report and EIAR (Offshore Ornithology)

Data Type	Summary
Shelmalere Offshore Wind Farm Digital Aerial Surveys (DAS)	<p>The offshore ornithology DAS currently being undertaken by APEM Ltd will provide information on species (or species-groups if species identification is not possible), abundance, distribution, behaviour, location, numbers, sex and age (where possible), and flight height and direction of ornithological receptors. Two years of monthly site-specific DAS are being undertaken, which commenced in April 2021. One survey will be undertaken per month until March 2023.</p> <p>The DAS survey area encompasses the Potential Turbine Array Infrastructure Zone plus a 4 km buffer. The transect-based data collection covers approximately 21% of the DAS survey area, a narrower strip-width is then subsequently processed, and observations are recorded for an area equating to approximately 12.5% of the DAS survey area. This meets / exceeds the industry standard survey area coverage of 12.5% and 10% in Ireland and the UK, respectively.</p>
Peer-reviewed literature	<p>Published, peer reviewed scientific papers on seabird behaviour and characteristics e.g., Robinson, 2005 (used to inform on the ecology of bird species in Britain and Ireland); Thaxter et al, 2012 and Woodward et al, 2019 (used to inform on seabird foraging ranges); Furness et al, 2018 (used to inform on nocturnal flight activity of Gannets and implications for CRM); Garthe & Hüppop 2004 (used to inform on the vulnerability of seabirds to OWF); Fliessbach et al. 2019 (used to inform on seabird sensitivity to ship traffic disturbance).</p> <p>Although not site-specific, these covered species and areas of marine waters that are relevant to The Project. Those studies conducted on an Irish waters-basis would have covered the Topic-specific Study Area. These sources may offer further understanding of seabird and OWF interactions and potential associated risks / effects.</p>
OWF grey literature	<p>Post-consent monitoring reports on Offshore Ornithology at UK and other European offshore wind farms due to a lack of grey literature from Irish OWF.</p> <p>These studies inform the EIAR by providing relevant information on the effects observed as a result of other OWF projects.</p>
Offshore Wind Farm assessment methodologies	<p>Publications on assessment methodologies for seabirds and OWFs e.g., Maclean et al, 2009 (to inform on OWF assessment methodologies); Wright et al, 2012 (to inform on assessing the risk of OWF to migratory birds); SNCBs, 2022 (to inform on seabird displacement from OWF); Band 2012 and Donovan, 2017 (to inform on sCRM) ; (Cook et al, 2018 (to inform on avoidance behaviours).</p> <p>These contain well-established methods that will be applied in the site-specific circumstances of The Project.</p>
Seabird Atlases	<p>Publications on bird distribution and movements within Irish waters and further afield, e.g., ObSERVE (Jessopp et al. 2018 (to inform on the abundance and seasonal distribution of seabirds in the western Irish sea); Rogan et al, 2018 (to inform on occurrence, distribution and abundance of seabirds in Irish waters)); Critchley et al., 2018 (to inform on seabird foraging ranges); Waggitt et al., 2019 (to inform on seabird distribution in the north-east Atlantic); Darby et al., 2021 (to inform on the foraging distribution of breeding Fulmar); Stone et al, 1995 (to inform on seabird distribution in north-west European waters); Stienen et al, 2007 (to inform on potential impacts of OWF on seabirds); Wernham et al, 2002 (to inform on the distribution of birds in Britain and Ireland).</p> <p>These contain information from regions covering The Project, including coastal waters off east Ireland or as wide as the east Atlantic region.</p>
Species population estimates	<p>Publications on seabird, waterbird and other bird species population estimates for Ireland, the UK, and wider regions e.g., Frost et al., 2019 (to inform on UK waterbird populations); Furness, 2015 (to inform on UK non-breeding seabird populations); Musgrove et al., 2013 (to inform on UK bird populations); Mitchell et al, 2004 (to inform on Irish and UK seabird populations); Cummins et al.,</p>

Data Type	Summary
	<p>2019 (to inform on the status of breeding Irish seabirds); JNCC Seabird Population Trends and Causes of Change: 1986-2019 Report, 2021.</p> <p>These contain information that can be drawn upon that is relevant to The Project, including covering coastal waters off east Ireland or the wider Irish Sea.</p>

6.6.3.2 Protected Sites

The Offshore Ornithology EIAR chapter will consider potential connectivity of Shelmalere Offshore Wind Farm with sites with statutory designation for nature conservation, which have birds listed as qualifying features. Two classes of statutory protected sites will be considered: SPAs and Ramsar sites. Sites which may have connectivity to Shelmalere Offshore Wind Farm include those designated for breeding seabirds and those for terrestrial, coastal, or marine bird interests (typically overwintering aggregations).

The Offshore Ornithology Topic-specific Study Area does not directly overlap with any ornithological designations. However, as seabirds can travel considerable distances, it is necessary to give consideration to protected sites beyond the boundary of the Offshore Ornithology Topic-specific Study Area.

SPAs designated for wintering seabirds, intertidal birds, and for birds which may pass through the Potential Turbine Array Infrastructure Zone on migration will also be considered during the EIAR process. A limited list of examples of sites that are closest in proximity to Shelmalere Offshore Wind Farm include:

- The Raven SPA (12.5 km from the Potential Turbine Array Infrastructure Zone);
- Cahore Marshes SPA (12.9 km from the Potential Turbine Array Infrastructure Zone);
- Wexford Harbour and Slobbs SPA (13.5 km from the Potential Turbine Array Infrastructure Zone);
- Lady's Island Lake SPA (14.1 km from the Potential Turbine Array Infrastructure Zone).

These sites and the species listed as Special Conservation Interests for each site identified via the Appropriate Assessment screening process will be fully addressed in the NIS that will be prepared alongside the EIAR.

6.6.3.3 Baseline assemblage and assessment of nature conservation value for each bird species

Species likely to be taken forward to impact assessment as IOFs will be those which are recorded during the site-specific DAS and which are considered to be at potential risk either due to their abundance, potential sensitivity to wind farm impacts or due to biological characteristics (e.g., commonly fly at rotor heights) which make them potentially susceptible to potential negative impacts resulting from The Project (e.g., collision, displacement). Prior to the completion of ongoing site-specific DAS, a list of species most likely to be considered IOFs is presented in Table 6-24.

This has been determined from available information outlined in Table 6-23 in particular the preliminary survey results, of which data from Year 1 (April 2021 – March 2022) are available at the time of publication of this EIAR Scoping Report, and the aforementioned seabird atlases. This species list may be subject to change based on the results of ongoing DAS and stakeholder consultation.

The early consideration of the raw data processed to date (April 2021-March 2022) suggests that accumulations of Auk species, Shearwater species and Black-legged kittiwake *Rissa tridactyla* occur within the Offshore Ornithology Topic-specific Study Area.

In summary, a total of 26 species have been identified to species level from the DAS at the time of EIAR scoping, with a further 14 groups recorded (e.g., Large gull species, Common guillemot/Razorbill, 'Commic' terns (whereby separation between Arctic tern and Common tern has not been possible)).

Common guillemot *Uria aalge*, Razorbill *Alca torda*, Northern gannet *Morus bassanus*, and Black-legged kittiwake have been recorded in all survey months for which data are available at this time. Arctic tern *Sterna paradisaea* were recorded in April - July 2021 surveys; Roseate terns *S. dougallii* were recorded in July – September 2021 surveys; Common/'commic' terns were recorded in April – September 2021 surveys. Manx shearwater *Puffinus puffinus* were recorded in April- September 2021 surveys, while further records identified to either 'small shearwater species' or 'auk / shearwater species' were recorded in August and September 2021. It is likely that these species, along with those identified as occurring in particular abundance during the breeding season, will be potentially considered as IOFs in the EIAR.

Additional species / groups identified include Gulls species, Northern fulmar *Fulmarus glacialis*, Common scoter *Melanitta nigra*, Red-throated diver *Gavia stellata*, Great northern diver *G. immer*, Diver species, few records of unidentified wader species, Great skua *Stercorarius skua*, Cormorant and Shag *Phalacrocorax carbo / aristotelis*, Shag, Sandwich tern *Thalasseus sandvicensis*, and European storm-petrel *Hydrobates pelagicus*.

Table 6-24 summarises expected IOFs, utilising data from DAS and desk-based study undertaken to inform the EIAR Scoping Report. Species include those of high nature conservation value, particularly those that are component features of SPAs in proximity to the Offshore Ornithology Topic-specific Study Area.

Table 6-24 Summary of Important Ornithological Features and associated nature conservation value for Shelmalere Offshore Wind Farm based on available information at EIAR Scoping

Species	Migratory Species	Annex I	BoCCI 4 Red-list	IUCN Vulnerable / Near threatened
Red-throated diver	Y	Y	N	N
Manx shearwater	Y	Y	N	N
Northern Fulmar	Y	N	N	N
European Storm-petrel <i>Hydrobates pelagicus</i>	Y	Y	N	N
Northern gannet	Y	N	N	N
Cormorant	Y	N	N	N
Shag	Y	N	N	N
Common scoter	Y	Y	Y	N
Black-legged kittiwake	Y	N	Y	Y
Common gull <i>Larus canus</i>	Y	N	N	N
Herring gull <i>Larus argentatus</i>	Y	N	N	Y
Lesser black-backed gull <i>Larus fuscus</i>	Y	N	N	N
Great black-backed gull <i>Larus marinus</i>	Y	N	N	N
Little gull <i>Hydrocoloeus minutus</i>	Y	N	N	Y
Sandwich tern <i>Thalasseus sandvichensis</i>	Y	Y	N	N
Little tern <i>Sternula albifrons</i>	Y	Y	N	N
Common tern <i>Sterna hirundo</i>	Y	Y	N	N
Roseate tern	Y	Y	N	N
Arctic tern	Y	Y	N	N
Atlantic puffin <i>Fratercula arctica</i>	Y	N	Y	Y
Common guillemot	Y	N	N	N
Razorbill	Y	N	Y	Y

Data analysis for the EIAR, outlined further below in Table 6-26, will consider seasonal variations in site usage by IOFs as well as the importance of the site for each species' different life stages. Relevant bio-seasons for each species will be informed by species-specific information from Furness (2015) and site-specific DAS survey data. Reference populations for each species and population sizes will be based on the best available information at the time of undertaking the assessment and agreed with key stakeholders, where possible. The conservation status (see Table 6-26) will be taken into consideration.

6.6.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR. A lack of long-term monitoring data sets and recent census data for several species in Ireland comprise a potential data gap to inform the assessment of some species in the EIAR (e.g., within the PVA).

With respect to proposed surveys for Offshore Ornithology, site-specific DAS commenced in April 2021 and will be undertaken each month up to March 2023 (24 months of data collection). The current methodology and scope of these ongoing surveys were discussed in consultation with key technical stakeholders prior to the surveys commencing.

Whilst some stakeholders maintain some concerns with the limitation of these surveys, e.g., the ability to identify seasonal/nocturnal pulses of migratory birds, The EIAR Team is committed to continuing discussions on these aspects and providing additional information to resolve such queries as and when required.

This may include the potential use of the UK industry standard methods such as the use of migratory corridors defined for relevant species within Wright *et al.* (2012); statistical modelling techniques that may be adapted to be applicable in Ireland; the assessment of bird movements recorded in land-based Vantage Point (VP) surveys that are ongoing at the potential Cable Landfall areas; and/or the deployment of an European Seabirds At Sea (ESAS) qualified observer aboard geophysical/environmental survey vessels expected to commence survey works within the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone in 2023.

6.6.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential impacts of Shelmalere Offshore Wind Farm on IOFs. Whilst the key principles of EIAR methodology, as set out in Chapter 4 will be followed for this assessment, there are also some aspects of assessment specific to Offshore Ornithology that warrant further detail being included within this section.

This is also important in view of the fact that potential impacts on Offshore Ornithology is one of the key focus areas for any EIAR for offshore wind farms.

6.6.5.1 Defining Conservation value of the receptors

The proposed assessment process would involve identifying IOFs on which to focus detailed assessment. IOFs are defined as bird species for which potential exists for a significant effect to arise, based on their conservation value and potential magnitude of impact. The conservation values of these IOFs will be determined by an agreed set of criteria. For example, a receptor of High conservation value would be a species listed as a qualifying feature of an internationally designated site (e.g., SPA or Ramsar), whereas a receptor of Low conservation value might be a species occurring within SPAs, Ramsar sites and NHAs, but not crucial to the integrity of the site.

6.6.5.2 Defining sensitivity of the receptor

In addition to the specific conservation value of the receptor, the general sensitivity of the receptor is also key issue to address.

The sensitivity of the receptors to potential impacts is determined subjectively based on species' ecology and behaviour. The judgement takes account of information available on the responses of birds to various stimuli (e.g. predators, noise and visual disturbance) and whether a species' ecology makes it vulnerable to potential impacts. For example, bird species that typically fly at heights that overlap with the rotor-swept area are considered to be more sensitive to collision risk with the moving blades of WTGs than species that fly much higher or lower that avoid the rotor-swept area. The sensitivity of each species will be assessed based on numerous factors, comprising population size, conservation status, and known sensitivity to OWF construction / operation / decommissioning.

The behavioural responses of Offshore Ornithology receptors are likely to vary with both the nature and context of the stimulus and the experience of the individual bird. Sensitivity also depends on the activity of the bird. In addition, individual birds of the same species will differ in their tolerance depending on the level of human disturbance that they regularly experience in a particular area, and have become habituated to (e.g., individuals that forage within close proximity to an area with high human activity levels are likely to have a greater tolerance than those that occupy remote locations with little or no human presence).

As an example, an Offshore Ornithology receptor with High sensitivity is one that is likely to be affected by and suffer highly adverse effects (including mortality) from, a given impact; in contrast, an Offshore Ornithology receptor with Low sensitivity would be a species which is likely to be affected to some extent by an impact, but the effect is likely to be small or not lead to serious adverse outcomes to the individuals affected.

Consideration of the level of sensitivity with regards to individual ornithology receptors is one of the core components of the assessment of potential impacts and the significance of their effect. Furthermore, as detailed above, each receptor's conservation value is also considered using reasoned judgement when determining their overall sensitivity to any potential impact or effect.

Such reasoned judgement is an important part of the overall narrative used to determine potential impact significance and is used, where relevant, as a mechanism for modifying the sensitivity of an effect assigned to a specific receptor.

6.6.5.3 Defining magnitude of impact

Impacts on Offshore Ornithology receptors are judged in terms of their magnitude. Magnitude refers to the scale of an impact and is determined on a quantitative basis where possible. This may relate to the area of habitat lost to the proposed development footprint in the case of a habitat feature or predicted loss of individuals in the case of a population of a species of bird. Magnitude is typically assessed within four levels. For example, a High magnitude of impact may involve a change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site and which would alter the long-term viability of the population and/ or the integrity of the protected site. A Low magnitude of impact would be a change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site, but which is sufficiently small-scale or of short duration to cause no long-term harm to the feature/ population.

6.6.5.4 Determining significance of effect

The CIEEM guidelines (2018) use only two categories to classify effects: “significant” or “not significant”. The significance of an effect is determined by considering the overall importance (defined here as the overall sensitivity) of the receptor and the magnitude of the impact.

A matrix-based approach can be useful in classifying the significance of an effect; however, the CIEEM guidelines (2022) make it clear that a matrix approach should not be relied on rigidly and the ultimate conclusion will be based on applying professional judgement as to whether the integrity of the feature is likely to be affected.

Effects are more likely to be considered significant where they affect ornithological features of higher overall sensitivity or where the magnitude of the impact is high. Effects not considered to be significant would be those where the integrity of the feature is not threatened, effects on features of lower overall sensitivity, or where the magnitude of the impact is low.

6.6.5.5 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works.

As additional plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the list of other plans, projects and activities to be assessed within the Cumulative Impact Assessment of the future EIAR has been agreed, as many details from these other plans, projects and activities relevant to the assessment of potential effects on Offshore Ornithology will be collated and reviewed. This will include as many details that can be collated with respect to impacts such as collision risk and displacement. These details will then be assessed in the context of site-specific potential effects associated with Shelmalere Offshore Wind Farm, and an assessment of potential cumulative effects will be carried out.

With respect to potential transboundary impacts, based on current understanding, potential transboundary impacts on Offshore Ornithology receptors may arise on mobile species that form part of the qualifying populations of designated sites in other States/Territories. These potential impacts may affect the integrity of these designated sites. Therefore, it is currently proposed to scope in potential transboundary impacts on Offshore Ornithology. The potential for such transboundary impacts to arise will be confirmed via a formal Transboundary Screening exercise that will be undertaken post EIAR Scoping. Where potential transboundary impacts are confirmed, these will be assessed within the final EIAR.

6.6.5.6 Major Accidents and Natural Disasters

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

6.6.5.7 Proposed Consultees

Table 6-25 summarises the proposed consultees for the Offshore Ornithology chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objectives of that consultation are also included in that Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of the Development Permission application.

Table 6-25 Summary of proposed consultees (Offshore Ornithology)

Proposed Consultee	Objective of Consultation
National Parks and Wildlife Services (NPWS)	As outlined above, initial consultation was undertaken to discuss and seek to agree the scope, approach and spatial extent for the proposed DAS undertaken to gather bird, marine mammal and other marine megafauna data.
Irish Whale and Dolphin Group (IWDG)	
Bord Iascaigh Mhara (BIM)	
Cork Nature Network (CNC)	
Wexford County Council (WCC)	
All of the above plus BirdWatch Ireland	1. To discuss and agree data available to date and to discuss any additional data collection requirements to inform the EIAR process.
NPWS and BirdWatch Ireland	1. To discuss and agree the approach to impact assessment for marine ornithology and SPA, and potential embedded mitigation measures. 2. To present preliminary findings on DAS surveys and to seek to agree key species of interest. 3. To discuss provisional outputs of assessment and potential mitigation measures.

6.6.6 Potential Impacts to be assessed within the EIAR

Table 6-26 outlines the potential impacts on Offshore Ornithology receptors which may arise within the Offshore Ornithology Topic-specific Study Area as a result of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in 6.5.5. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-26 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR Offshore Ornithology

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Direct temporary habitat loss / disturbance due to construction Construction activities such as increased vessel activity and underwater noise may result in direct disturbance or displacement of birds from important feeding and roosting areas, including due to direct habitat loss.	Yes	No	No	In
Indirect impacts on IOFs due to effects on prey species and habitats Potential indirect impacts include those resulting from underwater noise (e.g., during piling) or the generation of suspended sediments (e.g., during preparation of the seabed for foundations) that may alter the distribution, physiology or behaviour of bird prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey being available in the area adjacent to active construction works to foraging seabirds. There is also evidence that fish and mobile invertebrates may be attracted to the operational area (Kerckhof et al, 2010; EMU Ltd., 2008; Krone et al, 2013; Linley et al, 2008 and Wilhelmsson <i>et al</i> 2006) and so beneficial impacts may occur.	Yes	Yes	Yes	In
Operational Disturbance and displacement (Potential Turbine Array Infrastructure Zone) The presence of WTGs has the potential to disturb and displace birds from within and around the Offshore Ornithology Topic-specific Study Area. This would have the potential to reduce the area available to birds for feeding or loafing. Vessel activity and the lighting of WTGs and associated ancillary structures could also attract (or repel) certain species of birds and affect migrating birds. Displacement analysis will be undertaken in line with the latest updates to the joint SNCB interim guidance (SNCBs, 2022) using the matrix approach. Species included within the displacement analysis, along with the species-specific mortality rates and displacement rates will be based upon the best available evidence and agreed with consultees and stakeholders, where possible, and clearly defined within the EIAR. Additionally, the population-level impacts of the resulting potential additional mortality of both collision and displacement will be considered. Bird behaviour and abundance differs depending on time of the year and season. In order to account for this, separate bio-seasons will be recognised in the baseline technical reporting for Shelmalere Offshore Wind Farm and subsequent impact assessments to establish the importance of IOFs at Shelmalere Offshore Wind Farm at a particular period of time. Bio-seasons for each species will be determined in line with Furness (2015) with relevant amendments made to accommodate for site-specific differences, where an evidence base exists which supports this. For species not included in Furness (2015), bio-seasons will be agreed with key stakeholders and consultees, where possible.	No	Yes	No	In

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Collision Risk <p>There is a risk of birds in flight colliding with rotating WTG blades. The susceptibility of species to collision risk depends upon physiological and behavioural characteristics of the species, in addition to the design specifications of The Project.</p> <p>Collision risk modelling (CRM) at offshore wind farms is usually undertaken using the Band (2012) model, with variations applied to account for the variation around standard deviation or mean values for parameters. A new stochastic collision risk model (sCRM, Donovan, 2017) has recently been made available which incorporates parameter variability and therefore accounts for a varying degree of uncertainty in input parameters. Models will be used deterministically, making use of the latest evidence to inform the input parameters. The exact CRM option to be used, avoidance rates, flight height data, nocturnal activity rates and parameters for modelling will be based upon the best available evidence and agreed with consultees and stakeholders, where possible, and clearly defined within the EIAR.</p>	No	Yes	No	In
Decommissioning impacts <p>During decommissioning, the potential impacts are anticipated to be similar to those for the construction phase but on a smaller scale. There may also be an incremental reduction of impact as the permanent structures are removed from the site.</p>	No	No	Yes	In
Accidental pollution during construction (including indirect impacts) <u>Rationale for Scoping Out</u> <p>The impact of pollution including accidental spills and contaminant releases associated with the construction of infrastructure and use of supply / service vessels may lead to direct mortality of birds or indirectly via causing a deterioration in habitat quality or a reduction in prey availability either of which may affect species' survival rates. Following appropriate construction best practice, it has been agreed with stakeholders on consent applications for other OWFs in the UK and elsewhere that complete mortality within the equivalent extent of the Potential Turbine Array Infrastructure Zone plus buffer area is considered very unlikely to occur, and a major incident that may impact any species at a population level is considered very unlikely e.g. Awel Y Mor and Rampion II EIA Scoping Opinion in Wales and England respectively.</p> <p>It has been predicted for other OWFs that any impact would be of local spatial extent, short term duration, and not significant in EIA terms. This is considered to be equally applicable to Shelmalere Offshore Wind Farm, for which construction will be comparable in scale and operation and within the same environment, whilst implementing an appropriate approach to construction practices.</p>	No	No	No	Out

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Therefore, subject to consultation with the stakeholders and feedback received on this EIAR Scoping Report, it is intended to scope this impact out of further consideration within the EIAR.				
Operational disturbance and displacement (Potential Export Cable Corridor Infrastructure Zone) <u>Rationale for Scoping Out</u> Given that potential impacts along the Potential Export Cable Corridor infrastructure Zone would be highly localised and episodic (i.e., limited to any maintenance or repair of the export cables) it is proposed that this impact should be scoped out from further consideration within the EIAR in relation to the Potential Export Cable Corridor Infrastructure Zone, with the focus of operation disturbance-displacement on the Potential Turbine Array Infrastructure Zone only.	No	No	No	Out
Barrier Effects during Operation <u>Rationale for Scoping Out</u> For the purposes of assessment of displacement for breeding birds, it is usually not possible to distinguish between displacement and barrier effects. For example, to define where individual birds may have intended to travel to, or beyond an OWF, even when tracking data are available. The proposed approach to displacement assessment is highly precautionary and is assumed to account for barrier effects in addition to displacement impacts per se, and this is recognised by the updated SNCB (2022) interim guidance on displacement and the inclusion of flying as well as sitting birds Therefore, EIAR, potential barrier effects on resident IOFs will not be assessed in their own right but will be assumed to be captured within the assessment of displacement effects. The small risk of impact to migrating birds resulting from flying around rather than through the WTG array of an OWF is considered a potential barrier effect but has been scoped out of the assessment. Masden et al. (2010, 2012) and Speakman et al. (2009) calculated that the costs of one-off avoidances during migration were small, accounting for less than 2% of available fat reserves. Therefore, the impacts of any barrier effect on birds that only migrate through the site (including seabirds, waders and waterbirds on passage) are considered negligible and these would be scoped out of detailed assessment in the EIAR.	No	No	No	Out
Cumulative Impacts	Yes	Yes	Yes	In
Transboundary Impacts	Yes	Yes	Yes	In

*Following the updated SNCB (2022) interim guidance on displacement, account is provided to barrier effects within the matrix approach through the inclusion of both flying and sitting birds into the displacement analysis.

6.6.7 EIAR Scoping Questions

The following questions are designed to assist stakeholders in providing feedback to the EIAR Team on the Offshore Ornithology topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Offshore Ornithology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Offshore Ornithology Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Offshore Ornithology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Offshore Ornithology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Offshore Ornithology chapter of the EIAR for Shelmalere Offshore Wind Farm?

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Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W. and Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying Marine Protected Areas. *Biological Conservation*, 156, 53-61.

Waggitt, JJ, Evans, PGH, Andrade, J, et al. Distribution maps of cetacean and seabird populations in the North-East Atlantic. *J Appl Ecol*. 2019; 57: 253– 269. <https://doi.org/10.1111/1365-2664.13525>.



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Wilhelmsson, D., Malm, T. and Ohman, M.C. (2006). 'The influence of offshore windpower on demersal fish'. ICES Journal of Marine Science, 63: 775-784.

Woodward, L. et al. (2019). Desk-based revision of seabird foraging ranges used for HRA screening. BTO research report number 724. Thetford.

Wright, L.J., Ross-Smith, V.H., Massimino, D., Dadam, D., Cook, A.S.C.P. and Burton, N.H.K. (2012) Assessing the risk of offshore windfarm development to migratory birds designated as features of UK Special Protection Areas (and other Annex I species), Strategic Ornithological Support Services. Project SOSS-05. BTO Research Report No. 592.

6.7 CHAPTER 7: OFFSHORE BATS

6.7.1 Introduction

This chapter of the EIAR will outline the potential impacts of Shelmalere Offshore Wind Farm on Offshore Bats. Consideration of Bats in a terrestrial context are provided in the Onshore Chapter 5 (Biodiversity) of this EIAR Scoping Report.

This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing likely significant effects within the future EIAR and includes the following:

- A list of policy and guidance documents relevant to the Offshore Bats topic;
- A preliminary review of the receiving environment within the Offshore Bats Topic-specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential impacts on Offshore Bats;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Offshore Bats;
- Potential surveys proposed to inform the future EIAR for Offshore Bats;
- A summary of potential impacts on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by MarineSpace, supported by FT. The Offshore Bats Topic-specific Study Area is yet to be defined due to a high degree of uncertainty about this group of species. It is proposed that this is developed by the EIAR Team in consultation with key stakeholders with expertise on this topic, these have been identified in Table 6-29.

6.7.2 Relevant Policy and Guidance

Table 6-27 Relevant Policy and Guidance Documents (Offshore Bats)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Wind Turbine/Wind Farm Development: Bat Survey Guidelines	Bat Conservation Ireland, 2012	Ireland
Bat Mitigation Guidelines for Ireland – Version 2	NPWS, 2022	Ireland
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland

Where identified, additional relevant guidance documents will be consulted during the future EIAR process. If applicable documents may be sourced from countries outside of Ireland where guidance for offshore wind is further developed.

6.7.3 Receiving Environment

There are nine resident species of bats are found in Ireland, these are:

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius' pipistrelle (*Pipistrellus nathusii*);
- Leisler's bat (*Nyctalus leisleri*);
- Brown long-eared bat (*Plecotus auritus*);
- Daubenton's bat (*Myotis daubentonii*);
- Whiskered bat (*Myotis mystacinus*);
- Natterer's bat (*Myotis nattereri*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*).

In addition to the nine species that are known to be native to Ireland there have been individual reports of Brandt's bat (*Myotis brandtii*) and greater horseshoe bat (*Rhinolophus ferrumequinum*), however these are not considered to be resident in Ireland (Bat Conservation Ireland, 2020).

Although there are uncertainties around migrating patterns of bats, particularly within Ireland, it is considered that many species are known to be migratory, such as in continental Europe with migrations south during the winter (Bat Conservation Ireland, 2020).

Studies looking into the distribution and status of Nathusius' Pipistrelle, are being undertaken by All-Ireland Nathusius's Pipistrelle Bat Working Group to investigate whether these species of bats that are migrating along the Atlantic coast, between southern and northern Europe may drift into Ireland (DHLGH, 2021). It is not currently known whether this species migrates either within Ireland or to/from Ireland, although there is evidence of migration over sea between Britain and continental Europe (Bat Conservation Trust, 2021).

Table 6-28 Key datasets/sources to inform EIAR Scoping and EIAR (Offshore Bats)

Data Type	Source
BATATLAS - https://www.batconservationireland.org/whatwe-do/monitoring-distribution-projects/batlas	Bat Conservation Ireland, 2020
Records from Bat Conservation Trust - Available via https://www.bats.org.uk/news/2021/08/olympian-bat-smashesbritish-record-for-long-distance-migration	Bat Conservation Trust, 2021
All-Ireland Nathusius's Pipistrelle Bat Project. Updating the Distribution and Status of Nathusius's Pipistrelle, <i>Pipistrellus nathusii</i> in Ireland: Phase 5 (2021).	Department of Housing, Local Government and Heritage (DHLGH, 2021)
The status of Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>) in the British Isles	Russ et al., 2000
Article 17 Reports: The Status of EU Protected Habitats and Species in Ireland.	NPWS, 2020

6.7.4 Potential Additional Data and Proposed Surveys

Limited data sources have been identified to date to inform this EIAR Scoping Report. Additional data sources will potentially be identified via consultation related to this EIAR Scoping exercise and over the duration of the future EIAR process.

Future possible data collection may involve two possible scenarios:

- The deployment of passive detectors across potential Cable Landfall infrastructure areas; or
- The deployment of a bat detector on the geophysical survey vessel.

The final approach to such surveys will be determined in consultation with NPWS and other key technical stakeholders.

6.7.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Offshore Bats. Potential impacts on Offshore Bats in the will be assessed in the EIAR using the general methodology described within Section 4.3.1 of this EIAR Scoping Report. Potential impacts will be identified and defined using expert judgement, guidance, published research and policy documents listed in Section 6.7.2 and consideration of similar projects within the region and internationally.

The assessment of Offshore Bats will include a desk-based review of bat populations in Ireland, available evidence on potential effects on bat ecology from offshore wind developments and the likelihood of potential effect pathways with The Project. In the absence of published guidance on this matter it is proposed that international best practice be used. EUROBATS guidance series is suggested as an appropriate example (EUROBATS, 2022).

Where appropriate, mitigation measures will be proposed, and residual potential effects presented within the EIAR.

6.7.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works. As additional projects will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the eventual Cumulative Impact Assessment to be included in the future EIAR fully considers other developments.

Once the list of other plans, projects and activities to be included in the Cumulative Impact Assessment of the EIAR have been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Offshore Bats will be collated and reviewed. This will include as many details that can be collated with respect to impacts such as collision risk and displacement. These details will then be assessed in the context of project-specific potential effects associated with Shelmalere Offshore Wind Farm, and an assessment of potential cumulative effects will be carried out.

With respect to potential transboundary impacts, based on current understanding, potential transboundary impacts on Bats (Offshore) receptors may arise on mobile species that form part of the qualifying populations of designated sites in other States/Territories. These potential impacts may affect the integrity of these designated sites. Therefore, it is currently proposed to scope in potential transboundary impacts on Bats (Offshore). The potential for such transboundary impacts to arise will be confirmed via a formal Transboundary Screening exercise that will be undertaken post EIAR Scoping. Where potential transboundary impacts are confirmed, these will be assessed within the final EIAR.

6.7.5.2 Major Accidents and Natural Disasters

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

6.7.5.3 Proposed Consultees

Table 6-29 summarises the proposed consultees for the Offshore Bats chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 6-29 Proposed consultees (Bats-Offshore)

Proposed Consultee	Objective of Consultation
National Parks and Wildlife Services (NPWS)	<ol style="list-style-type: none"> 1. To discuss and agree the approach to impact assessment for Offshore Bats in the offshore environment and potential embedded mitigation measures. 2. To agree key species of interest. 3. To discuss provisional outputs of assessment and potential mitigation measures.
Cork Nature Network (CNC)	
All-Ireland Nathusius's Pipistrelle Bat Working Group	
Bat Conservation Ireland	

6.7.6 Potential Impacts to be assessed within the EIAR

Table 6-29 outlines the potential impacts on Offshore Bats that may arise as a result of the proposed Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in Section 6.16.5. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect having regard to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-30 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR) (Offshore Bats)

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Collision with WTGs Potential collision between bats offshore and WTGs	No	Yes	No	In
Loss of Foraging Habitat <u>Construction and Decommissioning phase:</u> Potential temporary loss/displacement of bats from offshore foraging habitats. <u>Operational Phase:</u> Potential long-term loss/displacement of bats from offshore foraging habitats.	Yes	Yes	Yes	In
Indirect impact on the availability of prey <u>Construction and Decommissioning phase:</u> Potential temporary indirect impacts on the availability of prey <u>Operational Phase:</u> Potential long-term indirect impacts on the availability of prey	Yes	Yes	Yes	In
Disruption to migratory pathways Presence of construction vessels and/or project infrastructure may disrupt existing bat migration routes.	Yes	Yes	Yes	In
Disturbance from lights Lights from construction vessels and/or project infrastructure may disturb bats.	Yes	Yes	Yes	In
Cumulative Impacts	Yes	Yes	Yes	In
Transboundary Impacts	Yes	Yes	Yes	In

6.7.7 EIAR Scoping Questions

The following questions are designed to assist stakeholder in providing feedback to the EIAR Team on the Offshore Bats topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Offshore Bats chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Offshore Bats Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Offshore Bats chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Offshore Bats chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Offshore Bats chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.7.8 References

Bat Conservation Ireland, 2020. BATLAS 2020. Available via: <https://www.batconservationireland.org/what-we-do/monitoring-distribution-projects/batlas>

Bat Conservation Trust, 2021. Available via <https://www.bats.org.uk/news/2021/08/olympian-bat-smashes-british-record-for-long-distance-migration>

Department of Housing, Local Government and Heritage (DHLGH, 2021), 2021. All-Ireland Nathusius's Pipistrelle Bat Project. Updating the Distribution and Status of Nathusius's Pipistrelle, *Pipistrellus nathusii* in Ireland: Phase 5 (2021). Dated 15 November 2021.

EUROBATS, 2022. EUROBATS Publication Series. Available here: EUROBATS Publication Series | UNEP/EUROBATS Accessed 8 June 2022.

Russ, J.M., Hutson, A.M., Montgomery W.I., Racey P.A., and Speakman, J.R. (2000) The status of Nathusius' pipistrelle (*Pipistrellus nathusii*) in the British Isles J. Zool., Lond. (2001) 254, p. 91-100.

6.8 CHAPTER 8: FISH AND SHELLFISH ECOLOGY

6.8.1 Introduction

This chapter of the EIAR will outline the potential impacts of Shelmalere Offshore Wind Farm on Fish and Shellfish Ecology receptors. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the EIAR and includes the following:

- A list of policy and guidance documents relevant to the Fish and Shellfish Ecology topic;
- A preliminary review of the receiving environment within the Fish and Shellfish Ecology Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential effects on Fish and Shellfish Ecology;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Fish and Shellfish Ecology;
- Potential surveys proposed to inform the future EIAR for Fish and Shellfish Ecology;
- Summary of potential impacts on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by Intertek which has extensive experience of EIAR for offshore wind farms.

For the purpose of this EIAR Scoping Report, the Fish and Shellfish Ecology Topic-specific Study Area is defined as the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone and an additional 24.5 km Zone of Influence (Zoi) around these Zones to account for migratory fish species and potential far-field impacts such as sediment plumes and sediment deposition.

As certain fish species will potentially be affected by underwater noise produced via the construction, operation and decommissioning of Shelmalere Offshore Wind Farm, the Fish and Shellfish Ecology Topic-specific Study Area will be refined as part of the future assessment process to take account of the maximum spatial extent of underwater noise effects (via piling and UXO). This will be derived from subsea noise modelling (see Chapter 1.3).

This chapter of the EIAR Scoping Report should be read in conjunction with Section 6.3, Chapter 3: Underwater Noise and Vibration and Section 6.9, Chapter 9: Commercial Fisheries of this EIAR Scoping Report.

6.8.2 Relevant Policy and Guidance

Policies and guidance documents relevant to Fish and Shellfish Ecology are detailed in Table 6-31.

Table 6-31 Relevant Policy and Guidance Documents (Fish and Shellfish Ecology)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA)	EPA, 2022	Ireland
Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects Part 1 April 2018	DCCAE, 2018a	Ireland
Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects Part 2 April 2018	DCCAE, 2018b	Ireland
Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine	CIEEM, 2019	UK & Ireland
Guidelines for data acquisition to support marine environmental assessment of offshore renewable energy projects	CEFAS, 2011	UK
Assessment of the environmental impacts of cables (The Convention for the Protection of the Marine Environment of the North-East Atlantic)	OSPAR, 2009	Global
Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI	Popper et al., 2014).	Global

6.8.3 Receiving Environment

6.8.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

The receiving environment will be established for the EIAR using key data sources identified to date that have been used to inform this EIAR Scoping Report and are presented in Table 6-32:

Table 6-32 Key datasets to inform EIAR Scoping and EIAR (Fish and Shellfish Ecology)

Data Type	Source
Shelmalere OWF Digital Aerial Surveys (DAS)	Two years of monthly site-specific DAS are being undertaken, which commenced in April 2021. One survey will be undertaken per month until March 2023. The DAS survey area encompasses the Potential Turbine Array Infrastructure Zone plus a 4 km buffer. The transect-based data collection covers approximately 21% of the DAS survey area, a narrower strip-width is then subsequently processed and observations are recorded for an area equating to approximately 12.5% of the DAS survey area. This meets / exceeds the industry standard survey area coverage of 12.5% and 10% in Ireland and the UK, respectively.

Data Type	Source
Seabed habitats	EMODnet; EUNIS; Ireland's Marine Atlas; National Biodiversity Centre Ireland; Shelmalere Offshore Wind Farm - Site Investigations off Counties Wexford and Wicklow. (FS007261) Foreshore License Application Supporting Documents
Shellfish production areas	Atlas of Commercial Fisheries for Shellfish around Ireland; Bord Iascaigh Mhara (BIM) Mussel Larva Monitoring 2019; Draft Fishery Natura Plan for Irish Sea Seed Mussel Fishery for the years 2018-2023; Shelmalere Offshore Wind Farm - Site Investigations off Counties Wexford and Wicklow. (FS007261) Foreshore License Application Supporting Documents; ; Ireland's Marine Atlas, Shellfish Stocks and Fisheries Review 2020 - Marine Institute; National Biodiversity Centre Ireland, Plan for Seed Mussel (2013-2017) in the Irish Sea
Spawning, nursery, and feeding areas and species migration and wintering areas	An Inventory of Irish Herring Spawning Grounds; Atlas of Commercial Fisheries around Ireland, third edition. Marine Institute, Ireland; 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); Iascach Intíre Éireann (Inland Fisheries Ireland) (Migratory species); Ireland's Marine Atlas (Gov Datasets); Irish Basking Shark Group; Irish Sea cod tagging program; Irish Stock Book; ObSERVE 1 Project: Aerial Surveys of Cetaceans and Seabirds in Irish waters: Occurrence, distribution and abundance in 2015-2017 (Rogan <i>et al.</i> , 2018_); Shellfish Stocks and Fisheries Review 2020 - Marine Institute; Spawning and nursery grounds of selected fish species in UK Waters; Shelmalere Offshore Wind Farm - Site Investigations off Counties Wexford and Wicklow. (FS007261) Foreshore Licence Application Supporting Documents
Fisheries landing data, fisheries VMS/AIS and commercial fishing grounds	Ireland's Marine Atlas; International Bottom Trawl Survey (IBTS) DATRAS (Database of Trawl Surveys); Atlas of Commercial Fisheries for Shellfish around Ireland; Atlas of Commercial Fisheries around Ireland, third edition. Marine Institute, Ireland; Bord Iascaigh Mhara (BIM); Central Statistics Office (CSO); International Council for the Exploration of the Sea (ICES); Ireland's Marine Atlas; Irish Ground Fish Survey (Marine Institute); Irish Sea cod tagging program; Irish Stock Book; Marine Institute; Sea-Fisheries Protection Authority (SFPA); Shellfish Stocks and Fisheries Review 2020 - Marine Institute; Shelmalere Offshore Wind Farm - Site Investigations off Counties Wexford and Wicklow. (FS007261) Foreshore Licence Application Supporting Documents. VMS data for The Project area received from the Marine Institute; 2003-2020 Irish Groundfish Survey (IGFS); Northern Irish Groundfish Survey (NIGFS); Irish Anglerfish and Megrim Survey (IAMS)
Fisheries management plans	Management plans for stocks (cod, herring, skates and rays in area 7); Shelmalere Offshore Wind Farm - Site Investigations off Counties Wexford and Wicklow. (FS007261) Foreshore Licence Application Supporting Documents.
Protected sites	Ireland's Marine Atlas; National Parks and Wildlife Service; National Biodiversity Centre Ireland; Shelmalere Offshore Wind Farm - Site Investigations off Counties Wexford and Wicklow. (FS007261) Foreshore Licence Application Supporting Documents.

6.8.3.2 Fish

The International Beam Trawl Survey (IBTS) reports on species of fish that can be found within the Irish Sea. These include Atlantic Cod (*Gadus morhua*), Haddock (*Melanogrammus aeglefinus*), herring (*Clupea harengus*), European hake, (*Merluccius merluccius*), horse mackerel (*Trachurus trachurus*), and Mackerel *Scomber scombrus*), monkfish, (*Lophius piscatorius*), plaice, (*Pleuronectes platessa*), whiting, (*Merlangius merlangus*), blue whiting (*Micromesistius poutassou*), Norway pout (*Trisopterus esmarkii*) (ICES, 2018).

Commercially important species which are known to be in the area are species such as Atlantic cod (*Gadus morhua*), whiting (*Merlangius merlangus*), horse mackerel (*Trachurus trachurus*), and Mackerel *Scomber scombrus*) (Marine Institute, 2022).

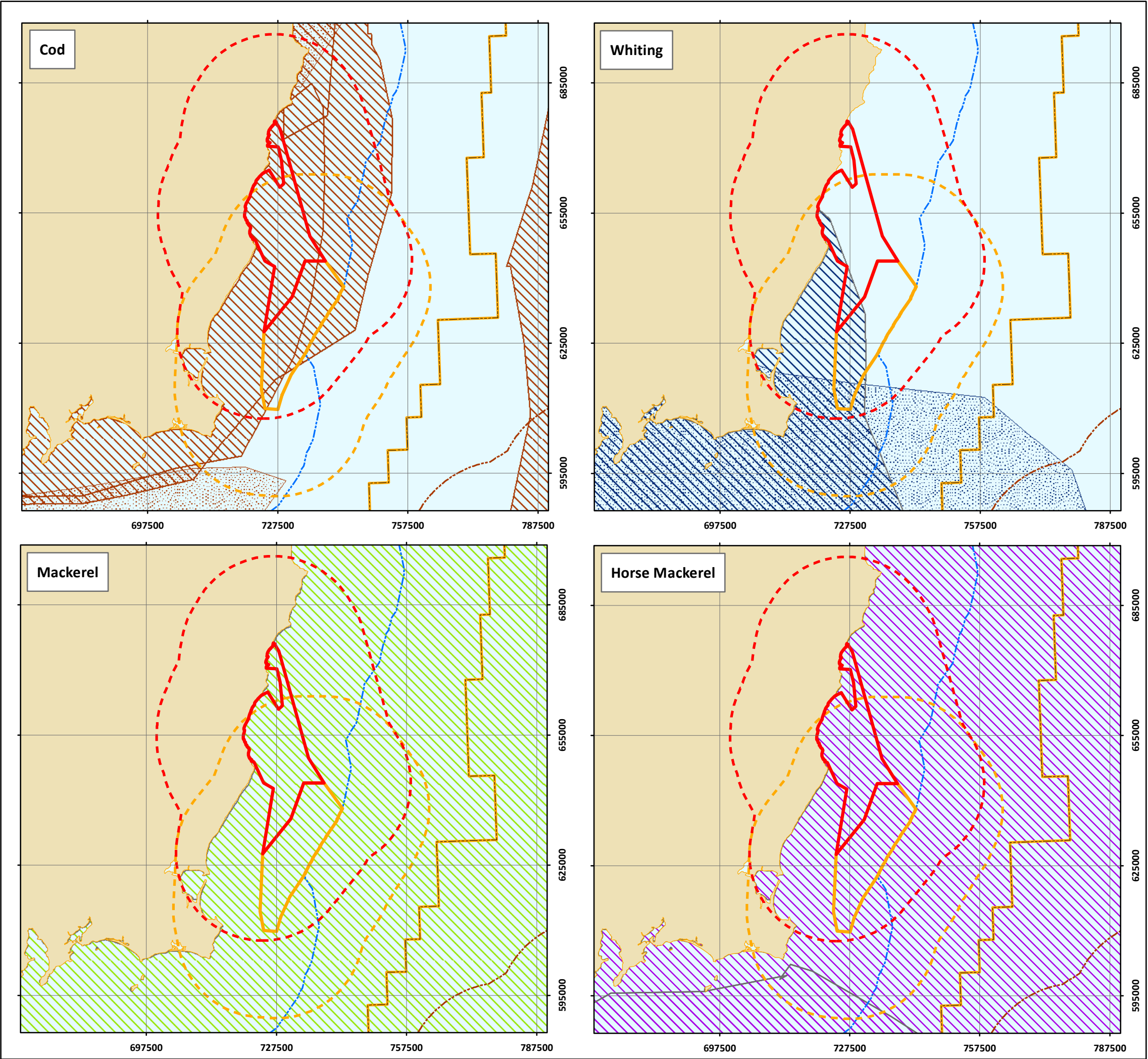
ObSERVE 1, a three-year aerial survey programme aimed to collect data on the distribution of cetaceans, seabirds and other marine megafauna in Irish offshore waters have also recorded instances of Ocean Sunfish (*Mola mola*). The Ocean Sunfish has been observed in the Irish Sea, with higher numbers observed in coastal areas during summer months. Within the Fish and Shellfish Ecology Topic-specific Study Area, group sizes of 1-5 were observed and the area is predicted to have moderate abundance densities for sunfish (Rogan et al., 2018).

It is noted that there may be other areas of fishing relevant to The Project that are not recorded in Ireland's Marine Atlas, represented within the Commercial Atlas of Fisheries at a scale that represents the true local fishing effort or included in the VMS data for The Project area obtained from the Marine Institute. The Fisheries Liaison Officer (FLO) and Community & Stakeholder Liaison Manager appointed to The Project will continue to engage with local fisheries to determine the full extent of fishing activity within the Fish and Shellfish Ecology Topic-specific Study Area. As part of this work, the FLO has received VMS data for the Commercial Fisheries Topic-specific Study Area from the Marine Institute. These data will be used to further inform the Fish and Shellfish Ecology baseline in the EIAR chapter.

6.8.3.3 Spawning and Nursery Grounds

The Fisheries Ecosystem Assessment Services (FEAS), a team within the Marine Institute, 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 places four species with spawning and nursery sites either within the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone or within the 20km buffer zones (used for the purposes of describing the baseline of this EIAR Scoping Chapter (Figure 6-16):

- Cod (*Gadus morhua*) – Nursery (within The Project area) and Spawning (within the Potential Export Cable Corridor Infrastructure Zone 20km buffer);
- Whiting (*Merlangius merlangus*) – Nursery and Spawning (both within The Project area);
- Mackerel (*Scomber scombrus*) – Nursery (within The Project area);
- Horse Mackerel (*Trachurus trachurus*) – Nursery (within The Project area).



Flanders Marine Institute (2019). Maritime Boundaries Geodatabase: Exclusive Economic Zone (EEZ), version 11. Available online at <http://www.marineregions.org/>. <https://doi.org/10.14284/387>; © Copyright Department of Communications, Climate Action and Environment (DCCAE); ©Marine Institute; ©Esri

SHELMALERE OWF EIAR SCOPING REPORT

FISH SPAWNING AND NURSERY AREAS

Drawing No: P2497-FISH-003

A

Legend

- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone
- 20km Cable Area Buffer
- 20km Array Area Buffer

Adminstrative Boundaries

- EEZ Boundary
- ROI 12nm Territorial Sea Limit
- UK 12nm Territorial Sea Limit

FEAS Nursery Grounds

- Cod
- Horse Mackerel
- Mackerel
- Whiting

FEAS Spawning Grounds

- Cod
- Whiting

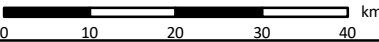
Figure 6-16 Fish and Shellfish Spawning and Nursery Areas within the Fish and Shellfish Ecology Topic-specific Study Area (Marine Institute (FEAS) [Accessed 2022])



NOTE: Not to be used for Navigation



Date	08 June 2022
Coordinate System	IRENET95 Irish Transverse Mercator
Projection	Transverse Mercator
Datum	IRENET95
Data Source	MarineRegions; DCCAE; MII; ESRI
File Reference	J:\P1975\Mxd\07_FISH\ P1975-FISH-003.mxd
Created By	Lewis Castle
Reviewed By	Emma Langley
Approved By	Eric Houston



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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 Irish coastal waters in the form of fisheries sensitivity maps (Coull et al. 1998, Ellis et al. 2012, Marine Institute 2018). These data indicate that the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone are located within or close to the spawning and or nursery grounds for herring (*Clupea harengus*), whiting (*Merlangius merlangus*) lemon sole (*Microstomus kitt*), sprat (*Sprattus sprattus*), Norway lobster (*Nephrops norvegicus*), Atlantic cod (*Gadus morhua*), Anglerfish (*Lophius piscatorius*), horse mackerel (*Trachurus trachurus*), sandeel (*Ammodytida spp.*) and mackerel (*Scomber scombrus*). Spawning and nursery grounds are illustrated in Figure 6-16.

Atlantic herring is an important commercial fish in Irish waters. In coastal waters spawning takes place mostly between September and February in high energy environments, usually at the mouth and bays of estuaries where tidal currents are strong (O'Sullivan et al. 2013). Herring are 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.

The Marine Institute has mapped the known locations of herring spawning grounds around the coast of Ireland (O’Sullivan et al., 2013). The Dunmore East spawning site, a commercially important area, is the closest site to Shelmalere Offshore Wind Farm, however there are no known coastal herring spawning sites within the Potential Turbine Array Infrastructure Zone or the Potential Export Cable Corridor Infrastructure Zone.

According to the Cefassensitivity maps sandeel nursery grounds could be found within the Potential Turbine Array Infrastructure Zone and the potential Export Cable Corridor Infrastructure Zone. Sandeels have a high level of habitat specialisation and studies show preference to medium/coarse grained sands with sandeel absent from sediments with high silt contents (Wright et al., 2000; Holland et al., 2005; Green, 2017). Sandeels display burrowing behaviour which is thought to help avoid displacement by underwater currents to less suitable areas, to aid with avoiding predation, and to conserve energy (Green, 2017). Additionally, sandeels like herring, are demersal spawners and lay their eggs directly onto the substrate (Wright et al., 2017; Wright, 2019). Planktonic larvae are then 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 potential 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.

Within the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone, there are nursery areas for several elasmobranchs which include the tope shark (*Galeorhinus galeus*), spotted ray (*Aetobatus narinari*) and thornback ray (*Raja clavata*). 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.

6.8.3.4 Diadromous species

Diadromous species are those which migrate between marine and freshwater as part of their lifecycle. The Atlantic salmon (*Salmo salar*) and sea lamprey (*Petromyzon marinus*) are listed on Annex II on the EC Habitats Directive (Fourth Schedule of the Habitats Regulation) and are qualifying features for the Slaney River SAC (located approximately 12 km from the Potential Turbine Array Infrastructure Zone and approximately 14 km from the Potential Export Cable Corridor Infrastructure Zone). These species spawn within freshwater but complete their lifecycle in the sea. The Slaney River Valley SAC is located roughly 8.4 km from the Potential Export Cable Corridor Infrastructure Zone (note: distance is measured in a straight line over land) and 12 km from the Potential Turbine Array Infrastructure Zone. Slaney River is the nearest significant river in terms of potential diadromous fish species utilisation. This river is recognised as a habitat for Annex II migratory fish species *Salmo salar* (Salmon), *Petromyzon marinus* (Sea lamprey), *Lampetra fluviatilis* (River Lamprey), and *Alosa fallax* (Twaiite Shad).

These four diadromous species are migratory and may be found in the region at certain times of the year:

- Sea lamprey – late April to early June.
- River lamprey – September to June.
- Twaite shad – April onwards.
- Atlantic salmon – May to June and autumn months.

The twaite shad are members of the herring family and, along with the previously listed species, are also qualifying features for the designation of the River Barrow and Nore SAC (approximately 49 km from the Potential Turbine Array Infrastructure Zone and approximately 36 km Potential Export Cable Corridor Infrastructure Zone (straight line measurements). Additionally, the allis shad, also an Annex II species, is a large member of the herring family and spends much of its life in coastal waters. This species enters freshwater to breed, with significant occurrence in large rivers reported on the continent. There is some evidence of allis shad entering Irish rivers, with one fish recorded some 40 km from the sea in the Slaney River. Nonetheless, only a small number of allis shad have ever been recovered from Irish freshwaters and while there is good evidence of the presence of breeding populations of twaite shad in Irish rivers, the only evidence of breeding by allis shad is the presence of allis/twaite hybrids.

High sensitivity hearing species such as clupeids (e.g. herring, sprat, twaite shad and allis shad) have specialisations of the auditory apparatus where the swim bladder and inner ear are intimately connected. These species can detect sound pressure as well as particle motion and are able to detect frequencies up to 3kHz; with optimum sensitivity between 300 Hz-1kHz (Nedwell et al. 2007). As part of the clupeid family, they are considered a high sensitivity hearing species because they have a specialisation of the auditory apparatus where the swim bladder and inner ear are intimately connected. Clupeids of the shad family (*Alosinae*) in particular, have shown sensitivity to a range of frequencies that can extend to >100 kHz. (Mann et al., 2001). Teague & Clough (2011) recorded positive significant reactions in juvenile twaite shad to sound frequencies of between 30 and 60 kHz with a peak at 45 kHz.

Twaite shad have known spawning grounds at the upper tidal reaches in the River Barrow and River Nore SAC. Spawning fish move to these areas in shoals to spawn annually in late May – early June. Telemetry investigations by Inland Fisheries Ireland indicate that the fish do not move in a single event to spawning areas but make a series of up and down river migrations, dropping far down into the Waterford Harbour area, at least, prior to settling for a short period in the spawning areas (IFI, 2021). The telemetry work and sampling in the near-shore marine areas indicate that the adult shads migrate in and out of the estuarine areas and open sea, presumed to be feeding movements. The telemetry study has also shown movements from one estuary to another, one fish moving from the Munster Blackwater to Waterford Harbour over the course of two to three days immediately after spawning.

Other diadromous species that may be present are the European eel (*Anguilla anguilla*) and the sea trout (*Salmo trutta trutta*), which are prevalent in Irish rivers and lakes 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 (IFI, 2021).

Adult sea trout, on the other hand, spawn in fresh water and then travel to the sea to feed after a few years. The Celtic Sea Trout Project (CTSP) (conducted by Inland Fisheries Ireland, 2016) reports sea trout catch within the Slaney River (CTSP, 2016). Given that both species have a marine stage, it is feasible that they will be found in the Potential Turbine Array Infrastructure Zone and/or the Potential Export Cable Corridor Infrastructure Zone at different times of the year. There is not a lot of information to suggest that rivers adjacent to the proposed marine cable route contain European eel, however NBDC records show one observation of European Eel within a tributary of the Slaney River, therefore, it is possible that fish migrating from further north out to the Atlantic may pass through the area.

6.8.3.5 Shellfish

Fishing activity within the Potential Turbine Array Investigation Zone and Potential Export Cable Corridor Infrastructure Zones indicates that a range of shellfish species occur in these areas. These include seed mussel (spat), scallops and razor clams lobster, crab and whelk (Tully, 2017; Gerritsen & Kelly, 2019). Of all these species, the Fish and Shellfish Ecology Topic-specific Study Area is predominantly fished for whelk (Marine Institute, 2022). Whelk is particularly sensitive to exploitation and over-fishing due to a lack of robust data on the reproductive cycle of this species, so relevant legislation has been introduced in order to try and manage this key fishery (Whelk (Conservation of Stocks) Regulations 2006).

Additionally, Cefassensitivity maps predict that *Nephrops* spawning and nursery grounds may be found within the Potential Export Cable Corridor Infrastructure Zone (Coull et al. 1998). The closest designated shellfish waters are located approximately 13km from the Potential Turbine Array Infrastructure Zone within Wexford Harbour.

6.8.3.6 Elasmobranchs

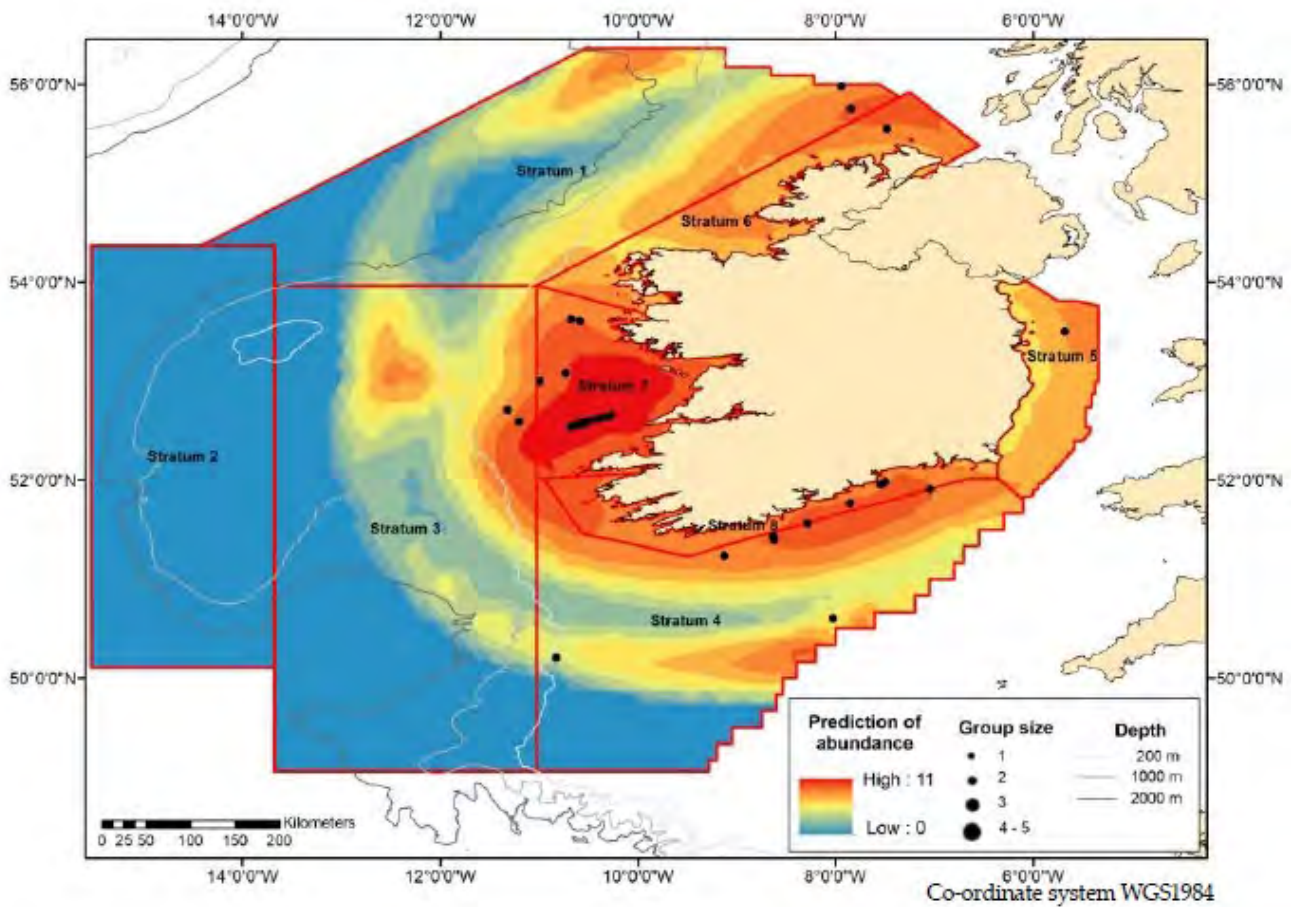
Elasmobranchs (sharks, skates, rays, basking shark) are among the most vulnerable marine fish to anthropogenic impacts due to their slow growth rates, late maturity, low fecundity and productivity which limits their capacity to recover from population declines. All sharks and rays are on the OSPAR List of Threatened and/or Declining Species and Habitats (Agreement 2008-06) (OSPAR, 2008). In Irish waters there are 28 species of Skates and Rays (ORCA Ireland, 2019). The IBTS reports catches of different elasmobranch species such as spotted dogfish (*Scyliorhinus canicular*), cuckoo ray, (*Leucoraja naevus*), spurdog (*Squalus acanthias*), tope (*Galeorhinus galeus*), smooth-hound (*Mustelus mustelus*), thornback ray (*Raja clavate*), spotted ray (*Raja montagui*), nurse hound (*Scyliorhinus stellaris*) (ICES, 2018).

Dedman et al., (2015) modelled abundance hotspots for Irish Sea rays and the study results predict that species such as Cuckoo Ray (*Leucoraja naevus*), Thornback Ray (*Raja clavate*), Blonde Ray (*Raja brachyura*), Spotted Ray (*Aetobatus narinari*) could be found within the Fish and Shellfish Ecology Topic-specific Study Area (Dedman et al., 2015; Dedman et al., 2017). Flapper (Common) Skate (*Dipturus batis*) is another ray species and is listed as Critically Endangered on the IUCN Red List of Threatened Species. There have been recordings of flapper skate in Irish waters, however no sightings have been observed around Shelmalere Offshore Wind Farm (NBDC, 2022).

The basking shark (*Cetorhinus maximus*) is the largest fish in the North Atlantic and the second largest in the world. Results from the ObSERVE 1 project (a three-year aerial survey programme aimed to collect data on the distribution of cetaceans seabirds and other marine megafauna in Irish offshore waters) carried out surveys of Ireland's offshore waters in the summer and winter of 2015 and 2016 and additional surveys were conducted in inshore/coastal areas in the summer and winter of 2016. These surveys have recorded the basking shark in low numbers in the Irish Sea. ObSERVE 1 modelled density estimates for summer distributions have predicted low to moderate numbers of basking shark within the Potential Turbine Array Infrastructure Zone and the Export Cable Corridor Infrastructure Zones (Rogan et al., 2018) (Figure 6-17).

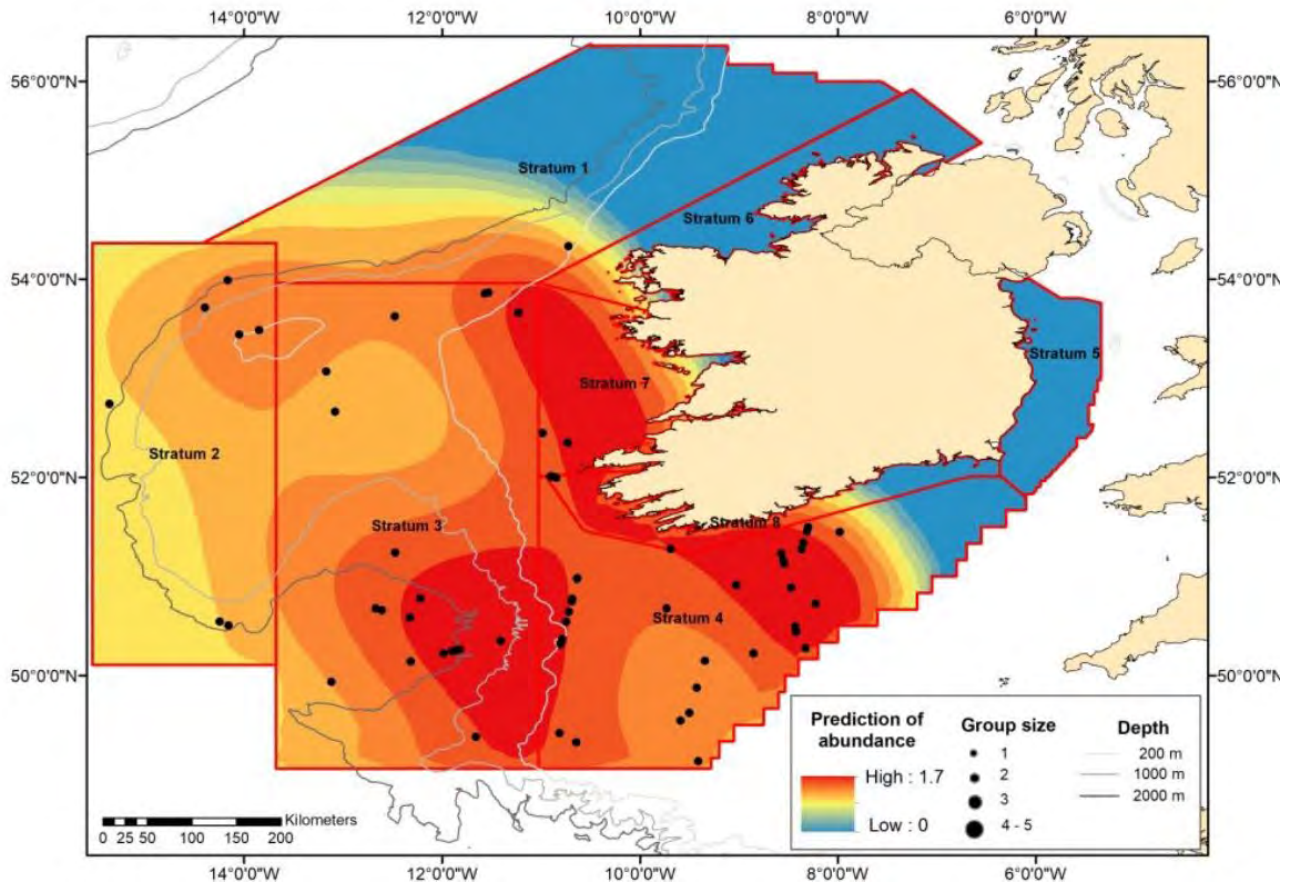
The Irish Basking Shark Group collates sightings of basking shark around the Irish coast with most sightings occurring around the south-west and west coasts of Ireland. Approximately three sightings were reported in the coastal waters adjacent to The Project area (NBDC, 2022). Most sightings occur in summer months, but it is less clear where they spend the winter (NBDC, 2022). Basking sharks are listed on the OSPAR List of Threatened and/or Declining Species and Habitats (Agreement 2008-06) and receive further protection through the Bonn Convention. Basking shark are not currently protected under any Irish regulation and are not a designated feature in any protected site. However, in March 2022 basking sharks have been granted protection status under the Wildlife Act in Ireland following a public campaign. The status has not yet been finalised but will be updated in an upcoming review of the Wildlife Act (O'Sullivan, 2022).

The blue shark (*Prionace glauca*) has also been observed in low numbers in the Irish Sea (Rogan et al., 2018). This species is on the IUCN Red List of Threatened Species as near threatened (IUCN, 2018). However, sightings have been recorded off the west and south-west coast of Ireland, away from the Potential Turbine Array Infrastructure Zone and the Export Cable Corridor Infrastructure Zone (Figure 6-18) The ObSERVE 1 study modelled densities of blue shark within the Potential Turbine Array Infrastructure Zone and the Export Cable Corridor Infrastructure Zones the densities are predicted to be low. Additionally, a study conducted by Nykänen et al. (2018) used tagging and aerial surveys to provide an unbiased large-scale abundance estimate for blue sharks. Modelling carried out in this study predicted 63% of time spent at the surface in shelf waters reducing to 14% of time at surface in off-shelf waters (Nykänen et al., 2018). Distance to the continental shelf was a significant factor explaining the variance in the abundance of blue shark distributions with larger numbers predicted in areas around the shallow areas of Porcupine Bank and shelf margin. There was no predicted abundance within or around the Fish and Shellfish Ecology Topic-specific Study Area.



Note that scale on density estimates is a relative figure which varies for each species and does not represent the abundance of animals. (Rogan et al 2015)

Figure 6-17 Predicted summer distribution of Basking shark (*Cetorhinus maximus*) taken from the ObSERVE 1 study. (Summer distribution has been modelled by the ObSERVE 1 study, as sightings were almost exclusively reported in this season)



Note that scale on density estimates is a relative figure which varies for each species and does not represent the abundance of animals. (Rogan et al 2015)

Figure 6-18 Predicted summer distribution of Blue shark (Prionace glauca) taken from the ObSERVE 1 study. (Summer distribution has been modelled by the ObSERVE 1 study, as sightings were almost exclusively reported in this season)

Table 6-31 lists the primary data sources that will be considered in undertaking the fish and shellfish appraisal in the EIAR. This list is not comprehensive and other primary data sources may be identified for use in preparation of the EIAR. Where available, data from the past ten years will be utilised to inform the EIAR.

6.8.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

These include specific landings data for the ICES rectangles 33E3, 34E3, 33E4, 34E4 which are not publicly available, but which have been requested from The Sea Fisheries Protection Authority (SFPA) Statistics Unit.

Since April 2021, DAS are being carried out on a monthly basis to gather site-specific baseline data for the EIAR. The information gathered from these surveys will also be used to inform the baseline of the EIAR Fish and Shellfish Chapter as any large fish species (basking sharks; Ocean sunfish) will be recorded. The surveys are programmed to continue monthly up to and including March 2023 (24-months total). Detailed technical consultation has already been undertaken with technical consultees to discuss the scope and methodology of these surveys (See Chapter 5, Table 5-19), which complies with the DCCAE Guidance (2018).

Specific aspects for which additional data collection will be a particular focus in the EIAR include information on the location and spatial extent of overwintering areas for crustaceans (e.g. brown crab and spider crab) and potential migration routes. Additional information on Basking shark will also be sought as this species utilises the coastal waters around Ireland from spring to summer. There is currently limited research on behavioural activities and temporal distributions in Ireland (IBSG, 2022).

Additional data related to the potential for the Fish and Shellfish Ecology Topic-specific Study Area to support spawning habitat for herring and general sandeel habitat will also be a focus of the EIAR. Site-specific data on seabed sediment types (Particle Size Analysis (PSA)) will be collected via the Geophysical, Benthic and Geotechnical Survey scheduled to commence in April 2023. Detailed review of these data will assist in the identification of potential herring and sandeel habitats.

No site-specific fish ecology surveys are currently proposed as it is considered that there is enough understanding of key species present in the Fish and Shellfish Ecology Study Area to enable a robust assessment to be presented in the EIAR. Technical consultation on this EIAR topic will be undertaken in order to obtain the views of key stakeholders on this specific issue.

6.8.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Fish and Shellfish Ecology receptors.

Potential impacts on Fish and Shellfish Ecology receptors will be assessed in the EIAR using the general methodology described within Section 4.4.3 of this EIAR Scoping Report. Potential impacts will be identified and defined using expert judgement, guidance and policy documents and consideration of similar projects within the region.

With specific reference to Fish and Shellfish Ecology, the assessment will identify the distribution of species within the Fish and Shellfish Ecology Topic-specific Study Area (including spawning & nursery grounds) and review their sensitivities to the potential impacts that may arise via the construction, operation and decommissioning of Shelmalere Offshore Wind Farm. There will be particular focus on assessing potential impacts on the following:

- Species with commercial or recreational importance.
- 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.
- Species of commercial or conservation interest known to be sensitive to the specific potential impacts of OWF development.

Particular focus will be given to sandeels and herring which are recognised as sensitive to seabed disturbance. There will also be a focus on those species that are sensitive to potential Underwater Noise and Vibration subsea noise impacts, i.e. fish with swim bladders.

A desk-based review of relevant literature will be undertaken to inform the baseline of the Fish and Shellfish Ecology EIAR chapter. Consultation with relevant stakeholders will help to further inform and identify any gaps in the existing baseline.

With respect to impact assessment, the sensitivity of the fish and shellfish receptors will be defined based on criteria including conservation value. The magnitude of potential impacts on fish and shellfish will be informed by outputs from project specific modelling, primarily the hydrodynamic modelling to inform the spatial extent of the sediment plumes and subsequent deposition (but also the WFD assessment) and underwater noise modelling. For the assessment of potential impacts of underwater noise on fish species, the thresholds for noise effects on fish species set out in Popper *et al.*, 2014 will be used. Where appropriate, mitigation measures will be proposed, and potential residual effects presented.

Potential effects in the construction, operation and decommissioning phases will be fully assessed and presented in the future EIAR.

6.8.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works. plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the other plans, projects and activities to be included within the Cumulative Impact Assessment in the EIAR have been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Fish and Shellfish Ecology will be collated and reviewed. These details will then be assessed in the context of project-specific potential effects associated with Shelmalere Offshore Wind Farm and an assessment of potential cumulative effects will be carried out.

Of specific note to Fish and Shellfish Ecology will be developing an understanding of the construction programme for any other OWF projects in the Fish and Shellfish Ecology Topic-specific Study Area. The potential temporal overlap of piling, leading to increased, cumulative underwater noise levels, will be a key issue to address within the EIAR.

With respect to potential transboundary impacts, based on current understanding, potential transboundary impacts on Fish and Shellfish Ecology receptors may arise on mobile species that form part of the qualifying populations of designated sites in other States/Territories. These potential impacts may affect the integrity of these designated sites. Therefore, it is currently proposed to scope in potential transboundary impacts on Fish and Shellfish Ecology. The potential for such transboundary impacts to arise will be confirmed via a formal Transboundary Screening exercise that will be undertaken post EIAR Scoping. Where potential transboundary impacts are confirmed, these will be assessed within the final EIAR.

6.8.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR with respect to the potential effects on Fish and Shellfish Ecology receptors.

6.8.6 Proposed Consultees

Table 6-33 summarises the proposed consultees for the Fish and Shellfish Ecology chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 6-33 Proposed consultees (Fish & Shellfish Ecology)

Data Type	Source
Inland Fisheries Ireland	<ol style="list-style-type: none"> 1. To discuss any available data that will inform the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Irish Basking Shark Group	<ol style="list-style-type: none"> 1. To discuss any available data that will inform the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Marine Institute	<ol style="list-style-type: none"> 1. To discuss any available data that will inform the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
NPWS	<ol style="list-style-type: none"> 1. To discuss any available data that will inform the EIAR.

Data Type	Source
	2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Sea Fisheries Protection Authority	1. To discuss any available data that will inform the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Department of Agriculture, Food and the Marine (DAFM)	1. To discuss any available data that will inform the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Individual Fishers and Regional Fishing Organisations	1. To discuss any available data that will inform the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation.

6.8.7 Potential Impacts to be assessed within the EIAR

Table 6-34 outlines the potential impacts on Fish and Shellfish Ecology receptors which may arise within the Fish and Shellfish Ecology Topic-specific Study Area as a result of the proposed Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in 6.17.5. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

The DCCAE Guidance and the Strategic Environmental Assessment (SEA) for the Offshore Renewable Energy Development Plan I and II (OREDPA) and the National Marine Plan Framework (NMPF) have been used to inform the potential impacts to be assessed for Fish and Shellfish Ecology receptors.

Table 6-34 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Fish and Shellfish Ecology)

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Loss/disturbance of habitat due to penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion: Activities that physically disturb the seabed e.g. foundation installation (for wind turbines and offshore platforms) and cable trenching, have the potential to disturb species with demersal life stages (i.e. those that lay their eggs on specific seabed types such as herring or thornback ray which lay benthic egg cases), or species that live in contact with the seabed like sandeel. The EIAR Fish and Shellfish Ecology Chapter will assess any potential effects which may occur due to disturbance or loss of habitat arising from project activities.	Yes	Yes	Yes	In
Electromagnetic changes: Electric and magnetic fields generated during cable operation may be detectable by pelagic fish species such as salmon and certain electrosensitive fish such as elasmobranchs. This can cause potential barriers to movement for those species. Potential EMF effects on fish and shellfish will be considered in the EIAR chapter in further detail.	Yes	Yes	Yes	In
Injury and displacement due to underwater noise impacts to hearing sensitive species Noise will be generated from project vessels and from activities such as foundation piling during installation and other construction activities such as cable trenching and ploughing. The potential effects of noise on fish and shellfish will be assessed in the EIAR.	Yes	No	No	In
Siltation rate changes, including smothering (depth of vertical sediment overburden): The EIAR will assess the potential impact from increased suspended sediment settlement levels against natural background variation and the likelihood of re-suspension of contaminants.	Yes	Yes	Yes	In
Physical change (to another seabed type): Turbine foundations, or any potential cable protection in the form of rock or concrete mattresses may result in the localised permanent habitat loss in the direct footprint of the cable protection. The presence of potential rock protection could also represent a change in habitat type. The EIAR will consider the potential effects of physical change in further detail.	Yes	Yes	Yes	In
Death or injury by collision: Shipping collision is a recognised cause of basking shark mortality, the key factor influencing the injury or mortality caused by collisions is ship size and speed. Ships travelling at 14 knots or faster are most likely to cause lethal or serious injuries. The	No	No	No	Out

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
EIAR Fish and Shellfish Chapter will assess the potential effect of death or injury by collision to species.				
Toxic Contamination from the introduction of synthetic compounds or non - synthetic contaminant: There is the potential that disturbance from the project activities could disturb contaminated sediment or introduce synthetic compounds and create Toxic effects to fish and shellfish species. The EIAR chapter will assess the potential effect from contamination.	Yes	Yes	Yes	In
Introduction of microbial pathogens, the introduction of invasive non -native species Potential invasive or non-native species (INNS) could be introduced into the environment by fouling of vessel hulls. INNS can pose significant threat to native species by outcompeting for resources. This effect will be assessed in the EIAR.	Yes	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	Yes	Yes	Yes	In

6.8.7.1 EIAR Scoping Questions

The following questions are designed to assist the stakeholder in providing feedback to the EIAR Team on the Fish and Shellfish Ecology topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Fish and Shellfish Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Fish and Shellfish Ecology Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Fish and Shellfish Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Fish and Shellfish Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Fish and Shellfish Ecology chapter of the EIAR for Shelmalere Offshore Wind Farm?

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6.9 CHAPTER 9: COMMERCIAL FISHERIES

6.9.1 Introduction

This chapter of the EIAR will outline the potential effects of Shelmalere Offshore Wind Farm on Commercial Fisheries. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the future EIAR and includes the following:

- A list of policy and guidance documents relevant to the Commercial Fisheries topic;
- A preliminary review of the receiving environment within the Commercial Fisheries Topic-specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential impacts on Commercial Fisheries;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Commercial Fisheries;
- Potential surveys proposed to inform the future EIAR for Commercial Fisheries;
- A summary of potential effects on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been completed by MarineSpace which has extensive experience of this topic from previous offshore wind farm EIAs (EIARs).

The Commercial Fisheries Topic-specific Study Area is defined as International Council for the Exploration of the Seas (ICES) Rectangles 33E3, 33E4, 34E3 and 34E4 within which the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zones lie. The Commercial Fisheries Topic-specific Study Area has been defined as such in order to enable a robust understanding of commercial fisheries activity within both Shelmalere Offshore Wind Farm and the surrounding region. This will enable any potential effects to be understood in a regional context.

This chapter of the EIAR Scoping Report should be read in conjunction with Section 6.8, Chapter 8: Fish and Shellfish Ecology and Section 6.10, Chapter 10: Shipping and Navigation of this EIAR Scoping Report.

6.9.2 Relevant Policy and Guidance

Policies and guidance documents relevant to the Commercial Fisheries EIAR topic are detailed in Table 6.34.

Table 6-35 Relevant Policy and Guidance Documents (Commercial Fisheries)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPP)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland

Policy / Guidance	Reference	Geographic Coverage
Guidance		
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland
Guidance Note for Environmental Impact Assessment in respect of FEPA and Coastal Protection Act (CPA) requirements, Version 2	Cefas, 2004	UK
Options and Opportunities for Marine Fisheries Mitigation associated with Windfarms commissioned by Collaborative Offshore Wind Research into the Environment (COWRIE)	Blyth-Skyrme 2010a	UK
Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects (Cefas, 2011)	Cefas, 2011	UK
Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments – Guidelines Based on Outputs from a Technical Workshop organised by the UK Fisheries Economic Network	Poseidon, 2012	UK
Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (FLOWW, 2014); UK	FLOWW, 2014	UK
Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds	FLOWW, 2015	UK
Changes to Fishing Practices around the UK as a Result of the Development of Offshore Windfarms – Phase One (Revised)	Gray <i>et al.</i> 2016	UK
Economic Impact Assessments of Spatial Interventions on Commercial Fishing: Guidance for Practitioners. Second Edition	Seafish and UKFEN, 2013	UK
Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers	Blyth-Skyrme, 2010b	UK

6.9.3 Receiving Environment

6.9.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

An initial desk-based review of literature and data sources was undertaken to support the preparation of this EIAR Scoping Report. There is currently no single data set or model which can accurately quantify the precise levels or values of commercial fishing within discrete sea areas. As such, data and information has been acquired from a number of sources including direct consultation with fisheries stakeholders undertaken to date by DP Energy; principal data and information sources to be used to inform the EIAR are also summarised in Table 6.35.

It is acknowledged that there are a range of limitations and assumptions associated with the datasets, for example, a large proportion of the fishing vessels active within the commercial fisheries study area will be under 10 m in length and are not captured in the official landings statistics or Vessel Monitoring Systems (VMS) as are they are not required to complete logbooks or transmit VMS data.

The Project has commenced engagement with the fishing community both through the Fisheries Liaison Officer (FLO) and via DP Energy's Community and Stakeholder Liaison Manager, both appointed to The Project since 2020. Engagement with all those with economic interests (including fishing) will be a key part of ongoing stakeholder communication. The Project is committed to continuing engagement with the fishing community to ensure that there is a robust understanding of fishing activity within the Topic-specific Study Area.

Table 6-36 Key datasets to inform EIAR Scoping and EIAR (Commercial Fisheries)

Data Type	Source
Landings	
Landings statistics for EU-registered vessels	European Union Data Collection Framework (EU ECF)
Landings statistics for Irish-registered vessels	Sea Fisheries Protection Agency (SFPA)
Landings statistics for UK vessels	Marine Management Organisation (MMO)
Spatial	
AIS data for fishing vessels	MMO
iVMS data (<12m)	Marine Institute
VMS data for all vessel operating within Irish waters (>12m)	Fisheries Monitoring Centre
VMS data for all vessels operating within Irish waters (>12m)	Marine Institute
VMS data for EU mobile bottom contacting gear vessels (>12m)	ICES
Inshore Fishing areas by gear type and species (<15m)	Ireland's Marine Atlas, Marine Institute
Seed mussel areas	Bord Iascaigh Mhara (BIM)
Potential 14-day Project-specific vessel traffic surveys (summer and winter) – AIS, radar and visual observations	NASH
Other	
Atlas of Commercial Fisheries around Ireland	Marine Institute
Atlas of Commercial Fisheries for Shellfish around Ireland	Marine Institute
An Inventory of Irish Herring Spawning Grounds	Marine Institute
Mussel Larvae Monitoring	BIM
Irish Fisheries Bulletin papers, Fisheries Reviews, Stock Book and Shellfish Stocks.	Marine Institute
An Atlas of fishing and some related activities in Ireland's territorial sea.	Marine Institute
Inshore vessel fishing activity records	BIM



6.9.3.2 Overview of receiving environment

Shelmalere Offshore Wind Farm is located within the south-west of the ICES Division VIIa (Irish Sea) statistical area. The ICES Division areas are divided into statistical rectangles for the purpose of recording fisheries landings; The Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone are located within ICES Rectangles 33E3, 33E4, 34E3 and 34E4.

The Commercial Fisheries Topic-specific Study Area includes several of the main established fishing grounds around Ireland (Barrels and Tuskar, Cardigan Bay, Light Ship Grounds, the Peaks grounds) (Tully *et al.*, 2006; Gerritsen and Kelly, 2019). Of these fishing grounds, only the Barrels and Tuskar grounds are in close proximity to the Potential Turbine Array Infrastructure Zone and/or the Potential Export Cable Corridor Infrastructure Zone. Smaller local grounds within the Commercial Fisheries Topic-specific Study Area which are not captured in Figure 6-19 are discussed within this chapter.

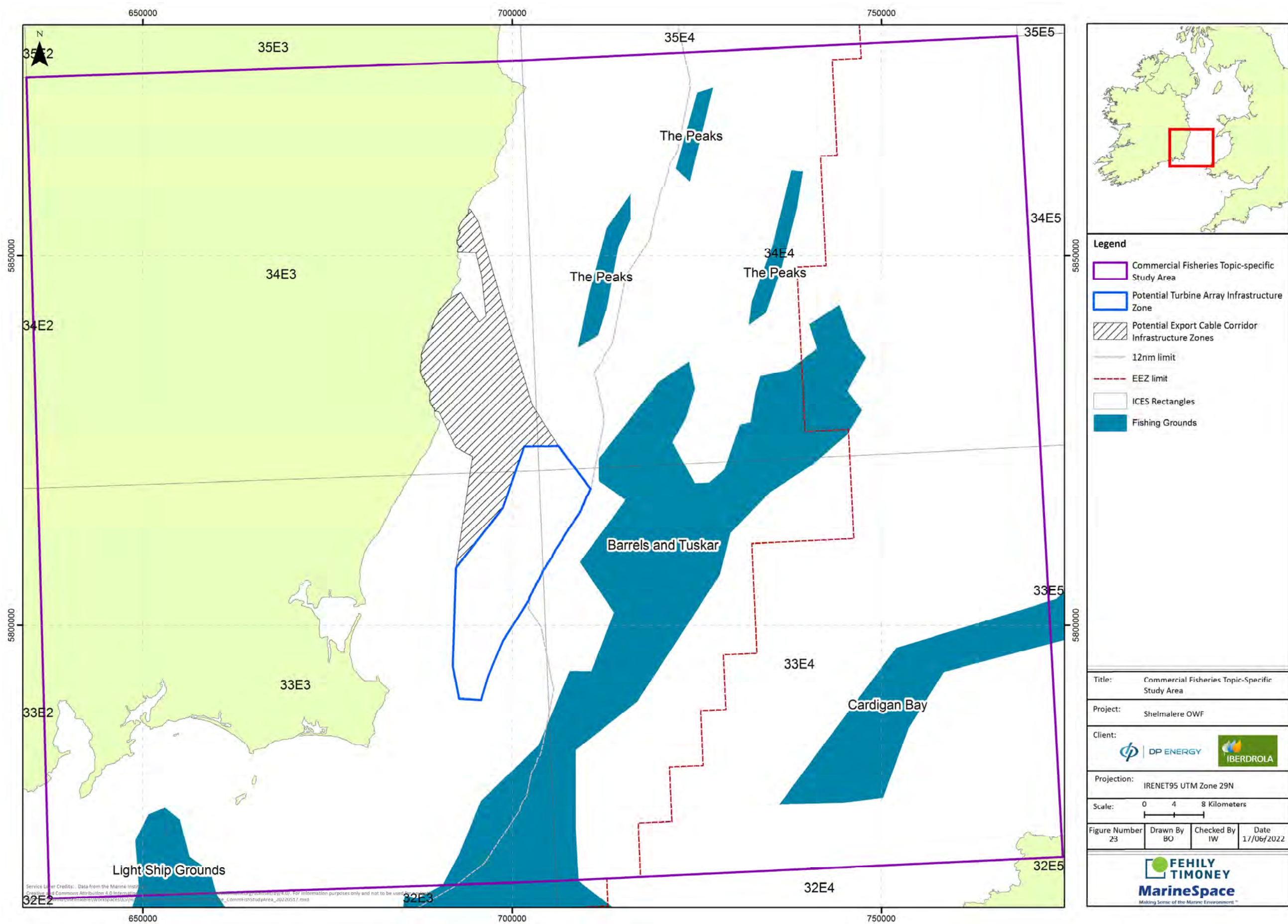


Figure 6-19 Topic-specific Study Area (Commercial Fisheries)

The east coast of Ireland supports a wide range of fish and shellfish species, many of which have high commercial importance (Gerritsen and Kelly, 2019); the distribution of fish stocks is described in more detail in Section 6.8, Chapter 8 Fish and Shellfish Ecology of this EIAR Scoping Report. A number of these fisheries occur over an extensive area while other fisheries are more spatially restricted (Gerritsen and Kelly, 2019). It should be noted that many vessels engage in a variety of fisheries throughout the year, particularly the inshore fleet. There are multiple fisheries occurring along the east coast which overlap with the Commercial Fisheries Topic-specific Study Area, including:

- Potting for whelk, brown crab, spider crab, lobster and shrimp;
- Dredging for scallops, seed mussel or razor clams;
- Trawling for whitefish or flatfish;
- Set net fishing targeting whitefish or bait with gillnets;
- Line fishing for mackerel or whitefish;
- Pelagic trawling for herring or sprat.

The most recent ICES landings data was reviewed (2013-2016) (EU DCF, 2018); the dataset was filtered by ICES Rectangles 33E3, 33E4, 34E3 and 34E4 which make up the Commercial Fisheries Topic-specific Study Area. However, it should be noted that vessels under 10 m are not required to complete logbooks, therefore the landings information is not representative for this fleet. Within the Commercial Fisheries Topic-specific Study Area, Irish fishing vessels accounted for 95% of the catch, with a proportion of landed weight caught by vessels also from Belgium, England, France, the Isle of Man, Northern Ireland, the Netherlands and Scotland (Figure 6-20). Irish vessels dominated the total landed catch from ICES Rectangles 33E3 (99%), 34E3 (99.6%) and 34E4 (90%). However, within 33E4 (which is located in both the UK and Irish Exclusive Economic Zone) Irish vessels only accounted for 49% of landings.

Figure 6-21 displays the top species caught in the Commercial Fisheries Topic-specific Study Area, with whelk *Buccinum undatum*, sprat *Sprattus sprattus*¹⁴, herring *Clupea harengus*¹⁵, edible crab *Cancer pagurus* and Great Atlantic scallop *Pecten maximus* constituting 87% of total landings weight between 2013-2016. Whelk dominated the catch for the two northern ICES Rectangles (34E3 and 34E4), whereas a number of different species made up a large percentage of the catch for the two southern ICES Rectangles (33E3 and 33E4).

¹⁴ Sprat are currently exempt from the ban on >18 m vessels fishing within the Irish 6nm.

¹⁵ Current ICES advice is that there should be zero catch of herring in the Celtic Sea due to low spawning stock biomass levels. <https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2021/2021/her.27.irls.pdf>

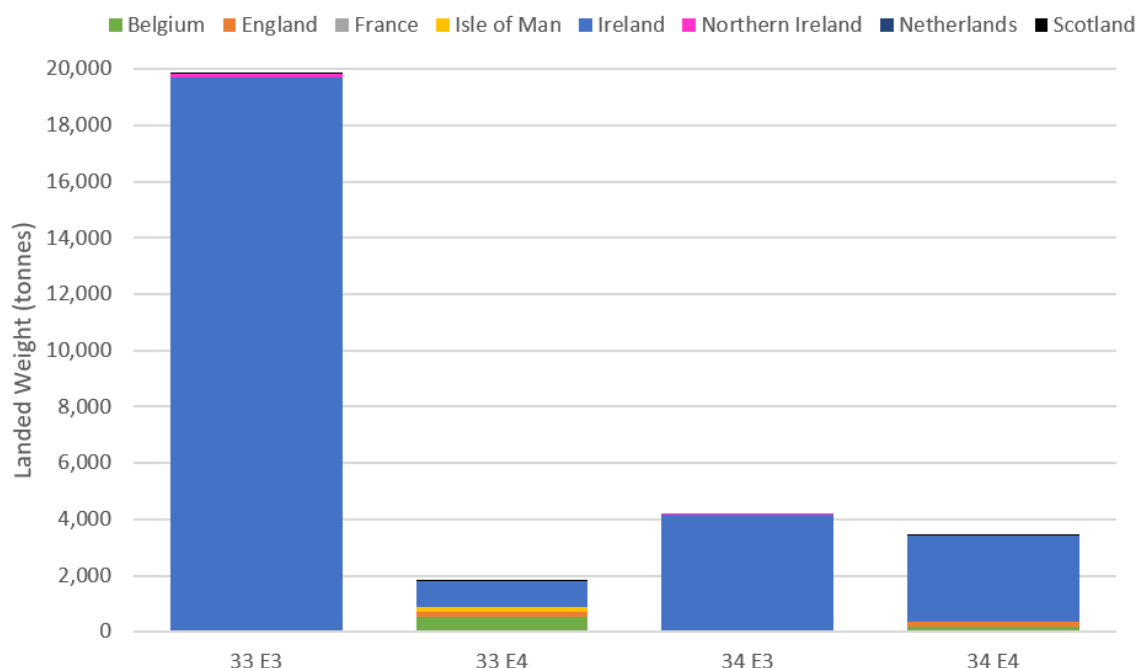


Figure 6-20 Landed weight (tonnes) by vessel nationality within each ICES Rectangle of the Commercial Fisheries Topic-specific Study Area (2013-2016) (EU DCF, 2018).

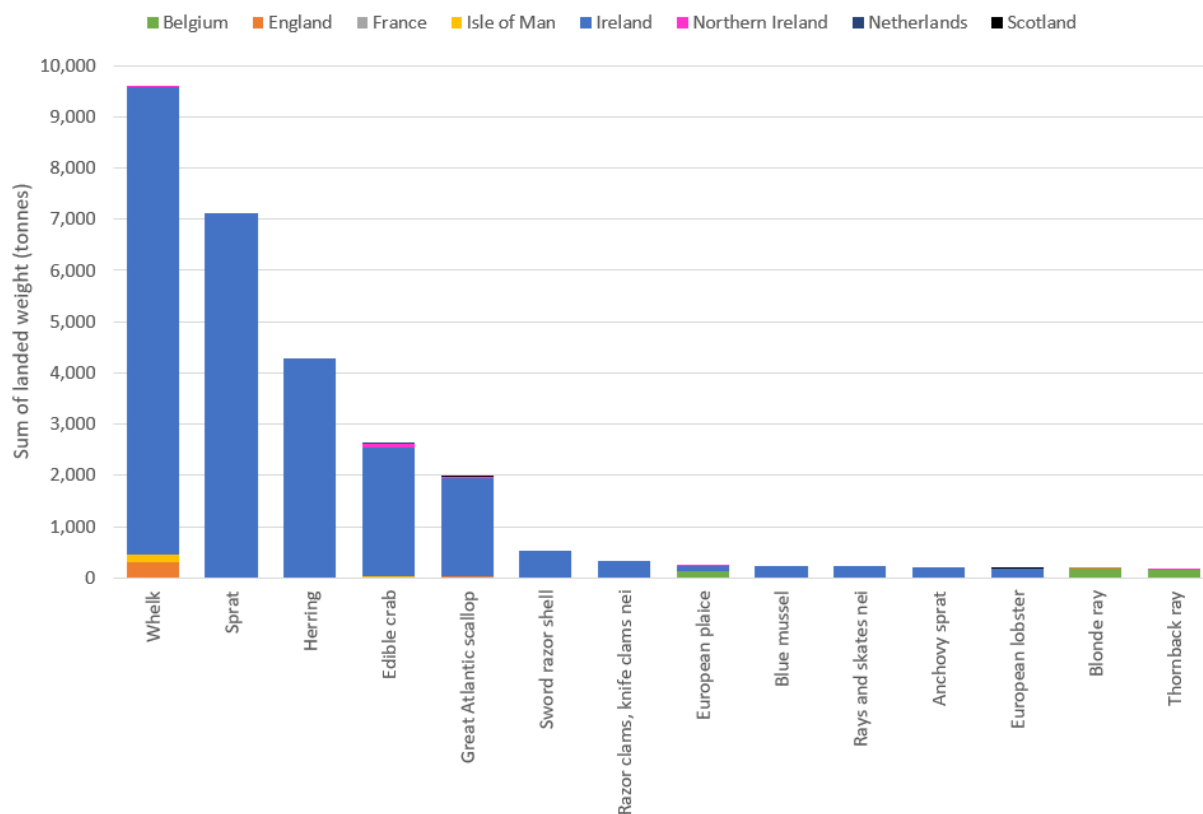


Figure 6-21 Top 15 species by weight (tonnes) from 2013 to 2016 landed from the Commercial Fisheries Topic-specific Study Area (EU DCF, 2018)

The Wicklow and Wexford coast is known to be an important whelk fishery for over 60 vessels¹⁶, and feedback from consultation with fishers to-date indicates that the grounds are located in discrete veins or patches across an extensive area, including within the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone (Fahy *et al.* 2005; Tully, 2017). Ireland's Marine Atlas, based on data from 2013 and 2014, also confirms activity within the Commercial Fisheries Topic-specific Study Area Figure 6-22), however, it is noted that this data is outdated and of limited resolution. Continuing consultation with fisheries stakeholders will enable the EIAR team to better understand this fishery; DP Energy and The Project's FLO are actively engaging with commercial fisheries stakeholders regarding information on fishing areas within the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zones.

Inshore potting for other species, such as crab and lobster, also occur within the Commercial Fisheries Topic-specific Study Area, but at a lower intensity than the whelk fishery. Dredge fishing occurs within the Commercial Fisheries Topic-specific Study Area and overlaps with both the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zones (Figure 6-22).

The Barrel and Tuskar grounds are the most important scallop grounds in the Southern Irish Sea, however only the extremities of the Barrel grounds overlap with the Potential Turbine Array Infrastructure Zone (Fahy *et al.* 2008; Tully, 2017). There are also minor scallop grounds which are exploited by a number of smaller local vessels which overlap with the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zones. There is a small razor clam fishery within the Commercial Fisheries Topic-specific Study Area, which is concentrated in Rosslare Bay and offshore of Curracloe; there is a small overlap of this fishery with the Potential Export Cable Corridor Infrastructure Zones (Tully, 2017) (Figure 6-23). There is a well-documented seed mussel fishery located along the Wicklow and Wexford coast and occurring in discrete areas (Chopin and Brown, 2019), some of which overlap with the Potential Export Cable Corridor Infrastructure Zone.

Although there are no major trawling grounds that are known to overlap with the Potential Turbine Array Infrastructure Zone and the Export Cable Corridor Infrastructure Zone, there are low levels of effort by beam, otter and pelagic trawls in the area (Fahy *et al.* 2008). There are a few local whitefish vessels active in the area, while other vessels may exploit the grounds when transiting through the Irish Sea (Figure 6-23).

There are seasonal (autumn and winter) sprat¹ and herring² fisheries within the Commercial Fisheries Topic-specific Study Area, particularly within ICES Rectangle 33E3 (O'Sullivan *et al.* 2013; EU DCF, 2018); these fisheries fluctuate annually as the stocks are highly migratory, and the Total Allowable Catch (TAC) for herring is currently zero in the Celtic Sea².

¹⁶ Number of vessels tends to fluctuate with the price of whelk due to relatively low gear prices.



There is limited gillnetting and long-lining/ hook and line fishing in the area and there are no known seining grounds overlapping the Potential Turbine Array Infrastructure Zone and the Export Cable Corridor Infrastructure Zone.

At the time of writing, there are currently no aquaculture sites which overlap with the Potential Turbine Array Infrastructure Zone and the Export Cable Corridor Infrastructure Zone. The Export Cable Corridor Infrastructure Zone was designed to avoid a line grown mussel farm off Kilmichael Point and within the Commercial Fisheries Topic-specific Study Area. There are a number of aquaculture licences granted within Wexford Harbour that are subject to appeal; 15 appeals are listed on the Aquaculture Licence Appeals Board (ALAB) website for 2019, all of which are still pending a decision (ALAB, accessed 30/05/2022).

Historically the Native European Flat Oyster (*Ostrea edulis*) fishery stretched for 90km from Wicklow Head to Ravens point with harvests of up to 40 million oysters being landed in Arklow Port during the 1800s. The NORRI (Native Oyster Reef Restoration Ireland) project aims to restore the reef beds along the east coast which will contribute to biodiversity restoration and carbon sequestration. In tandem NORRI proposes to establish Biomimicry Living labs in Arklow harbour for research, education and outreach purposes. Shelmalere Offshore Wind Farm has entered into a three-year sponsorship deal with NORRI to financially support the research that will work towards this reef restoration

There are several ports within the Commercial Fisheries Topic-specific Study Area. Duncannon, Dunmore East, Kilmore Quay, Rosslare, and Wicklow are medium-sized ports which receive a mix of mostly demersal and shellfish species (Gerritsen and Kelly, 2019). Courtown, Wexford and Rosslare are all important ports for the whelk fishery.

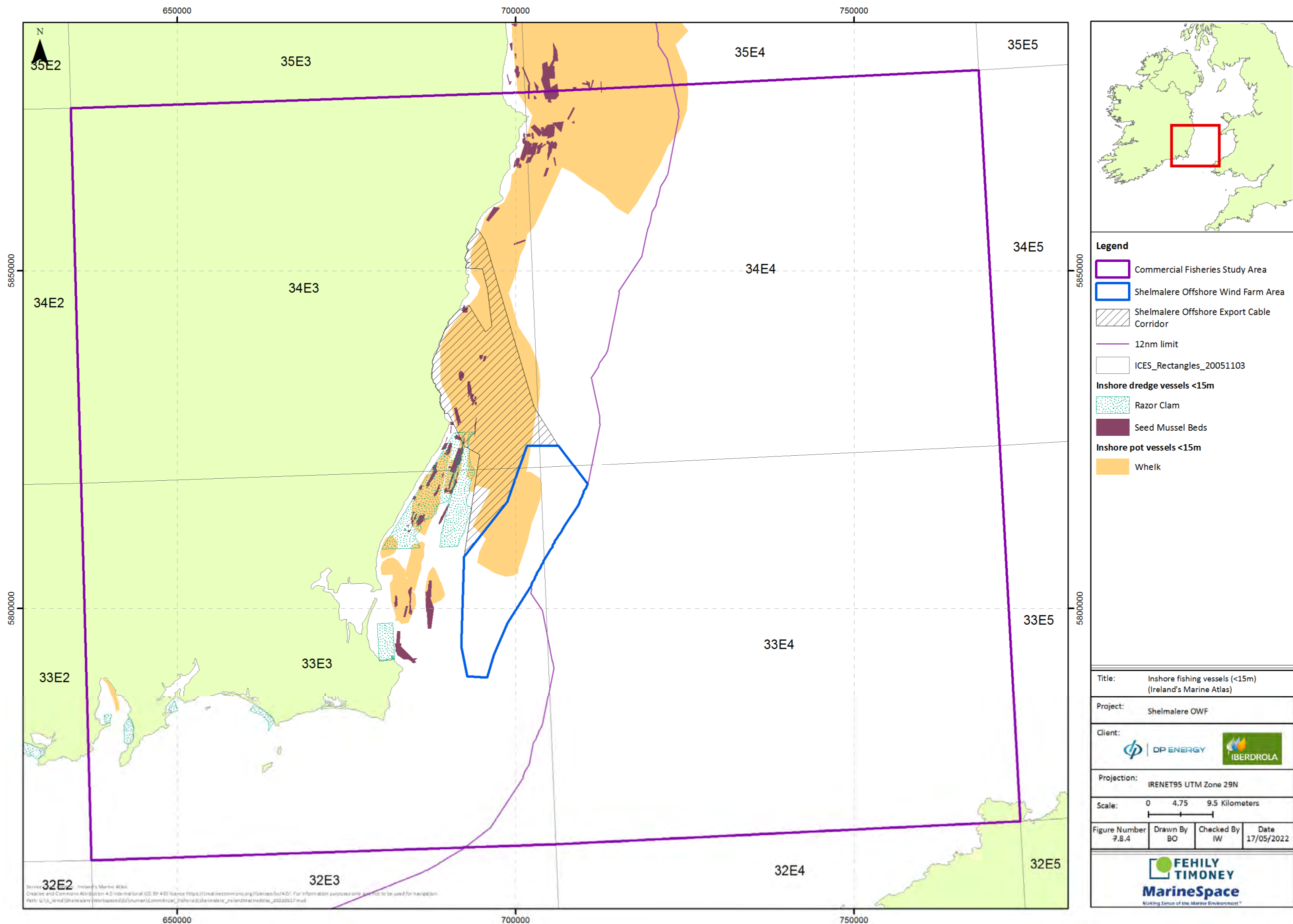


Figure 6-22 Nearshore commercial fishing activity within the Commercial Fisheries Topic-specific Study Area (Tully, 2017)

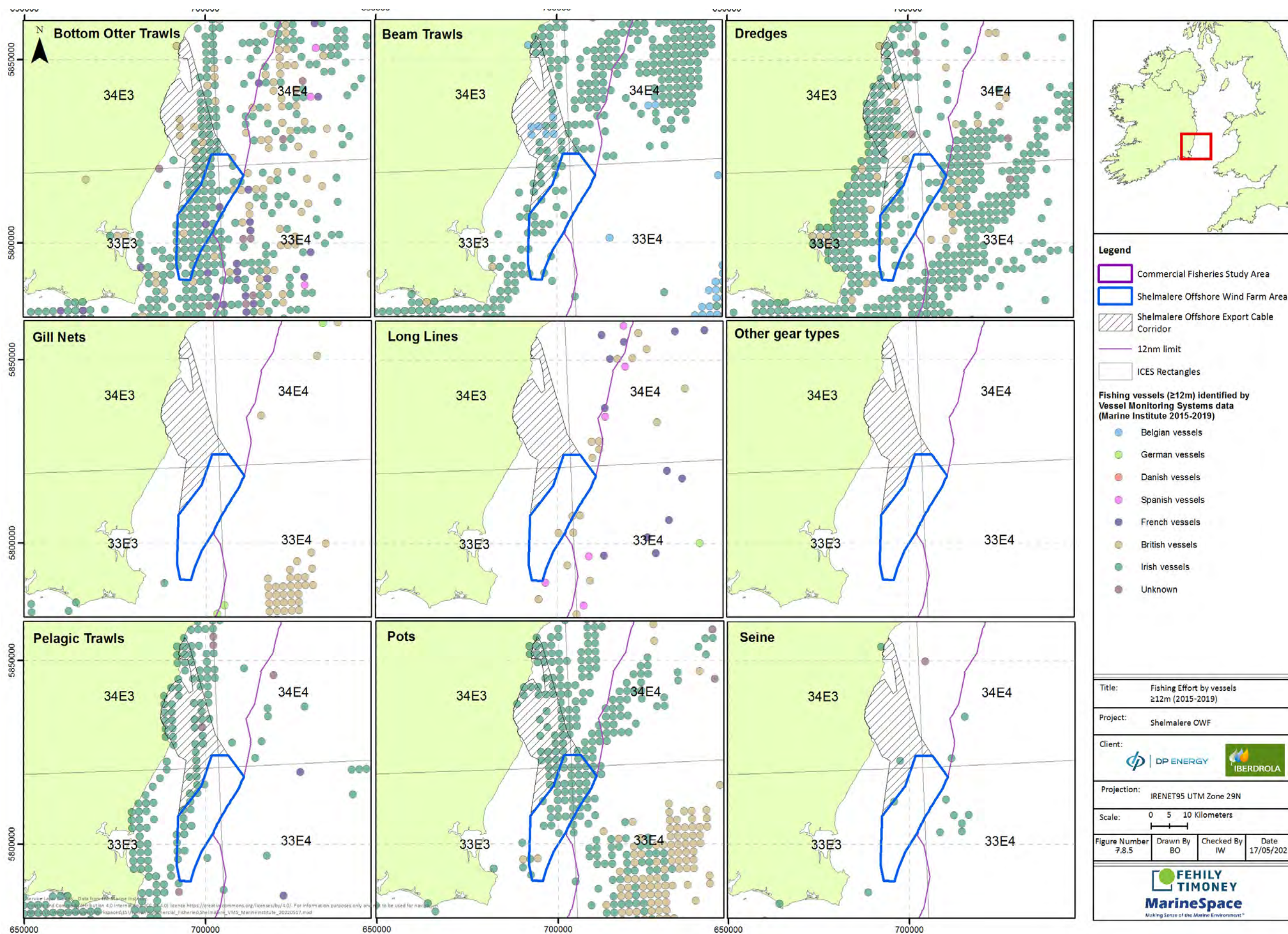


Figure 6-23 Commercial fishing activity within the Commercial Fisheries Topic-specific Study Area (based on VMS data)

6.9.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

There is currently no single data set or model which can accurately quantify the precise levels or values of commercial fishing within discrete sea areas. This is largely due to the fact that there is no obligation on smaller fishing vessels (with the exception of vessels carrying hydraulic dredges and fishing for razor clams) to log their movements and catches. For larger (>15 m) vessels, this is less of an issue, as they often are required to have VMS and AIS on board.

To mitigate these data gaps, it is essential to undertake extensive consultation with local, regional and national fishing organisations and individual fishers.

The Project has commenced engagement with the fishing community both through the FLO and via DP Energy's Community and Stakeholder Liaison Manager, both appointed to The Project since 2020. Engagement with all those with economic interests (including fishing) will be a key part of ongoing stakeholder communication.

Project-specific vessel traffic surveys, in compliance with MGN654 guidance, may also be undertaken to inform the assessment, as outlined in the Shipping and Navigation Chapter. These data would capture fishing vessels active in the area, including smaller vessels which may not be included within official data sources.

DP Energy and The Project's FLO will continue engagement with commercial fisheries stakeholders throughout all phases of consultation.



6.9.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Commercial Fisheries receptors.

The commercial fisheries impact assessment of the EIAR will follow the EIAR methodology as described in Section 5.2. Guidance documents, specific to commercial fisheries, will be considered in preparation of the EIAR.

- Review of existing relevant data and information and consultation with fisheries stakeholders;
- Acquisition of additional project-specific data to fill any gaps;
- Formulation of a conceptual understanding of receiving environment conditions;
- Consultation and agreement with the fisheries stakeholders regarding proposed assessment approaches;
- Determination of the potential project design envelope;
- Assessment of effects using data analysis, stakeholder feedback, and expert-based judgements by the EIAR Team;
- Where significant residual effects remain, the identification of mitigation measures to reduce these residual effects to acceptable (non-significant) levels.

In order to inform an extended baseline characterisation of the commercial fisheries activity within the Commercial Fisheries Topic-specific Study Area, data from multiple sources (including direct consultation with fisheries stakeholders) will be compiled.

It is acknowledged that changes to the existing baseline for commercial fisheries could occur, as it is a dynamic industry with frequent and sometimes unpredictable changes in fish abundance and distribution, climatic conditions, management regulations and fuel costs, all of which affect activity; this will be considered within the EIAR.

The approach to assessing potential effects on Commercial Fisheries receptors within the EIAR will be based on the following stages:

Receptor groups will be identified through a review of the datasets listed above and feedback from consultation. Potential effects will be assessed separately for each receptor group, which will ensure all key potential effects are assessed properly.

Potential effects in the construction, operation and decommissioning phases will be fully assessed and presented in the future EIAR.

6.9.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects are assessed within the EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works. As additional plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments. Once the projects to be included the Cumulative Impact Assessment in the EIAR have been agreed, as many details from these other plans, projects and activities relevant to the assessment of potential effects on Commercial Fisheries will be collated and reviewed. These details will then be assessed in the context of project-specific potential effects associated with Shelmalere Offshore Wind Farm and an assessment of potential cumulative effects will be carried out.

With respect to potential transboundary impacts, based on current understanding, potential transboundary impacts on Commercial Fisheries may arise on the interests of other States, such as non-Irish commercial fishing vessels and/or shipping traffic. Therefore, it is currently proposed to scope in potential transboundary impacts on Commercial Fisheries. The potential for such transboundary impacts to arise will be confirmed via a formal Transboundary Screening exercise that will be undertaken post EIAR Scoping. Where potential transboundary impacts are confirmed, these will be assessed within the final EIAR.

6.9.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR with respect to the potential effects on Commercial Fisheries receptors.

6.9.5.3 Proposed Consultees

Initial engagement has taken place with a number of fisheries stakeholders since December 2020. Meetings were held in June and July 2021 with members of the fishing community, to discuss the proposed offshore site investigations being undertaken to inform the EIAR and design of Shelmalere Offshore Wind Farm.

Outputs from this initial engagement have been used to develop further understanding of existing fishing activity in the region.

Table 6-37 summarises the proposed consultees for the Commercial Fisheries chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 6-37 Proposed consultees (Commercial Fisheries)

Proposed Consultee	Objective of Consultation
Marine Institute	1. To discuss commercial fisheries activity in the area that will feed into the receiving environment chapter of the EIAR. 2. To discuss the approach to the assessment of impacts. 3. To discuss preliminary findings of the assessment and potential mitigation measures.
Department of Agriculture, Food and the Marine	As above.
Bord Iascaigh Mhara (BIM)	As above.
Sea Fisheries Protection Authority	As above.
Inland Fisheries Ireland	As above.
National Parks and Wildlife Service	As above.
Irish Fish Producers Organisation	As above.
Irish South and East Fish Producers Organisation	As above.
Irish South and West Fish Producers Organisation	As above.
Killybegs Fish Producers Organisation	As above.
Irish Islands Marine Resource Organisation	As above.
National Inshore Fishers Organisation / National Inshore Fisheries Association	As above.
Southeast Regional Inshore Fisheries Forum	As above.
Fisheries Local Action Group Southeast	As above.
Fisheries Local Action Group East	As above.
Irish Fish Processors and Exporters Association	As above.
Individual Fishers	As above.

6.9.6 Potential Impacts to be Assessed within the EIAR

Table 6.37 outlines the potential impacts on Commercial Fisheries receptors which may arise within the Commercial Fisheries Topic-specific Study Area as a result of the proposed Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out above. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-38 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Commercial Fisheries)

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Loss or restricted access to fishing grounds The implementation of advisory clearance distances around installation and maintenance vessels, and safety zones during construction, maintenance and decommissioning works may result in temporary loss or restricted access to fishing grounds within the Commercial Fisheries Topic-specific Study Area.	Yes	Yes	Yes	In
Displacement of fishing activity into other areas Fishing activity may be displaced to other areas due to loss or restricted access to fishing grounds as a result of potential project infrastructure, vessels and safety zones.	Yes	Yes	Yes	In
Increased steaming times due to presence The implementation of safety zones around construction, maintenance and decommissioning works may cause disruption to established steaming routes.	Yes	Yes	Yes	In
Loss or damage to gear due to interaction with Project infrastructure Potential for loss or damage of gear across all phases, as a result of interaction with Project infrastructure (e.g., snagging of inter-array or export cables; drifting of gear due to strong tides). This will be assessed in the Shipping and Navigation chapter of the EIAR.	Yes	Yes	Yes	In
Collision risk between fishing vessels and Project vessels and/or Project infrastructure Potential for collision risk between fishing vessels and Project vessels. This will be assessed in Chapter 9: Shipping and Navigation.	Yes	Yes	Yes	In

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Change in distribution of commercially exploited fish and shellfish populations Distributions of fish and shellfish populations have potential to be affected by the activities occurring across the different phases of Shelmalere Offshore Wind Farm. This will be assessed in the Fish and Shellfish Ecology chapter of the EIAR.	Yes	Yes	Yes	In
Change to catch rates Changes in distributions of fish and shellfish have the potential to affect the catch rates for commercial fishing vessels.	Yes	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	Yes	Yes	Yes	In

6.9.7 EIAR Scoping Questions

The following questions are designed to assist the stakeholder in providing feedback to the EIAR Team on the Commercial Fisheries topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Commercial Fisheries chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Commercial Fisheries Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Commercial Fisheries chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Commercial Fisheries chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Commercial Fisheries chapter of the EIAR for Shelmalere Offshore Wind Farm?

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6.10 CHAPTER 10: SHIPPING AND NAVIGATION

6.10.1 Introduction

This chapter of the EIAR will outline the potential effects of Shelmalere Offshore Wind Farm on Shipping and Navigation receptors. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the future EIAR for Shelmalere Offshore Wind Farm and includes the following:

- A list of policy and guidance documents relevant to the Shipping and Navigation topic;
- A preliminary review of the receiving environment (navigational features and principal shipping routes and activities within the Shipping and Navigation Topic-specific Study Area);
- The methodology proposed to be used within the EIAR to assess potential impacts on Shipping and Navigation;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Shipping and Navigation;
- Potential surveys proposed to inform the future EIAR for Shipping and Navigation;
- A summary of potential impacts on this receptor group that will be fully assessed within the future EIAR (and for this specific topic, the Navigation Risk Assessment (NRA) that will be submitted as part of the EIAR).

This chapter of the EIAR Scoping Report has been completed by NASH Maritime Ltd. (NASH) which has extensive experience of NRA and EIAR for offshore wind farms.

The Shipping and Navigation Topic-specific Study Area is defined as the area within a radius of 10 Nautical Mile (nm) from the Potential Turbine Array Infrastructure Zone and within a radius of 5 nm from the Potential Export Cable Corridor Infrastructure Zone seaward of Mean High-Water Springs (MHWS). The Shipping and Navigation Topic-specific Study Area was defined so that all shipping routes and traffic which pass close enough to Shelmalere Offshore Wind Farm to potentially be affected by its presence could be tracked by the proposed marine traffic surveys and properly assessed via the NRA and EIAR process. This is also a standard extent used on the majority of UK offshore wind farm EIARs.

6.10.2 Relevant Policy and Guidance

Policies and guidance documents relevant to the Shipping and Navigation EIAR topic are detailed in *Table 6-39*.

Table 6-39 Relevant Policy and Guidance Documents (Shipping and Navigation)

Policy / Guidance	Reference	Geographic Coverage
Policy		
National Marine Planning Framework (NMPF)	DHLGH, 2021	Ireland
Offshore Renewable Energy Development Plan (OREDPA)	DCCAE, 2014	Ireland
Guidance		
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects	DCCAE, 2017	Ireland
MGN 654 Guidance on “UK Navigational Practice, Safety and Emergency Response Issues”. Annex 1: Methodology for Assessing Marine Navigational Safety Risks of Offshore Wind Farms. Annex 5: Search and Rescue, Maritime Assistance Service, Counter Pollution and Salvage Incident Response.	Maritime and Coastguard Agency (MCA), 2021	UK
MGN 372 “Guidance to Mariners Operating in the Vicinity of UK OREIs”.	MCA, 2008	UK
International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 the Marking of Man-Made Offshore Structures.	IALA, 2021	International
International Maritime Organisation (IMO) Formal Safety Assessment.	IMO, 2018	International
Royal Yachting Association (RYA) Position on Offshore Energy Developments.	RYA, 2019	UK
European Boating Association (EBA) Position Statement, Offshore Wind Farms.	EBA, 2019	International
The Shipping Industry and Marine Spatial Planning.	Nautical Institute, 2013	International

DCCAE (2017) Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects sets out guidance for assessing shipping and navigation within an EIAR. Section 4.6.5 of this guidance highlights that Likely Significant Effects could potentially include collision risk, displacement of shipping, decreased trade supply and reduced visibility. Whilst the guidance does not set out a specific methodology for assessing potential effects of a project on shipping and navigation receptors in an EIAR, Section 4.6.4/4.6.6 identifies the appropriateness of producing an NRA and Appendix II points to UK guidance, in particular the UK’s Maritime and Coastguard Agency’s (MCA) MGN654.

MGN654, updated in 2021, provides detailed guidance on how to conduct NRAs for offshore renewable energy projects in the UK and the means by which Likely Significant Effects should be assessed. This approach is largely based on the IMO’s Formal Safety Assessment (FSA) approach to maritime risk assessment. In the absence of specific Irish guidance on how to conduct NRAs as part of an EIAR, it is proposed that MGN654 will be utilised as the basis of the NRA for inclusion in the EIAR for Shelmalere Offshore Wind Farm.

The OREDPA (DCCAE 2014) sets out key principles, policy actions and enablers for delivery of Ireland’s significant potential in the area of offshore renewable energy development.

With regards to shipping and navigation, OREDP draws attention to the following potential effects associated with the development of offshore renewable energy projects:

- Displacement of shipping – avoiding areas of high vessel densities and conducting an NRA;
- Decreased trade/supply – supporting continued access to ports and harbours;
- Reduced visibility – avoiding areas of high vessel densities and ensuring devices are marked in compliance with international regulations;
- Increased collision risk – avoiding constraining areas of high vessel densities, minimising impact of construction/maintenance and ensuring risks are assessed through an NRA.

The NMPF (DHLGH, 2021) outlines the Government’s vision, objectives and marine planning policies for each marine activity, including shipping and navigation. In particular, the plan recognises that *“offshore renewable energy projects can have a wide range of positive and adverse impacts for other activities or marine sectors”*, including *“competing for space with traditional sea users”*. Section 19 of the NMPF concerns the safety of navigation and sets out a number of relevant policies including:

- Safety of Sea Policy 1: Minimising navigational risk as a result of Offshore Wind Farms;
- Safety of Sea Policy 2: Minimising impact of developments on under-keel clearance;
- Safety of Sea Policy 3/4: Ensuring developments are marked, charted and have appropriate aids to navigation;
- Safety of Sea Policy 5: Ensure developments do not impact capabilities of Search and Rescue.

6.10.3 Receiving Environment

6.10.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

The receiving environment will be established for the EIAR using data shown in Table 6-40. This table lists the principal datasets used to determine the principal navigational features and shipping activities in the Shipping and Navigation Topic-specific Study Area.

Table 6-40 Key datasets to inform EIAR Scoping and EIAR (Shipping and Navigation)

Type	Summary and Source
AIS Data	AIS data is required on all large commercial vessels and passenger vessels and may be optionally carried by recreational craft and fishing vessels. Anonymised data from the Automatic Identification System (AIS) for 2019, provided by the UK’s Marine Management Organisation (MMO). High fidelity AIS data will be obtained for more recent years to validate the data analysis.
VMS Data	Data from the Vessel Monitoring System (VMS) collated for 2017 by OSPAR is used to determine fishing vessel intensity.
Cruising Routes	A Coastal Atlas of Recreational Boating in Ireland (The Irish Cruising Club, 2018) provides details of the principal routes used by recreational craft.

Type	Summary and Source
Nautical Charts	Nautical chart 1787 is reviewed to identify the principal navigational features in the topic-specific study area.
Sailing Directions	Admiralty Sailing Directions NP40: Irish Coast Pilot.
Historical Accident Data	Historical accident data from the Irish Coastguard, Marine Casualty Investigation Board, Marine Accident Investigation Branch (MAIB), RNLI and IMO.

Vessel traffic in the Irish Sea is strongly influenced by the presence of three Ship Routeing Schemes (see *Figure 6-25*). Ship Routeing Schemes are established based on the volume of traffic and degree of risk and, therefore, aim to mitigate an area of heightened navigational risk. A Traffic Separation Scheme (TSS) is located close to the Shipping and Navigation Topic-specific Study Area (Off Tuskar Rock) and was adopted in 1968 by the IMO (Resolution A.161 ES.IV). The TSS consists of a two nm-wide separation zone with north-east / south-west traffic lanes on either side.

Under the International Regulations for Preventing Collisions at Sea 1972 (COLREGs), vessels are required to navigate on the starboard lane of a TSS and should cross a TSS at 90 degrees. The area between the landward boundary of the scheme TSS and Tuskar Rock is considered as an inshore traffic zone, to be used by local traffic rather than through traffic. The other two TSS' in the wider region are located to the south-west of Milford Haven (Off Smalls) and to the north-west of Anglesey (Off Skerries).

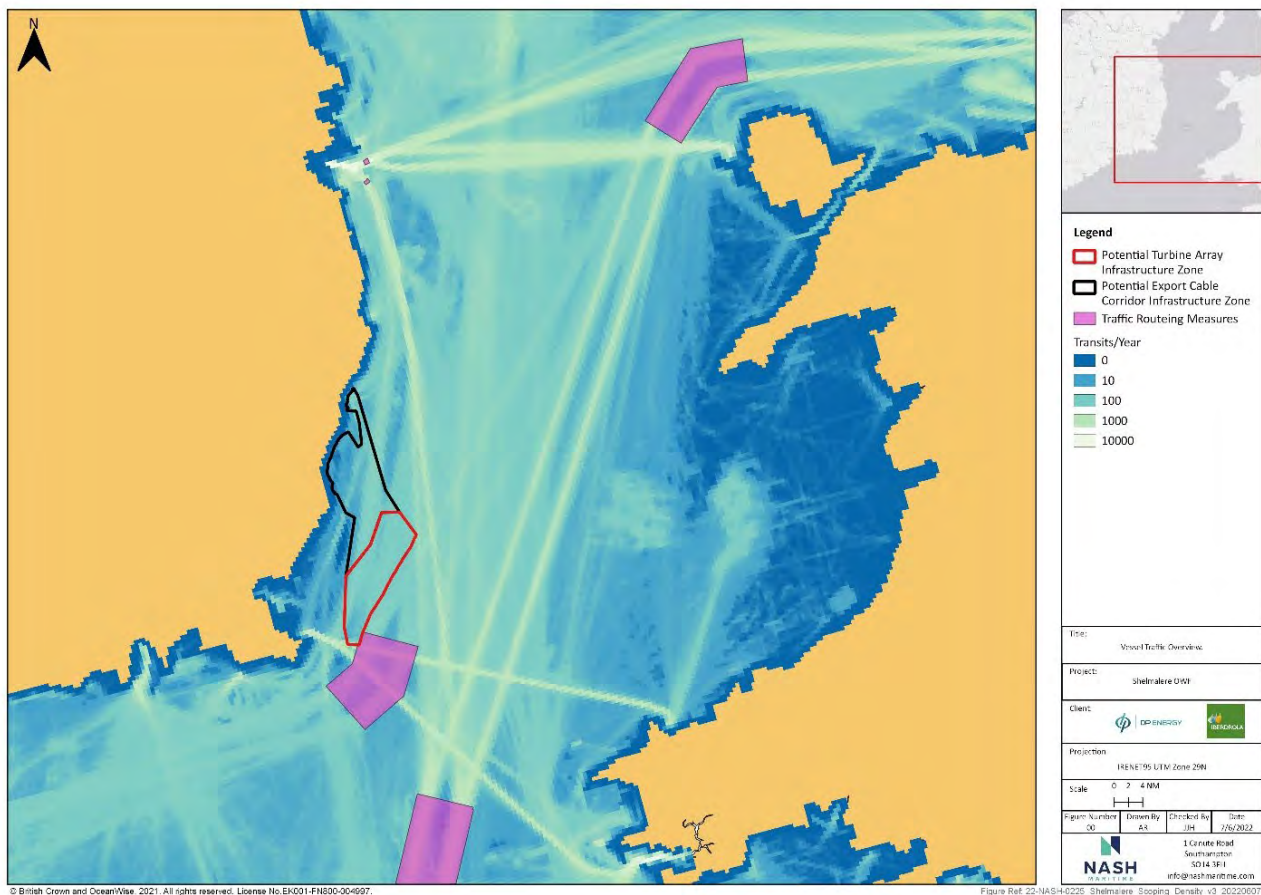


Figure 6-24 Vessel Traffic Overview (2019 AIS Data)

Figure 6-26 shows the transits of commercial vessels within the 2019 AIS data through the Shipping & Navigation Topic-specific Study Area. The Potential Turbine Array Infrastructure Zone is located in proximity to the main Irish Sea shipping routes which are orientated north south and used by vessels ranging from small coastal traffic (up to 100 m length) to large container vessels and tankers (up to 300 m length) bound for ports such as Liverpool. The majority of this traffic is orientated between Belfast, Dublin and Liverpool to the north with the Off Smalls TSS off Milford Haven towards Lands End. To the north of the Potential Turbine Array Infrastructure Zone is an area of shallow water called the Arklow Bank which separates inshore and offshore vessel traffic as it departs from Dublin heading south.

Some traffic which routes into the Off Tuskar TSS intersects the easterly area of the Potential Turbine Array Infrastructure Zone. From an initial analysis of the AIS data from 2019, an estimated 2,000 vessels utilised the Off Tuskar TSS lanes in 2019. A smaller number of vessels are shown to utilise the inshore route (<200 per year) but are smaller in size at around 100 m in length. An initial review of the 2019 AIS data, undertaken by NASH on behalf of Shelmalere Offshore Wind Farm Ltd., does not suggest any commercial vessel anchorages in the Shipping and Navigation Topic-specific Study Area.

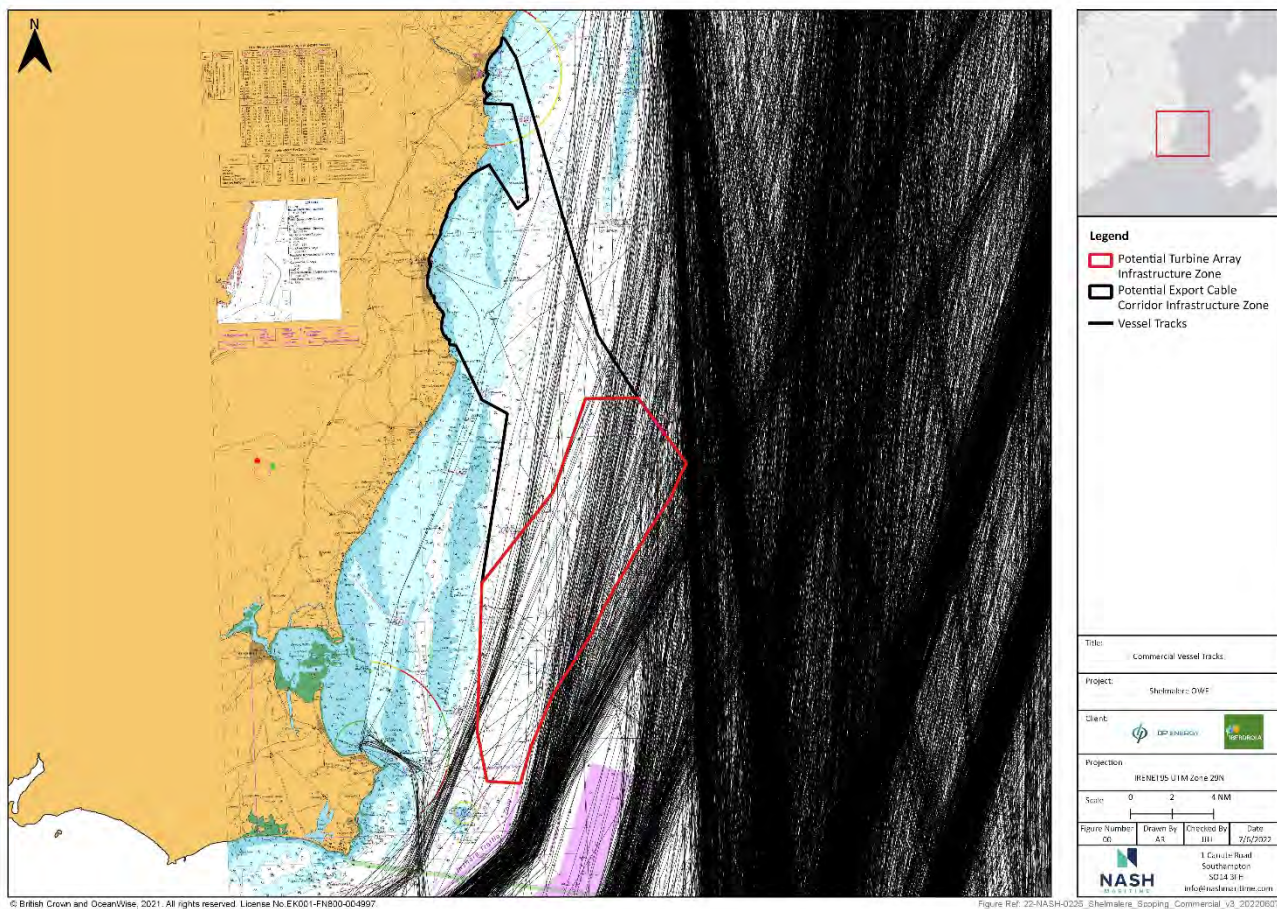


Figure 6-25 Commercial Shipping Transits (2019 AIS Data)

There are several passenger ferry services operating within or transiting through the Shipping and Navigation Topic-specific Study Area (see Figure 6-27):

- An Irish Ferries route between Dublin and Cherbourg passes to the east of the Arklow Bank and adjacent to the north-east corner of the Potential Turbine Array Infrastructure Zone, with three-weekly crossings;
- A Stena Line route between Rosslare and Fishguard passes to the north of Tuskar Rock and through the most southerly part of the Potential Turbine Array Infrastructure Zone, with 14 crossings each week;
- An Irish Ferries route between Rosslare and Pembroke passes to the north of Tuskar Rock and adjacent to the southerly boundary of the Potential Turbine Array Infrastructure Zone, with 14 crossings each week;
- A Brittany Ferries route between Rosslare and Bilbao operates two weekly sailings, passing to the west of Tuskar Rock;
- A Brittany Ferries route between Rosslare and Roscoff operates one weekly sailing, passing to the west of Tuskar Rock;
- A route between Rosslare and Cherbourg is operated by both Stena Line and Brittany Ferries with a combined 4 weekly sailings, passing to the west of Tuskar Rock.

A limited number of cruise ships (estimated to be up to 200 transits per year), ranging in size between 150 m and 330 m, were also recorded transiting through the Potential Turbine Array Infrastructure Zone during 2019.

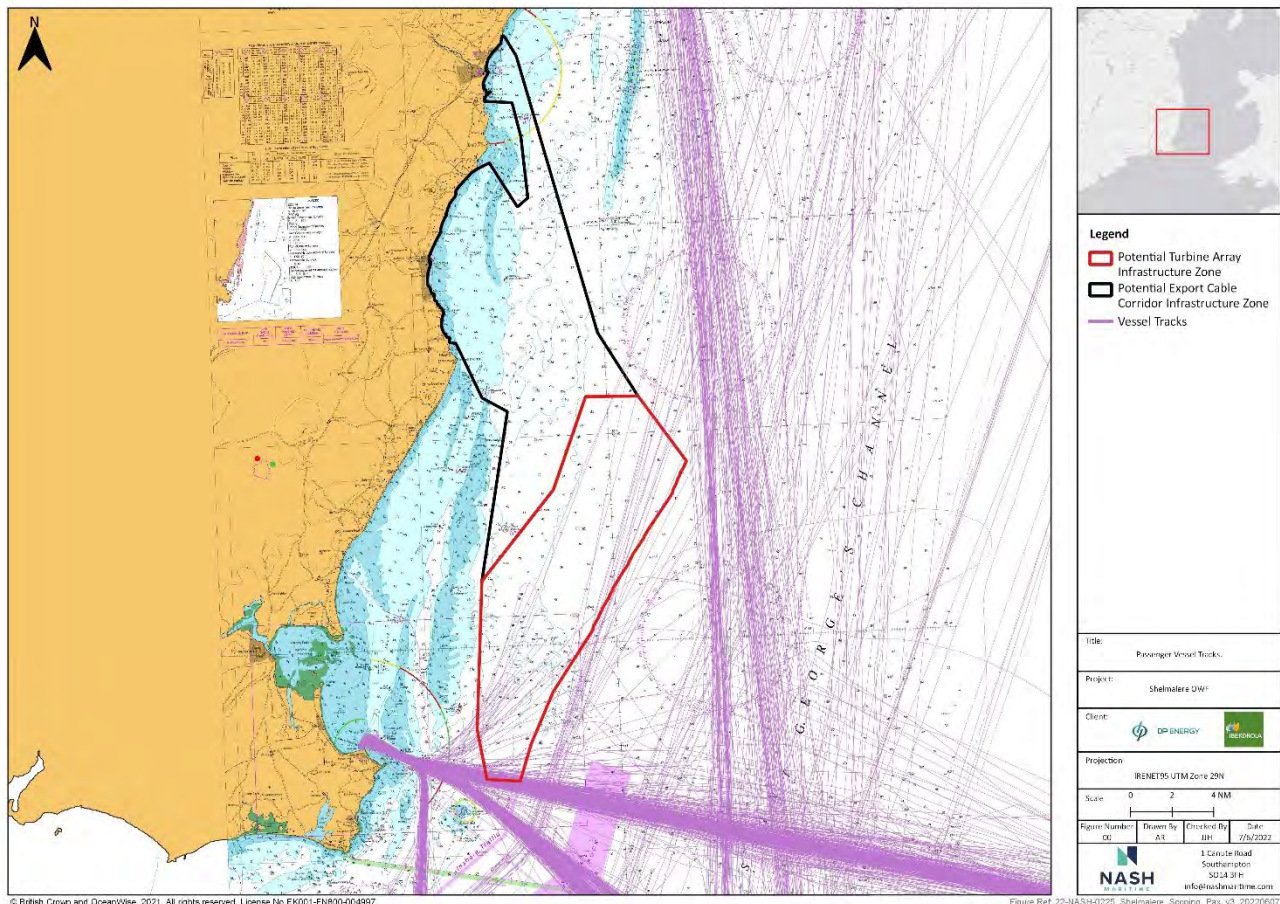


Figure 6-26 Passenger and Ferry Transits (2019 AIS Data)

Figure 6-28 shows the activities of fishing vessels recorded by both AIS and VMS in the Shipping and Navigation Topic-specific Study Area. The data suggests that some limited fishing activity via larger (>15 m) vessels occurs, but that the majority of these larger fishing vessels are on transit through the Potential Turbine Array Infrastructure Zone. AIS data is not necessarily required on fishing vessels and, therefore, this analysis underestimates small fishing vessels that might be operating in the Shipping and Navigation Topic-specific Study Area, particularly in inshore areas. For example, it is known that the Potential Turbine Array Infrastructure Zone supports a relatively high density of smaller vessels targeting the whelk fishery in this area. Additional information on the current understanding of fishing activity in this area is contained within the Commercial Fisheries chapter of this EIAR Scoping Report.

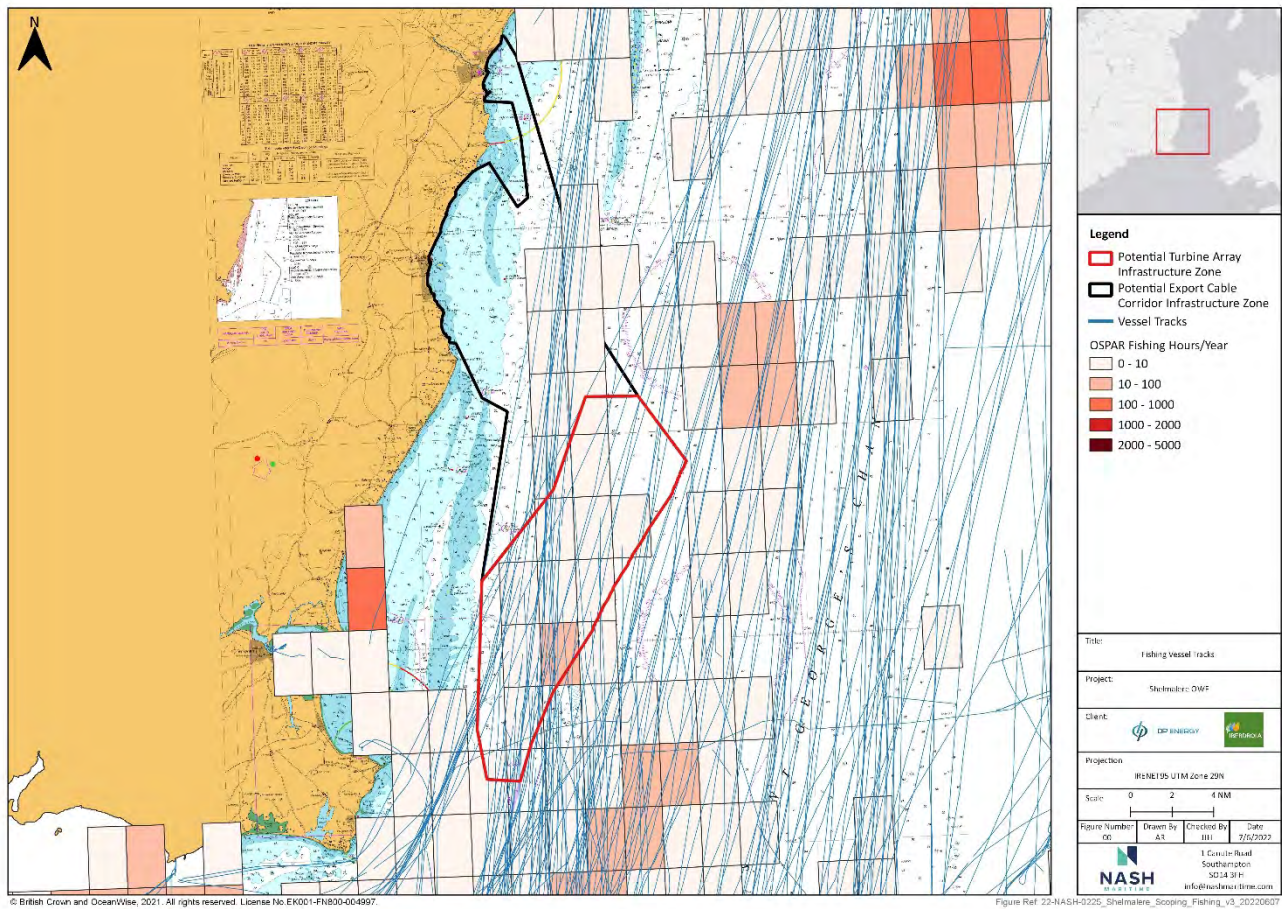


Figure 6-27 Fishing Tracks and Intensity (2019 AIS Data and 2017 VMS Data)

The movements of recreational vessels collected from the 2019 AIS is displayed in Figure 6-29. AIS is not required on recreational craft (precautionary estimates from the EIAR topic specialists are that between 10% and 30% of cruising yachts might voluntarily carry AIS), therefore, this analysis underestimates these movements. A review of the Irish Cruising Atlas (2018) suggests that most yachts navigating through this area would be concentrated inshore, calling at harbours along the eastern Irish coast.

There is some evidence of cruising routes across the Irish Sea from the Llyn Peninsula and Pembroke towards Arklow and Rosslare, which would intersect the Potential Turbine Array Infrastructure Zone.

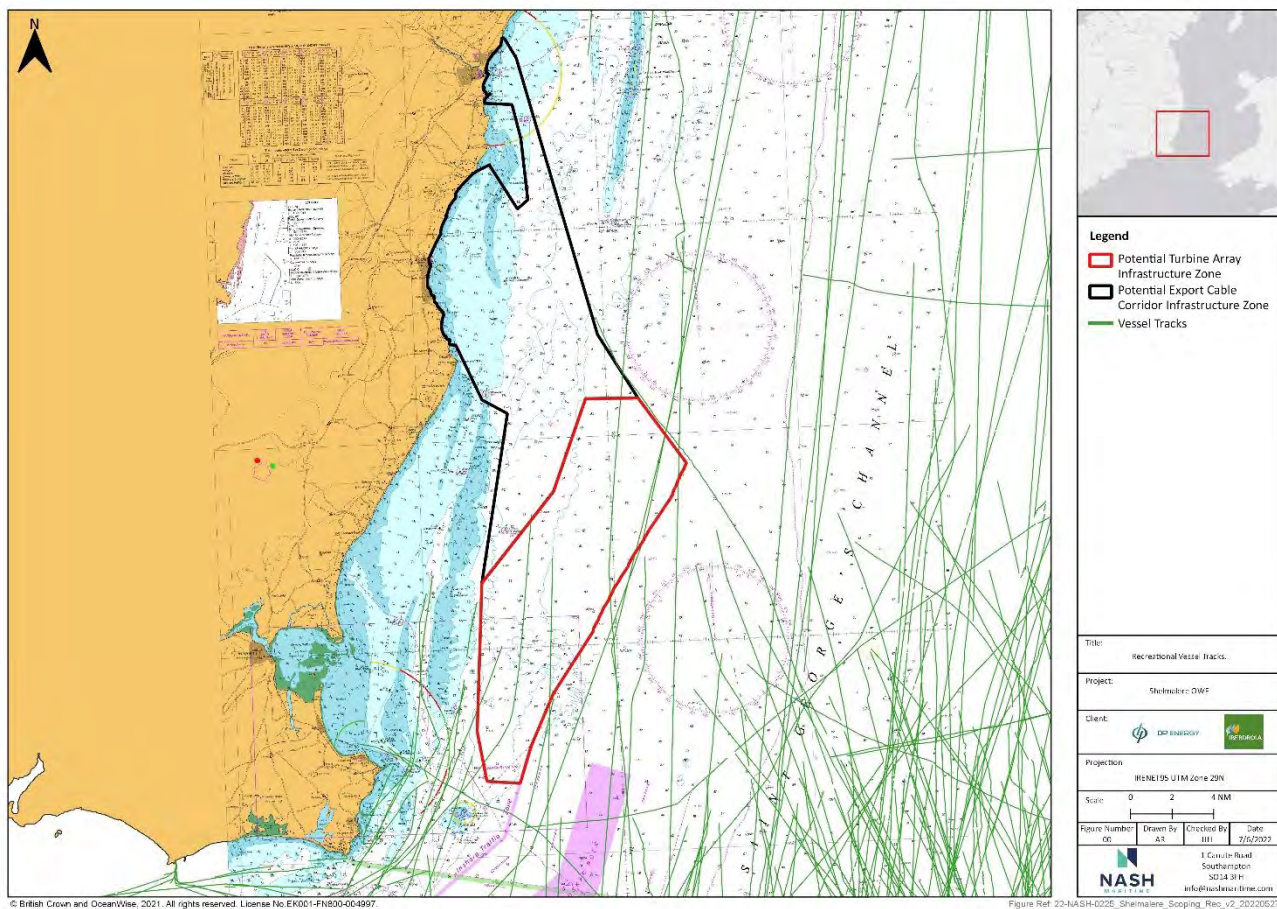


Figure 6-28 Recreational Tracks (2019 AIS Data)

Several ports and harbours are located within the Shipping and Navigation Topic-specific Study Area:

- **Arklow Harbour:** located at the mouth of the Avoca River and is principally a fishing and recreational harbour. Two small marinas located on the north and south banks. A commercial pier is located to the south of the harbour at Roadstone Quarry. Arklow Harbour is also the O&M hub for the Arklow Bank offshore wind farms, with a new purpose-built maintenance facility to be developed at the Harbour's South Dock;
- **Courtown:** a small harbour with a 10 m wide entrance in which mostly recreational and fishing vessels are kept on mooring buoys or alongside the pier walls;
- **Wexford Harbour:** used by fishing boats and recreational vessels and has numerous shallow and shifting banks/bars at the harbour entrance;

- Rosslare Europort¹⁷: small seaport consisting of several Ro-Ro ferry berths with more than 30 sailings per week to Spain, France and the UK. A small boat harbour is located to the west but dries out at low water.

Several important Aids to Navigation exist within the Shipping and Navigation Topic-specific Study Area, including:

- A south cardinal marks the southern extent of the Arklow Bank;
- Two red laterals mark the 20 m depth contour between Courtown and Arklow to offset traffic further offshore;
- The Rusk Channel, inshore of Blackwater with a charted depth of 0m, is marked by both north cardinals and lateral channel marks;
- A series of cardinal marks (SE Blackwater, S Blackwater and Lucifer) keep vessel traffic to the east of Blackwater and Lucifer Banks;
- The approaches to Rosslare include a buoyed channel with laterals marks and a sector light for approaches to the east, which overlaps with the southern extent of the array investigation area;
- Tuskar Rock has a lighthouse with a flashing light visible for 24 nm. A south cardinal is also positioned immediately to the south.

Search and Rescue (SAR) in Ireland is the responsibility of the Department of Transport and is controlled in the Irish Maritime Search and Rescue Region by the Irish Coast Guard. Coordination of SAR in this region is from a Marine Rescue Centre based in Dublin (National Maritime Operations Centre) and Irish Coast Guard stations are based in Rosslare and Wicklow. SAR helicopters are based in Dublin and Waterford. RNLI stations are located within the Shipping and Navigation Topic-specific Study Area at Arklow, Courtown, Wexford and Rosslare.

6.10.4 Potential Additional Data and Proposed Surveys

In addition to the collation of existing data (above), project-specific vessel traffic surveys, in compliance with MGN654 guidance, may also be undertaken to inform the assessment to be included in the future EIAR. Small craft such as fishing and recreational users are not mandated to carry AIS and, therefore, may be under-represented in an assessment limited to this data source. A project-specific vessel traffic survey would ensure all marine users are captured and included in the subsequent assessment. As part of any project-specific vessel traffic surveys, all vessels would be recorded by AIS, radar and visual observations for a period of 14 days during representative summer and winter surveys. The exact timing and methodology of these surveys will be discussed and agreed with key consultees.

¹⁷ In April 2022, Rosslare Europort Authority announced plans to establish the port, its hinterland and the south-east region as Ireland's Offshore Renewable Energy (ORE) Hub, with the potential to create up to 2,000 jobs.

6.10.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR (and the NRA) to assess potential effects of Shelmalere Offshore Wind Farm Ltd. on Shipping and Navigation receptors.

The NRA will investigate potential effects on Shipping and Navigation receptors as highlighted in both the OREDP and NMPF and identified within this chapter of this EIAR Scoping Report. The principal guidance to be followed in the EIAR will include the UK MCA's MGN654 "Methodology for Assessing the Navigational Safety Risks of Offshore Renewable Energy Installations". Additional relevant guidance to be used in preparation of the EIAR is set out in Table 6-37 of this EIAR Scoping Report.

To support the NRA, significant data collection will be conducted. Key datasets that will be obtained and used in the assessment to be set out within the future EIAR will include:

- The analysis of longer-term AIS datasets to establish principal shipping routes and seasonality of transits within the topic-specific study area.
- Analysis of VMS data to understanding fishing patterns;
- Review of nautical charts and publications applicable to the Shipping and Navigation Topic-specific Study Area;
- Analysis of historical accident data collected by the Irish Coastguard, Marine Casualty Investigation Board, Marine Accident Investigation Branch (MAIB), RNLI and IMO.;
- Review of recreational cruising routes within the Irish Cruising Atlas (2018).

It is proposed that consultation will be undertaken with key stakeholders and regulators. Table 6-40 identifies several organisations that it is proposed to include in consultation on the Shipping and Navigation aspect of the EIAR. Additional consultees will be identified following a more detailed analysis of the collated data.

The assessment methodology for the NRA to be included in the future EIAR will follow the IMO's Formal Safety Assessment (IMO, 2018) approach to maritime risk assessment. Based on a review of the information collected and feedback from consultees, potential effects and hazards associated with The Project will be identified. These will include potential effects/hazards associated with the construction, operation and maintenance and decommissioning of The Project. The likelihood and consequence of these effects will be scored and combined to produce a risk score. Where risks are determined to be intolerable, risk control measures will be reviewed in order to reduce the risk to As Low As Reasonably Practicable (ALARP).

6.10.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment.

It is expected this search area will identify other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works. As additional plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will need to be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the other plans, projects and activities to be included in the Cumulative Impact Assessment of the EIAR have been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Shipping and Navigation, will be collated and reviewed. These details will be assessed in the context of project-specific potential effects associated with Shelmalere Offshore Wind Farm and an assessment of potential cumulative effects will be carried out.

With respect to potential transboundary impacts, based on current understanding, potential transboundary impacts on Shipping and Navigation may arise on the interests of other States, such as non-Irish commercial fishing vessels and/or shipping traffic. Therefore, it is currently proposed to scope in potential transboundary impacts on Shipping and Navigation. The potential for such transboundary impacts to arise will be confirmed via a formal Transboundary Screening exercise that will be undertaken post EIAR Scoping. Where potential transboundary impacts are confirmed, these will be assessed within the final EIAR.

6.10.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR with respect to the potential effects on Shipping and Navigation receptors.

6.10.5.3 Proposed Consultees

Table 6-41 summarises the proposed consultees for the Shipping and Navigation chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. The specific objective of this consultation are also presented in that table.

It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 6-41 Proposed Consultees (Shipping and Navigation)

Proposed Consultee	Objective of Consultation
Marine Survey Office	<ol style="list-style-type: none"> 1. Review NRA methodology and assessment approach. 2. Discuss potential effects of Shelmalere Offshore Wind Farm on navigation safety. 3. Review possible risk control options.
Commissioner of Irish Lights	<ol style="list-style-type: none"> 1. Discuss navigational routeing through the Shipping and Navigation Topic-specific Study Area. 2. Review possible risk control controls including marking and lighting requirements.
SAR providers (Irish Coast Guard, Royal National Lifeboat Institute)	<ol style="list-style-type: none"> 1. Discuss historical incidents in the Shipping and Navigation Topic-specific Study Area. 2. Discuss possible impacts of Shelmalere Offshore Wind Farm on SAR capabilities.
Ports and Harbours (Rosslare Europort, Wexford, Courtown, Arklow, etc.).	<ol style="list-style-type: none"> 1. Review operations including constraints on navigating into relevant ports and harbours. 2. Discuss potential impacts of Shelmalere Offshore Wind Farm on vessel access into ports.
Ferry Companies (Stena Line, Irish Ferries and Brittany Ferries).	<ol style="list-style-type: none"> 1. Review ferry routeing through Shipping and Navigation Topic-specific Study Area, including in adverse weather. 2. Discuss potential impacts of Shelmalere Offshore Wind Farm on ferry safety and commercial operations (e.g. timetables).
Recreational User Groups (Irish Sailing, Irish Cruising Club, Irish Cruising Association etc.).	<ol style="list-style-type: none"> 1. Establish types, magnitude, seasonality of recreational activity through Shipping and Navigation Topic-specific Study Area. 2. Discuss potential impacts of Shelmalere Offshore Wind Farm on recreational activities.
Fishing Representatives	<ol style="list-style-type: none"> 1. Establish types, magnitude, seasonality of fishing activity within the Shipping and Navigation Topic-specific Study Area. 2. Discuss potential impacts of Shelmalere Offshore Wind Farm on fishing activities.

6.10.6 Potential Impacts to be assessed within the EIAR

Table 6-41 outlines the potential impacts on Shipping and Navigation receptors which may arise within the Shipping and Navigation Topic-specific Study Area as a result of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out in Section 6.9.4. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-42 Potential Impacts (by project phase) to be assessed within/scoped out of the EIAR (Shipping and Navigation)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Increased Collision Risk Due to Increased Vessel Activity The construction, operation and maintenance and decommissioning of Shelmalere Offshore Wind Farm would result in additional vessel movements which could potentially pose a collision risk to other vessels. These collisions could potentially result in damage, loss of life and pollution.	Yes	Yes	Yes	In
Increased Collision Risk Due to Presence of Infrastructure The construction of infrastructure could potentially result in the deviation of vessel routes that results in choke points or narrow corridors which increases the risk of collision. Furthermore, smaller craft could potentially be offset into shipping routes used by larger vessels. These collisions could potentially result in damage, loss of life and pollution.	Yes	Yes	Yes	In
Increased Contact Risk Due to Presence of Infrastructure The construction of infrastructure in otherwise navigable waterways could potentially result in contacts with navigational vessels. Vessels may contact structures through mechanical failure or human error. These contacts could potentially result in damage, loss of life and pollution.	Yes	Yes	Yes	In
Increased Grounding Risk Due to Presence of Infrastructure The construction of infrastructure in otherwise navigable waterways could potentially result in deviations of shipping routes into or near areas of shallow water which could potentially increase the risk of grounding following human error or mechanical failure. These groundings could potentially result in damage, loss of life and pollution.	Yes	Yes	Yes	In
Interference with Sea Lanes Essential to International Navigation The construction of infrastructure that interferes with, or the approaches to, sea lanes essential to international navigation has the potential to impact international trade and shipping routes.	Yes	Yes	Yes	In
Increased Deviation of Commercial Vessels The construction of infrastructure could potentially result in increased journey times for commercial vessels and ferries with regular timetables that could potentially make routes uncompetitive, resulting in loss of income, or increased fuel and operational costs.	Yes	Yes	Yes	In
Reduced Access into Ports and Harbours Shelmalere Offshore Wind Farm could potentially reduce access into ports and harbours by blocking approach channels or reducing the depth of water.	Yes	Yes	Yes	In

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Reduction in SAR Capability The presence of Shelmalere Offshore Wind Farm could potentially reduce the effectiveness of SAR. This might potentially include difficulty in accessing areas of sea within the array or diminished visibility of casualties.	Yes	Yes	Yes	In
Interference with Radar, Communications and Positioning Systems Offshore WTGs and transmission cables have the potential to create effects on ship and shore-based equipment that are essential to navigation safety and communications.	Yes	Yes	Yes	In
Reduction in Under-Keel Clearance Cable burial and protection could potentially result in the reduction of navigable depth that potentially increases the risk of vessel grounding or reduce access of navigating vessels.	Yes	Yes	Yes	In
Risk of Snagging of Fishing Gear or Anchors The presence of cables potentially increases the risk of fishing gear or anchors becoming caught that has potential risks to navigational safety or damage to project assets.	Yes	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	Yes	Yes	Yes	In

6.10.7 EIAR Scoping Questions

The following questions are designed to assist stakeholder in providing feedback to the EIAR Team on the Shipping and Navigation topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Shipping and Navigation chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Shipping and Navigation Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Shipping and Navigation chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Shipping and Navigation chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Shipping and Navigation chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.10.8 References

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- Royal Yachting Association (RYA), 2019. Position on Offshore Energy Developments.

6.11 CHAPTER 11: OFFSHORE ARCHAEOLOGY AND CULTURAL HERITAGE

6.11.1 Introduction

This chapter of the EIAR will outline the potential effects of Shelmalere Offshore Wind Farm on Offshore Archaeology and Cultural Heritage. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the future EIAR and includes the following:

- A list of policy and guidance documents relevant to the Offshore Archaeology and Cultural Heritage topic;
- A preliminary review of the receiving environment within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential effects on Offshore Archaeology and Cultural Heritage;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the future EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for Offshore Archaeology and Cultural Heritage;
- Potential surveys proposed to inform the EIAR for Offshore Archaeology and Cultural Heritage;
- A summary of potential impacts on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by ADCO which has extensive experience of this topic from previous offshore wind farm EIARs.

The Offshore Archaeology and Cultural Heritage Topic-specific Study Area is focused on the Potential Turbine Array Infrastructure Zone and the Potential Export Cable Corridor Infrastructure Zone, including the intertidal zone at the potential Cable Landfall locations, plus a buffer of approximately 24.5 km around these Zones. This buffer area relates to the maximum tidal ellipse in this area and thus, encapsulates the area within which potential far-field effects may arise on Offshore Archaeological and Cultural Heritage receptors (e.g. sediment deposition / scour).

6.11.2 Relevant Policy and Guidance

Policies and guidance documents relevant to the Offshore Archaeology and Cultural Heritage EIAR topic are detailed in Table 6-43. The EIAR will consider the potential effects of the construction, operational and maintenance (O&M) and decommissioning phases of Shelmalere Offshore Wind Farm within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area.

The assessment will be conducted in line with the following procedures and guidelines:

Table 6-43 Relevant Policy and Guidance Documents (Offshore Archaeology and Cultural Heritage)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPA)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) Framework and Principles for the Protection of the Archaeological Heritage	DAHGI, 1999a	Ireland
DAHGI Policy and Guidelines on Archaeological Excavation	DAHGI, 1999b	Ireland
COWRIE Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy	COWRIE, 2007	UK
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland, including foreshore, EEZ and Irish Continental Shelf
International Council on Monuments and Sites (ICOMOS) guidance, non-governmental international organisation dedicated to the conservation of the world's monuments and sites	ICOMOS, 2011	Global
United Nations Educational, Scientific and Cultural Organization (UNESCO) guidance, who seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity	UNESCO, 1972	Global

6.11.3 Receiving Environment

6.11.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

The receiving environment will be established for the EIAR using the following key data sources:

- Integrated Mapping for the Sustainable Development of Ireland's Marine Resource' (INFOMAR) project;
- European Marine Observation and Data Network (EMODnet);
- Historic Shipwreck Inventory maintained by the National Monuments Service (NMS) at the Department of Housing, Local Government and Heritage;
- Sites and Monuments Record (SMR), also known as the Register of Monuments and Places (RMP)
- National Inventory of Architectural Heritage (NIAH);
- Topographical Files, National Museum of Ireland.

6.11.3.2 Submerged Prehistoric archaeological potential

The EMODnet Geology project indicates a series of six palaeo coastlines that have been recorded in addition to the present-day coastline within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area. These palaeo coastlines extend several kilometres out to sea. The results are derived from computer modelling rather than empirical data (Brook *et. Al*, 2012) for the most part, but they nevertheless suggest a necessary consideration (potential receptor) in assessing potential archaeological impacts in the EIAR. Three of the palaeo coastlines pre-date the presence of people in Ireland, but three others would have existed when Ireland was being occupied by people in early prehistoric times (Figure 6-30).

The first of these relates to c. 10,000 years BP (Before Present, namely before 1950 AD), when the coastline lay approximately 4 km east of the present-day shore at Ballygarrett, and 12km east off Raven Point, Wexford. At this time (the Mesolithic period), hunter-fisher-gatherers were actively exploiting the coastlines in what is regarded as the earliest evidence for occupation of and activity on the island of Ireland. The Potential Export Cable Corridor Infrastructure Zone and part of the Potential Turbine Array Infrastructure Zone coincide with this palaeo coastline.

By c. 8,000 BP, the coastline lay just offshore of the current coastline off Ballygarrett and approximately 2km off Raven Point. The Potential Export Cable Corridor Infrastructure Zone and part of the Potential Turbine Array Infrastructure Zone overlap with this palaeo coastline. The computer-modelled palaeo coastlines indicate that the shoreline along this part of Ireland's east coast has varied considerably since early prehistory. Despite the dynamic coastline, the possibility that material associated with activities in early prehistory exists along the submerged shorelines, will be considered in the EIAR.

6.11.3.3 Historic Shipwreck events

Ireland's east coast has been the country's principal maritime trade route for centuries and it has proved hazardous to shipping, both inshore close to the sandbanks and offshore. The systematic recording of these events has taken place only since c. 1750. There are many recorded wrecking events associated with the sea area from the south end of Arklow Bank, Co. Wicklow to Greenore Point, Co. Wexford, but the majority of these incidents have left no visible trace of wreckage on the seabed. The narrative associated with their loss nevertheless informs an understanding of the pattern of wrecking over space and time; topics that are developed in the EIAR chapter.

The number of known wreck site locations is far less than the number of recorded wreckings. Figure 6-30 shows the distribution of known wreck sites within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area. The distribution shows various gaps, including much of the inshore area south of Arklow and north of Cahore Point. The waters in this area are relatively shallow and include the Glassgorman Bank sand bank. A second area where there are few known wreck sites lies to the east of the Blackwater Bank and Lucifer Shoals, offshore of Wexford, which includes the Potential Turbine Array Infrastructure Zone. In contrast, the line of wreck sites that populate Blackwater Bank highlights the hazardous nature of this feature, which lies outside the proposed infrastructure zone.



In summary, there are ten known wrecks within the entire potential Infrastructure Zones, two of which occur with the Potential Turbine Array Infrastructure Zone and eight within the Potential Export Cable Corridor Infrastructure Zone. There are a larger number of known wrecks in the wider study area that reaches one tidal excursion from the potential array area. The assessment that will be presented within the future EIAR will describe the details of each known wreck site and will inform an insight to the pattern of wrecking as evident in the distribution. In addition to known wrecks, the *potential* for archaeological sites existing within the Potential Turbine Array and Export Cable Infrastructure Zones will be assessed via review of a range of secondary information.

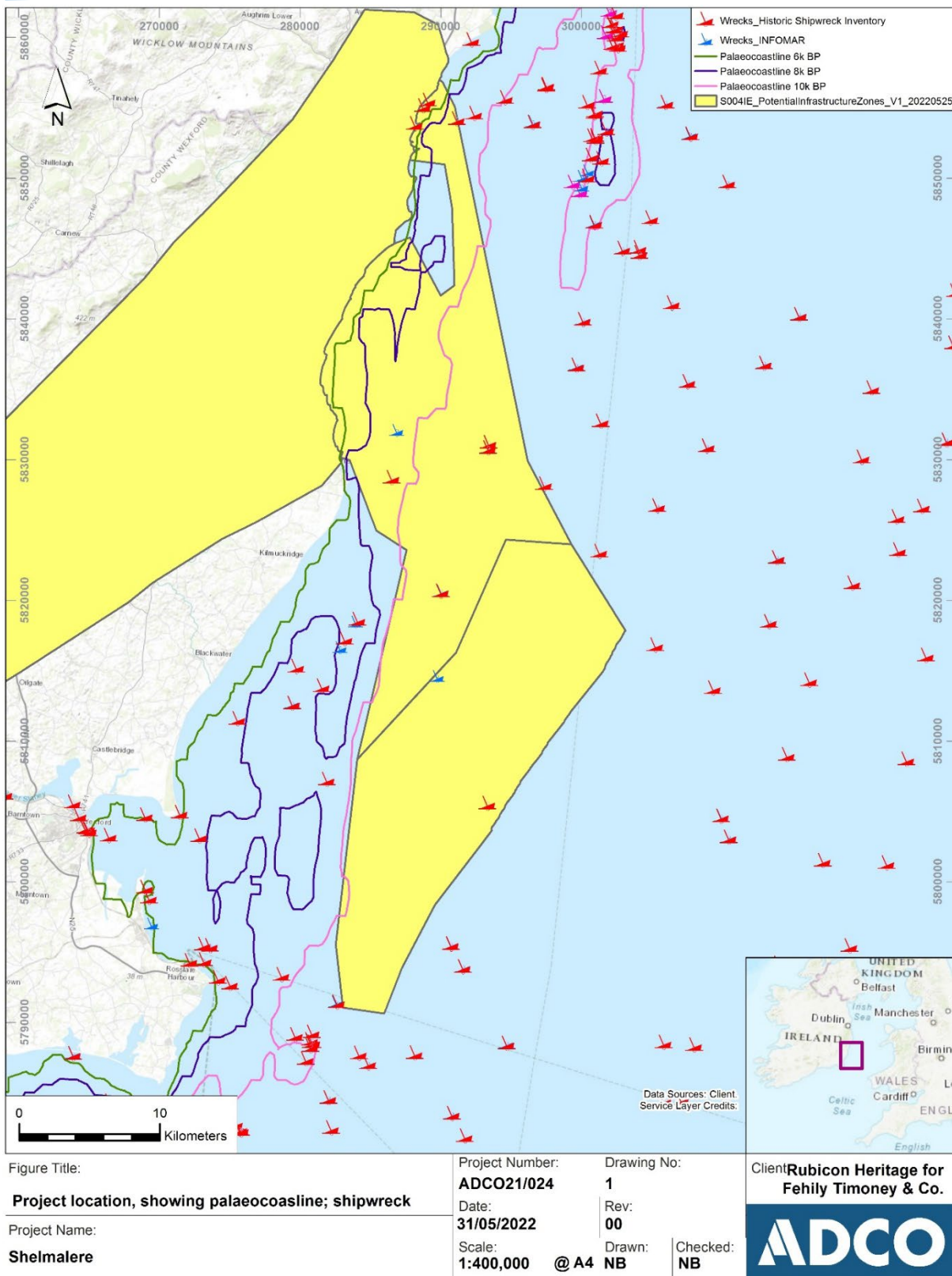


Figure 6-29 Marine Archaeological features within the offshore Archaeology and Cultural Heritage Topic Specific Study Area

6.11.3.4 Potential Cable Landfall Locations

The archaeological potential at the Cable Landfall location, once selected, will be indicated by the range of recorded archaeological sites and buildings of architectural heritage that are registered in the National Monuments Service's Register of Monuments and Places and in the National Inventory of Architectural Heritage maintained by the Built Heritage Policy Unit, while the historic Ordnance Survey First Edition six-inch map series in particular will provide important insight to the coastline and any features or structures that occur there.

Intertidal archaeological survey will be considered at potential Cable Landfall locations, and the results of these walkover surveys will provide a baseline from which a comprehensive assessment will be undertaken and presented in the future EIAR.

There is a degree of overlap between the Offshore Archaeology and Cultural Heritage Topic-specific Study Area and the Onshore Archaeology Topic-specific Study Area at the interface location and consequently, both chapters of the EIAR will present some of the same information and will arrive at similar observations but each will reflect the separate nuances of Offshore Archaeology and Cultural Heritage and Onshore archaeology respectively.

6.11.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

With respect to proposed surveys to inform the future EIAR, it is proposed that a project-specific geophysical survey will be undertaken. The data and observations arising from this survey will be used to further inform the Offshore Archaeology and Cultural Heritage assessment to be set out in the EIAR. These data can help to define the magnitude of potential impacts from Shelmalere Offshore Wind Farm on Offshore Archaeology and Cultural Heritage features that may be present and to determine the significance of any potential effects on those features. Data from this survey will be provided to ADCO so that a review can be carried out of side-scan sonar, magnetometer, sub-bottom profiler and multibeam data for the area and surroundings of known wreck sites and previously identified geophysical targets.

To inform the EIAR, it is proposed that a project-specific geotechnical survey will be undertaken. The geotechnical survey is not required to be consented by the Department but is subject to the approval of the National Monuments Service within the Department. An archaeological Written Scheme of Investigation (WSI) and methodology for archaeological data collection will be developed. This WSI will provide detail on the archaeological background of the site and immediate surroundings, the fieldwork methodology and post fieldwork methodology and reporting. All sampling undertaken by the survey contractor will be in accordance with this WSI.

The record of sites that typically occur in an intertidal environment, such as bridges, quays and timber alignments, are generally not captured within national records or inventories. In the absence of systematic recording of such sites on the foreshore, intertidal walkover surveys consented by the National Monuments Service will also be undertaken to inform the EIAR.

Table 6-44 Summary of site investigations activities to inform Marine Archaeology

Survey Method	Summary Approach
Geophysical Survey	<p>Survey of the Potential Turbine Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone with a range of sensors to collect site-specific data:</p> <p>Multibeam Echo Sounder (MBES) – to generate detailed topographical information of the seabed and mapping of near seafloor sediment types.</p> <p>Sidescan Sonar (SSS) to identify key seabed sediment types and bedforms as well as to identify any features of note including but not limited to wrecks, debris or other man-made objects. Additionally SSS may be used to support the selection of locations for potential infrastructure elements.</p> <p>Sub-Bottom Profiler (SBP) – to allow for assessment of variations in thickness and sediment cover of the seabed sediments and shallow geology to a depth of 5 m or greater, for inter array cable and export cable design cable design purposes and development of the ground model.</p>
Geotechnical Survey (Core Sampling)	<p>Locations for core sampling will be determined using geophysical data and through the survey framework provided by the Regulator. It is not expected that geotechnical cores will be specifically required for archaeology purposes, therefore the geoarchaeological assessment will be limited to a review of cores collected through the geotechnical survey. A WSI will be prepared by The Project archaeologist in line with the requirements of the National Monuments Service, to facilitate the recording and reporting of archaeological observations.</p>

6.11.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Offshore Archaeology and Cultural Heritage receptors. The Offshore Archaeology and Cultural Heritage assessment presented within the EIAR will be based on a review of existing seabed data and archaeological sources. The potential to identify flooded and buried palaeo landscapes within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area will be assessed. The sources relating to palaeo landscapes are associated with marine mapping endeavours, including the 'Integrated Mapping for the Sustainable Development of Ireland's Marine Resource' (INFOMAR) project, and the European Marine Observation and Data Network (EMODnet).

The recorded and known shipwreck sites within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area will be assessed. The principal archaeological archive relating to the sea area is the Historic Shipwreck Inventory maintained by the National Monuments Service (NMS) at the DHLGH. The Inventory is a comprehensive record of shipwreck events around Ireland that began to be recorded systematically from the mid-1700s. The majority of the shipwreck events contained within the Inventory are available archivally and contain records of the wrecking event where the precise location of wreckage is not known. These are referred to as 'recorded' wreckings. These records will typically position the ship in relation to the nearest topographic reference point and do not record where a vessel may have finally foundered.

For further insight, it will be necessary to consider other sources, including fishing records of ‘snag points’, divers’ records of discoveries underwater, and marine geophysical survey records. These sources can help lead to the precise positioning of a wrecked vessel, and these instances are referred to as ‘known’ shipwreck sites. The NMS maintains a national wreck site database of known shipwreck sites that is accessible as an online portal and updated to 2018. INFOMAR has also recorded shipwrecks, and the shipwreck data is integrated into the Historic Shipwreck Inventory web page up to 2018.

The potential for archaeological sites existing along the intertidal and coastal zone of the Potential Export Cable Corridor Infrastructure Zone, where it is proposed to bring marine export cables ashore, will be assessed. The NMS maintains the Sites and Monuments Record (SMR), also known as the Register of Monuments and Places (RMP), which provides comprehensive details relating to known archaeological sites on land from all periods up to c. 1750. Sites that are of younger date tend to be considered within the context of Built Heritage and are registered in the National Inventory of Architectural Heritage (NIAH). Sites within the intertidal environment, such as bridges, quays and timber alignments, are generally not captured in either the SMR or the NIAH registers, and may be informed through intertidal surveys, where possible.

In addition, licensed archaeological interventions provide a further source of information and summary accounts of such work are available online through the NMS. The assessment will be further informed by the site-specific marine geophysical survey data and marine geotechnical data that will be acquired as part of the wider project.

Potential effects will be assessed using the main EIAR assessment matrix presented in Section 4.4.3. The significance of effects will be presented and, where appropriate, mitigation will be proposed along with any residual impacts.

6.11.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works. As additional plans projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the other plans, projects and activities to be assessed within the cumulative assessment in the EIAR have been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Offshore Archaeology and Cultural Heritage will be collated and reviewed. These details will then be assessed in the context of project-specific potential effects from Shelmalere Offshore Wind Farm and an assessment of potential cumulative effects completed.

With respect to potential transboundary impacts, based on current understanding, potential impacts on Offshore Archaeology and Cultural Heritage receptors are expected to be restricted to areas within Irish waters only, i.e. not on any international territory. No impacts are also expected on any interests of another State, i.e. fishing/shipping which occurs within the Irish EEZ as a result of potential impacts on Offshore Archaeology and Cultural Heritage receptors. Therefore, as there is no pathway for transboundary impacts it is currently proposed to scope out transboundary impacts on Offshore Archaeology and Cultural Heritage from consideration in the future EIAR. This will be confirmed via the formal Transboundary Screening exercise that will be undertaken post EIAR Scoping.

6.11.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR with respect to the potential effects on Offshore Archaeology and Cultural Heritage receptors.

6.11.5.3 Proposed Consultees

Table 6-45 summarises the proposed consultees for the Marine Archaeology chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 6-45 Proposed Consultees (Offshore Archaeology and Cultural Heritage)

Proposed Consultee	Objective of Consultation
NMS/UAU	<ol style="list-style-type: none"> 1. To discuss and agree approach to marine geophysical surveys and geotechnical campaigns to inform the EIAR process 2. To update on marine geophysical surveys and geotechnical campaigns completed to date and to discuss any additional data collection requirements 3. To discuss the approach to the assessment of impacts. 4. To discuss preliminary findings of the assessment and potential mitigation measures.

6.11.6 Potential Impacts to be Assessed within the EIAR

Table 6-46 outlines the potential impacts on Offshore Archaeology and Cultural Heritage receptors which may arise within the Offshore Archaeology and Cultural Heritage Topic-specific Study Area as a result of the proposed Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out above. This process is aimed at delivering a proportionate approach to the EIAR.

Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-46 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Offshore Archaeology and Cultural Heritage)

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Sediment disturbance and deposition leading to effects on known heritage assets.	Yes	Yes	Yes	In
Direct damage to known heritage assets.	Yes	Yes	Yes	In
Alteration of sediment transport regimes due to physical presence of project infrastructure.	No	Yes	No	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

6.11.7 EIAR Scoping Questions

The following suggested list of questions are designed to assist the respondent in providing feedback to the EIAR team as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Offshore Archaeology and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Offshore Archaeology and Cultural Heritage Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR team have regard to in the preparation of the Offshore Archaeology and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Offshore Archaeology and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Offshore Archaeology and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.11.8 References

Brook A, Bradley S, Edwards R and Goodwyn N, 2012. 'The palaeogeography of Northwest Europe during the last 20,000 years', Journal of Maps 7.1 (2012), pp 573–587. Available via: https://www.emodnet-geology.eu/map-viewer/?p=submerged_landscapes

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COWRIE, 2007. Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy. Available via: <https://www.biofund.org.mz/wp-content/uploads/2018/11/F1349.Cowrie-Ciarch-Web.pdf>

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DAHGI, 1999. Policy and Guidelines on Archaeological Excavation. Available via: <https://www.archaeology.ie/sites/default/files/media/publications/excavation-policy-and-guidelines.pdf>

Department of the Environment, Climate and Communications (DCCAE). Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects. 2017.

International Council on Monuments and Sites (ICOMOS) Guidance Documents. Available via: <https://www.icomos.org/en/documentation-center>

United Nations Educational, Scientific and Cultural Organization (UNESCO) Guidance Documents. Available via: <https://whc.unesco.org/en/guidelines/>

6.12 CHAPTER 12: AVIATION AND RADAR

6.12.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential effects of Shelmalere Offshore Wind Farm on Aviation and Radar receptors and sets out the methodology and approach to be taken to assessing these effects within the future EIAR for Shelmalere Offshore Wind Farm. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to the Aviation and Radar topic;
- A preliminary review of the receiving environment within the Aviation and Radar Topic-specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on Aviation and Radar due to Shelmalere Offshore Wind Farm;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Aviation and Radar;
- Potential surveys proposed to inform the future EIAR for Aviation and Radar;
- A summary of potential impacts on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by Osprey Consulting Services Limited (Osprey) which has extensive experience of EIAR for offshore wind farms.

The Aviation and Radar Topic-specific Study Area comprises the Potential Turbine Array Infrastructure Zone and a 30 km radius around this zone. This 30 km radius is the recommended consultation zone within the vicinity of an aerodrome with a surveillance radar facility (as defined in Irish Aviation Authority (IAA) Statutory Instrument (S.I.) 215 and the UK Civil Aviation Publication (CAP) 764, a smaller range of 17 km is recommended for a non-radar equipped aerodrome). It is acknowledged that aviation stakeholder input from beyond this initial 30 km radius might be received, and this will be considered further during the assessment to be set out in the EIAR.

6.12.2 Relevant Policy and Guidance

Policies and guidance documents relevant to the Aviation and Radar EIAR topic are detailed below:

Table 6-47 Relevant Policy and Guidance Documents (Aviation and Radar).

Policy / Guidance	Reference	Geographic Coverage
Guidance		
IAA Statutory Instrument (S.I.) 215: <i>Obstacles to Aircraft in Flight</i> .	IAA, 2015	Ireland
The Irish Aeronautical Information Package (IAIP), published by the Aeronautical Information Service (AIS) of the Republic of Ireland (RoI) on behalf of the IAA. It is prepared in accordance with the <i>Standards and Recommended Practices</i>	IAA, 2021	Ireland

Policy / Guidance	Reference	Geographic Coverage
(SARPS) of Annex 15 to the ICAO ¹⁸ Convention on International Civil Aviation and the Aeronautical Information Services Manual (Doc 8126) ¹⁹ .		
IAA S.I. 423 <i>En-route Obstacles to Air Navigation</i> .	IAA, 1999	Ireland
IAA S.I. 266 <i>Standardised Rules of the Air</i> .	IAA, 2019	Ireland
IAA S.I. 72 <i>Rules of The Air Order</i> .	IAA, 2004	Ireland
<i>IAA Aerodrome Licensing Manual</i>	IAA, 2014	Ireland
<i>IAA Aeronautical Services Advisory Memorandum (ASAM) Number 018 Issue 2</i>	IAA, ASAM, 2015	Ireland
European Union Aviation Safety Agency ²⁰ (EASA) <i>Document 923 Safety Instruction Bulletin</i>	EASA, 2021	EU
International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), Recommendation O-139, <i>The Marking of Man-Made Offshore Structures</i> .	IALA, 2021	Global
Eurocontrol <i>Guidelines for Assessing the Potential Impact of Wind Turbines on Surveillance Sensors</i> .	Eurocontrol, 2014	EU
International Civil Aviation Authority (ICAO), Document 8168 Ops/611 <i>Procedures for Air Navigation Services Aircraft Operations (PANS-Ops)</i> .	ICAO, 2006	Global
ICAO Annex 14 <i>Aerodromes Design and Operations contains Standards and Recommended Procedures (SARPs)</i> .	ICAO, 2018	Global
<i>Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects</i> .	DCCAE, 2017	Ireland
CAA Policy and Guidelines on Wind Turbines	Civil Aviation Authority, 2016	UK

The UK Civil Aviation Publication (CAP) 764 (CAA, 2016) is also useful as a guidance reference and will be utilised where relevant to complement IAA S.I. The IAA S.I. extract relevant information from the UK CAA CAPs and republish. In certain circumstances, there is justifiable explanatory omission within the IAA S.I. These omissions can be of relevance for completeness.

¹⁸ ICAO is a United Nations organisation that recommends air traffic standards for over 190 individual countries. Ireland is a member state of ICAO.

¹⁹ <https://www.icao.int/NACC/Documents/Meetings/2014/ECARAIM/REF09-Doc8126.pdf>

²⁰ EASA is the centrepiece of the European Union's strategy for aviation safety. Its mission is to promote the highest common standards of safety and environmental protection in civil aviation. The Agency develops common safety and environmental rules at the European level.

6.12.3 Receiving Environment – Airspace

6.12.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

The receiving environment will be established for the EIAR using variety of aviation industry standard information and charts. The Potential Turbine Array Infrastructure Zone is located within Class G uncontrolled airspace which extends from the surface to Flight Level (FL) 75 (approximately 7,500 feet (ft) above mean sea level (amsl)); and below the Class C Controlled Airspace (CAS) which forms part of the Dublin and Shannon Control Areas (CTAs).

Within Class G airspace, any aircraft can enter and transit the airspace without Air Traffic Controller (ATC) clearance and subject only to a small set of mandatory rules, as stipulated in the [IAA IAIP En-route \(ENR\)](#) Section 1.4-1 Air Traffic Service (ATS) Airspace Classification (IAA, 2021).

Separation from other traffic is not provided but an ATS Flight Information is provided if requested and required. ATC clearance and radio communication is not required. Instrument Flight Rules (IFR)²¹ traffic has no minimum visibility requirement. Visual Flight Rules (VFR)²² traffic has Visual Meteorological Conditions (VMC) minima²³ defined in the [IAA IAIP En-route \(ENR\)](#) Section 1.4-1 Air Traffic Service (ATS) Airspace Classification (IAA, 2021). Within Class C airspace, ATC clearance and continuous two-way communication is required, but separation is not provided between VFR traffic; VFR traffic is expected to remain VMC to allow avoidance of other aircraft, terrain and obstacles.

²¹ Instrument Flight Rules (IFR) are rules which allow properly equipped aircraft to be flown under [Instrument Meteorological Conditions \(IMC\)](#); when the pilot is flying the aircraft in reference to cockpit instruments under weather conditions where visual references are not possible to maintain VFR flight. IFR are detailed in ICAO Annex 2: Rules of the Air, Chapter 5: Instrument Flight Rules and the [IAA S.I. 266 RotA](#).

²² Visual Flight Rules (VFR) - flight is permitted when specific weather conditions permit the pilot to maintain separation from other aircraft, terrain and obstacles dependent on the classification of airspace within which the aircraft is operating.

²³ At and above FL100: 8 km visibility, 1,500 m horizontal and 1000 ft vertical from cloud. Below FL100: 5 km visibility, 1,500 m horizontal and 1,000ft vertical from cloud. Or at and below 3,000ft AMSL or 1,000 ft above terrain, whichever is higher: 5km (3km for flight at IAS 140 kts or less) visibility. Clear of cloud, in sight of surface. Helicopters may be flown below 300 m (1,000 ft) above terrain in flight visibility not less than 1,000 m if manoeuvred at a speed which would give the pilot in command adequate opportunity to observe other traffic or obstacles in good time to avoid collision.

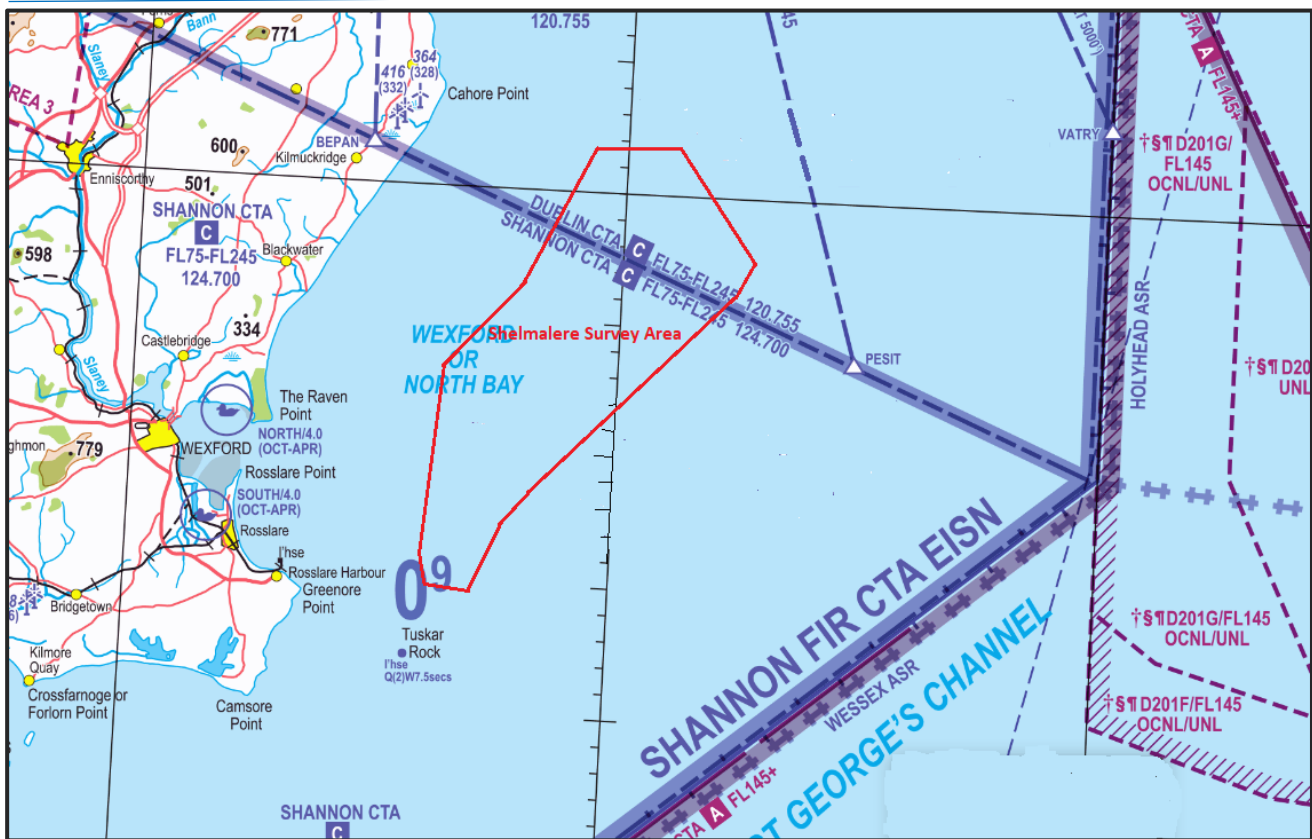


Figure 6-30 Airspace Structure in the vicinity of the Potential Turbine Array Infrastructure Zone

Located above the Class G airspace, Class C CAS of the Dublin and Shannon CTAs, is established from FL 75 up to FL 245 (approximately 24,500 ft) as shown at Figure 6-31. Aircraft in CAS are controlled by ATCs located at the Dublin Area Control Centre (ACC), Shannon ACC and Dublin Airport. Within Class C airspace, all flights are subject to an ATC service with standard separation maintained between aircraft dependent on whether they are flying under Instrument Flight Rules (IFR) or Visual Flight Rules²⁴ (VFR).

Above FL 245, Class C airspace forms the Shannon Upper Terminal (Control) Area (UTA) which is utilised by en-route air traffic flying between Europe and the North Atlantic air routes. Control of these aircraft is provided by the Shannon ACC.

In summary, aircraft operating in the vicinity of Shelmalere Offshore Wind Farm may be in receipt of an ATS. However, within this classification of airspace, pilots are ultimately responsible for their own terrain and obstacle clearance [ENR Section 1.4-1].

6.12.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 6.12.3.1 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the wider assessment process. It should be noted that these data sources are not comprehensive and not intended to provide all the information required for the future assessment of effects. Additional data sources will potentially be identified via consultation related to this EIAR Scoping exercise and over the duration of the EIAR process.

There are no identified data gaps as relevant airspace and user information is available in the IAIP and associated S.I. Therefore, no site-specific surveys are proposed to further characterise the site and/or to inform the assessment of potential aviation/radar impacts in the future EIAR.

6.12.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Aviation and Radar receptors.

There are two main areas of consideration in terms of potential effects of offshore wind farms on aviation stakeholders:

1. Physical Obstruction: WTGs have the potential to present a physical obstruction at or close to an aerodrome or in the low flying environment;
2. Radar/Air Traffic Services (ATS): WTG clutter appearing on a primary radar display has potential to affect the safe provision of an ATS as it can mask unidentified aircraft from the ATC and/or prevent them from accurately identifying and maintaining surveillance of aircraft under control. In some cases, radar reflections from WTGs can affect the performance of the radar system itself.

These potential effects will be assessed within the EIAR via a desk-based study and with reference to the existing evidence base regarding the effects that offshore wind farms have the potential to cause to aviation stakeholders. IAA guidance in terms of wind energy developments in proximity to aviation infrastructure is limited. The UK CAA CAP 764 *Policy and Guidelines on Wind Turbines* (CAA, 2016) contains consultation guidance which is typically applied in the UK. The guidance contained in CAP 764 has been utilised during the preparation of this EIAR Scoping Report.

The types of radar operating over the Potential Turbine Array Infrastructure Zone have been considered, together with civil aviation agencies. These include the IAA who are the main en-route air navigation provider in the Republic of Ireland (RoI), regional airports, offshore airborne Search and Rescue (SAR) and military operations of relevance. These have been assessed to inform the receiving environment as it is set out in this EIAR Scoping Report.

A radar technical effects (Line of Sight (LoS)) analysis between the blade tip height and potentially affected civil and military aviation radar systems will be carried out as part of the EIAR to establish the theoretical detectability of the WTGs to those regional radar systems which have the potential to be affected by their operation. This will be presented as a Technical Appendix of the EIAR.

For each identified receptor, the potential physical obstruction and/or radar effect, and then subsequently the potential operational effects will be considered. The assessment of potential effects in the EIAR, such as those on aerodrome Instrument Flight Procedures (IFP), will consider the orientation of approach and departure flight paths, physical safeguarding of flight, airspace characteristics and flight procedures of the receiving environment. In expanding upon points 1 and 2 above, the specific considerations in terms of potential effects of offshore wind farms on aviation stakeholders include the following:

- a. The potential effects WTGs could have on aviation operations;
- b. Baseline airspace structure environment in the Aviation and Radar Topic-specific Study Area, including aerodrome IFPs;
- c. Potential technical effects of WTGs on regional radar systems (including the radars operated by the Irish Air Corps, IAA and regional civil aerodromes);
- d. Potential effects on Low Flying Activities in the Aviation and Radar Topic-specific Study Area.;
- e. Potential effects on airborne SAR activities in the Aviation and Radar Topic-specific Study Area.;
- f. Location of Shelmalere Offshore Wind Farm relevant to other small littoral airfields within the applicable consultation zones (defined in IAA S.I. 215 and CAP 764).;
- g. Effects not considered previously, and which are identified through aviation stakeholder engagement as part of consultation on this EIAR Scoping Report.
- h. Potential cumulative and transboundary effects to aviation infrastructure and operations due to Shelmalere Offshore Wind Farm.

6.12.5.1 Cumulative and Transboundary Effects

Potential cumulative effects of Shelmalere Offshore Wind Farm will be fully assessed within the future EIAR. The first step in the Cumulative Impact Assessment will be the identification of which residual aviation and radar effects from Shelmalere Offshore Wind Farm have the potential to interact and produce a cumulative effect with other plans, projects and activities ('effect screening'). For example, multiple offshore wind farms located closely together may restrict the area for routine aircraft operations. The second step in the Cumulative Impact Assessment will be the identification of the other plans, projects, and activities which may themselves produce potential aviation and radar effects that may lead to potential cumulative effects with Shelmalere Offshore Wind Farm.

Other plans, projects and activities to be included in the Cumulative Impact Assessment within 100 km (the maximum range where radar cumulative effect may occur) of Shelmalere Offshore Wind Farm (Potential Turbine Array Infrastructure Zone) will be considered with respect to the potential effect of WTGs causing interference on radar systems. Other plans, projects and activities within 40 km of Shelmalere Offshore Wind Farm (Potential Turbine Array Infrastructure Zone) will be considered for the potential effect of creating an obstacle to fixed and rotary wing aircraft operating offshore.

With respect to potential transboundary impacts, based on current understanding, potential impacts on Aviation and Radar receptors are expected to be restricted to areas within Irish waters only, i.e. not on any international territory. No impacts are also expected on any interests of another State, i.e. fishing/shipping which occurs within the Irish EEZ as a result of potential impacts on Aviation and Radar receptors.

Therefore, as there is no pathway for transboundary impacts it is currently proposed to scope out transboundary impacts on Aviation and Radar from consideration in the future EIAR. This will be confirmed via the formal Transboundary Screening exercise that will be undertaken post EIAR Scoping.

6.12.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR with respect to the potential effects on Aviation and Radar receptors.

6.12.5.3 Proposed Consultees

Table 6-48 summarises the proposed consultees for the Aviation and Radar chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 6-48 Key Proposed consultees (Aviation and Radar)

Proposed Consultee	Objective of Consultation
IAA	1. To discuss and agree any WTG operational or technical effects to inform the EIAR including potential mitigation measures
CHC Ireland (CHCI)	1. To discuss and agree any WTG impacts on SAR operations to inform the EIAR including potential mitigation measures
Dublin Airport	1. To discuss and agree any WTG operational or technical impacts to inform the EIAR including potential mitigation measures
Newcastle Aerodrome	1. To discuss and agree any WTG operational or technical impacts to inform the EIAR including potential mitigation measures
Department of Defence (Irish Air Corps and Garda)	1. To discuss and agree any WTG operational or technical impacts to inform the EIAR including potential mitigation measures
Casement (Baldonnell) Aerodrome	1. To discuss and agree any WTG operational or technical impacts to inform the EIAR including potential mitigation measures
Met Éireann	1. To discuss and agree any WTG technical impacts on meteorological radar to inform the EIAR including potential mitigation measures
NATS	1. To discuss and agree any WTG operational transboundary or technical impacts to inform the EIAR including potential mitigation measures

6.12.6 Potential Impacts to be Assessed within the EIAR

Table 6-49 outlines the potential impacts on Aviation and Radar receptors which may arise within the Aviation and Radar Topic-specific Study Area as a result of the proposed Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out above. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-49 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Aviation and Radar)

Potential Impact	Project Phase where Impacts May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Physical Aeronautical Obstruction The physical, vertical and geographical, presence, during construction, operation and decommissioning, of WTGs has potential to present an obstruction in the airspace to aircraft. The Aviation and Radar assessment in the EIAR will be informed by the findings from engagement / consultation with the aviation stakeholders listed in Section 6.11.5.1. of this EIAR Scoping Report.	Yes	Yes	Yes	In
Technical Effect – Radar and Air Traffic Services (ATS) The presence, when operational, of radar detectable WTGs which potentially present electromagnetic interference effects to aviation radar. The Aviation and Radar assessment in the EIAR will be informed by the findings of a radar LoS study (including aeronautical navigational aids and meteorological radar) in the southeast of RoI.	No	Yes	No	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

6.12.7 EIAR Scoping Questions

The following questions are designed to assist the stakeholder in providing feedback to the EIAR Team on the Aviation and Radar topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Aviation and Radar chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Aviation and Radar Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Aviation and Radar chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR Team have regard to in the preparation of the Aviation and Radar chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Aviation and Radar chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.13 CHAPTER 13: COASTAL AND MARINE INFRASTRUCTURE AND OTHER USERS

6.13.1 Introduction

This chapter of the EIAR will outline the potential effects of Shelmalere Offshore Wind Farm on Coastal and Marine Infrastructure and Other Users. This chapter of the EIAR Scoping Report sets out the methodology and approach to be taken to assessing these effects within the future EIAR and includes the following:

- A list of legislation, policy and guidance documents relevant to the Coastal and Marine Infrastructure and Other Users topic;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area;
- The methodology proposed to be used within the future EIAR to assess potential impacts on Coastal and Marine Infrastructure and Other Users;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the future EIAR for Coastal and Marine Infrastructure and Other Users;
- Potential surveys proposed to inform the EIAR for Coastal and Marine Infrastructure and Other Users;
- A summary of potential impacts on this receptor group that will be fully assessed within the future EIAR.

This chapter of the EIAR Scoping Report has been completed by MarineSpace which has extensive experience of this topic from previous offshore wind farm EIAs (EIARs).

The Coastal and Marine Infrastructure and Other Users Topic-specific Study Area is defined as a 25 km radius from the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone. This is the approximate distance over which far-field impacts may arise, based on analysis of tidal ellipses (see Volume 2A; Chapter 1 Marine Processes).

6.13.2 Relevant Policy and Guidance

Policies and guidance documents relevant to the Coastal and Marine Infrastructure and Other Users EIAR topic are detailed in Table 6-50.

Table 6-50 Relevant Policy and Guidance Documents (Coastal and Marine Infrastructure and Other Users)

Policy / Guidance	Reference	Geographic Coverage
Policy		
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
Guidance		
Guidelines on the information to be contained in Environmental Impact Assessment Reports	EPA, 2017	Ireland

Policy / Guidance	Reference	Geographic Coverage
Proximity of Offshore Renewable Energy Installation and Submarine Cable Infrastructure in UK waters	ESCA, 2016	UK and Ireland
OSPAR - Guidance on Environmental Considerations for Offshore Wind Farm Development.	OSPAR, 2008	UK and Ireland
Cumulative Impact Assessment Guidelines - Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms	Renewable UK, 2013	UK
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	DCCAE, 2017	Ireland
Decommissioning of Offshore Renewable Energy Installations: Guidance Notes for Industry.	BEIS, 2019	UK

Specific policy and guidance for certain other users, including as Aviation and Radar (Chapter 12) and Shipping and Navigation (Chapter 10), are considered in detail within those chapters within this EIAR Scoping Report.

6.13.3 Receiving Environment

6.13.3.1 Data Sources used for EIAR Scoping Report and to be used for EIAR

The receiving environment will be established for the EIAR using the following data sources:

- Marine Institute Open Access Repository and Ireland's Marine Atlas;
- European Marine Observation and Data Network (EMODnet);
- Kingfisher Information Services (KIS)-ORCA.;
- Wales Marine Planning Portal (Welsh Government, 2022);
- Marine Management Organisation Interactive Map (MMO,2022) ;
- Environmental Impact Assessment Report (EIAR) and EIAR Scoping Reports including those for Arklow Bank Phase 2 OWF, Greenlink Interconnector, Celtic Interconnector, Phase 1 OWF projects and Arklow Wastewater Treatment Plan EIAR;
- The Crown Estate Marine Data Exchange;
- DHLGH Foreshore Unit Applications.

Figure 6-32 identifies the range of coastal and marine infrastructure and other user activity in the Topic-specific Study Area, as described further within this Section.

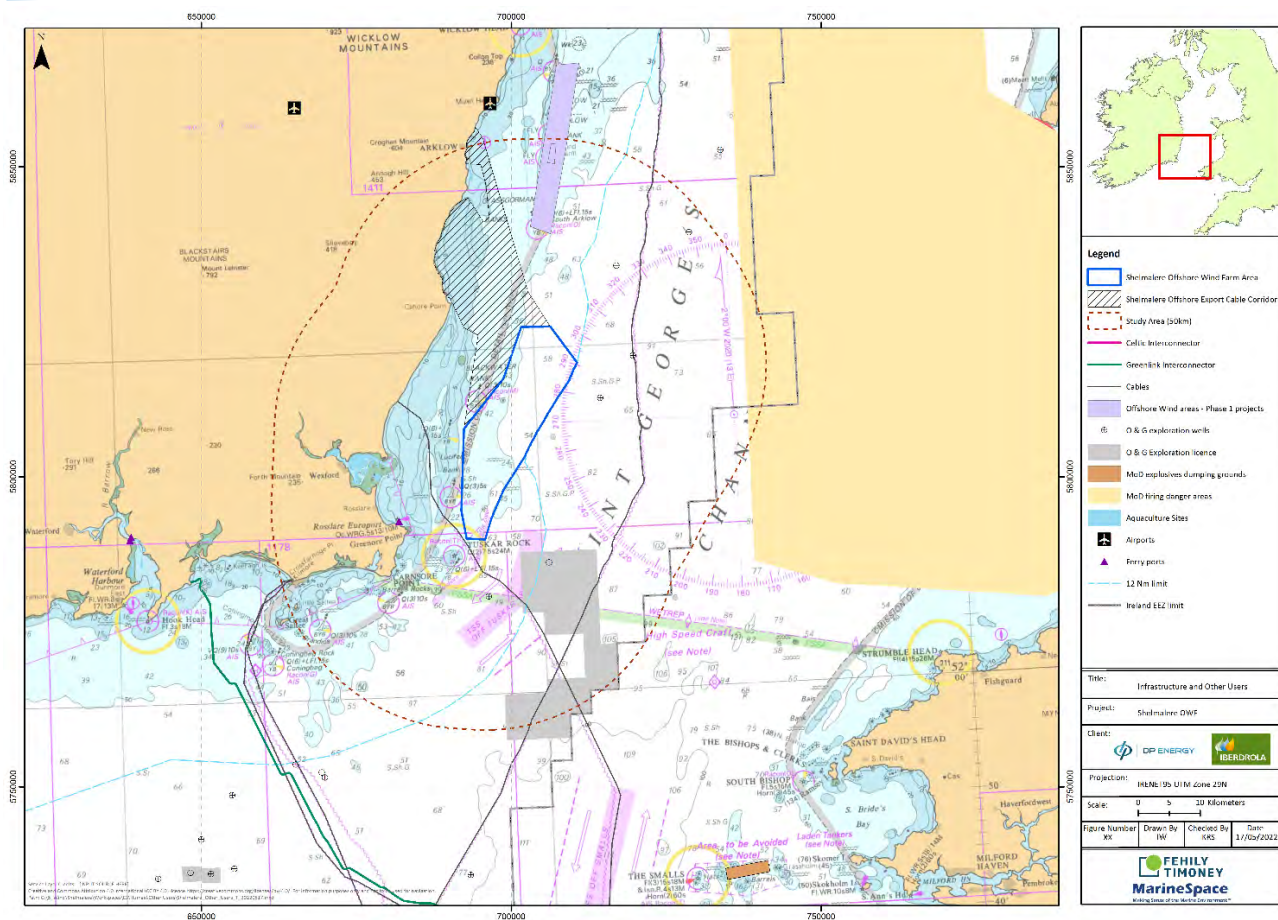


Figure 6-31 Coastal and Marine Infrastructures and Other Users Topic-specific Study Area and receptors

6.13.3.2 Defence and Military Activity and Unexploded Ordnance (UXO)

There are no known defence or military activities within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area. Within UK waters of the Irish Sea, there are a number of Ministry of Defence (MoD) activity areas. These include:

- Aberporth Firing Danger Area, which is located 26.5 km from the Potential Turbine Array Infrastructure Zone. This Danger Area covers the majority of Cardigan Bay and provide an area for testing and evaluation of military ordnance, munitions and explosives (RPS, 2010);
- An explosives dumping ground, is located approximately 65 km from the Turbine Array Infrastructure Zone. The explosive dumping group is located off the Welsh coast, to the east of Skomer Island and is categorised as “no longer in use”.

Whilst there is a possibility that munitions and UXOs may have dispersed from the original explosive dumping ground and within the danger area due to marine physical processes, it is likely that the greatest concentrations will remain at or close to the original dumping site, with decreasing chance of encountering munitions at increased distance from the site.

6.13.3.3 Marine Disposal Sites

A review of the EPA Dumping at Sea permits site (<https://epawebapp.epa.ie/terminalfour/DaS/index.jsp>) provided the following information with respect to marine disposal sites within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area. There are two active disposal sites (S0027-01; S0016-01) and nine inactive sites. Of the two active sites, S0016-01 is closest to Shelmalere Offshore Wind Farm, being located 4.5 km from the Potential Turbine Array Infrastructure Zone.

Table 6-51 Summary of marine disposal sites within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area

Permit No.	Permit End Date	Active / Inactive	Dump Material	Distance to Potential Turbine Array Infrastructure Zone	Distance to Potential Export Cable Corridor Infrastructure Zone
S0027-01	31/05/2025	Active	Dredge Material	27.3 km	8.8 km
33	30/09/1984	Inactive	Dredge Material	30.4 km	Within
S0002-01	1 year from date of commencement	Inactive	Dredge Material from harbour	30.4 km	Within
274	01/01/1996	Inactive	Dredged Material	30.6 km	Within
S0016-01	8 years from the date of commencement	Active	Dredged Material from Maintenance Dredging	4.5 km	12.3 km
257	31/12/1997	Inactive	Fish Waste	4.8 km	19.5 km
175	31/12/1993	Inactive	Whelk Shells	5.5 km	19.7 km
213	31/03/1995	Inactive	Dredged material	12.3 km	18.6 km
100	03/08/1989	Inactive	Dredged material	12.4 km	18.5 km
61	31/07/1986	Inactive	Dredged material	12.5 km	18.6 km
198	31/01/1995	Inactive	Dredged Material	12.6 km	16.1 km

6.13.3.4 Ports and Harbours

There are a limited number of ports and harbours located within the Topic-specific study area. Rosslare Europort is one of Ireland's busiest ports due to its geographic position in the southwest of the country, providing good access routes to the UK and mainland Europe. Around 810,000 passengers use the port per annum, with 56 round trips to the UK and 30 round trips to mainland Europe every week (Rosslare Europort, 2022). Rosslare Europort is located within the boundary of the Topic-specific study area, 10.1 km to the southwest of the Potential Turbine Array Infrastructure Zone.

Other local ports and harbours include Arklow, Wexford and Courtown. Arklow Harbour is situated at the mouth of the Avoca River, approximately 31 km from the Potential Turbine Infrastructure Zone and 0.6 km from the Potential Export Cable Corridor Infrastructure Zone.

The harbour has an active fishing sector, with fish catches including whelks, herring and mussels. There are also two marinas based in this area, one privately owned and operated, and one owned and operated by the Local Authority.

Wexford Harbour is located at the mouth of the River Slaney, approximately 21.2 km from the Potential Turbine Infrastructure Zone and 20.5 km from the Potential Export Cable Corridor Infrastructure Zone. It is used on a commercial basis by local fishing vessels and on an amenity level by recreational craft.

Courtown Harbour is situated approximately 18.5 km from the Potential Turbine Infrastructure Zone and 0.2 km from the Potential Export Cable Corridor Infrastructure Zone. Similarly to Wexford Harbour, it is used on a commercial basis by local fishing vessels and on an amenity level by recreational craft.

The potential effects on shipping and navigation (including that associated with the ports and harbours above) that may arise from Shelmalere Offshore Wind Farm are detailed further in Chapter 7.

6.13.3.5 Subsea Cables

Two existing subsea telecommunications cables are located within the Topic-specific Study Area:

- UK-Ireland 2 Telecom; located 0.6 km to the south of the Potential Turbine Array Infrastructure Zone;
- Hibernia Atlantic submarine cable; located 9.1 km to the east of the Potential Turbine Array Infrastructure Zone.

The export cable for Arklow Bank Phase 1 OWF passes through the Potential Export Cable Infrastructure Zone (see Figure 6-32).

There are two planned interconnectors in the south and southeast of Ireland that lie outside the Coastal and Marine Infrastructures and Other Users Topic-specific Study Area. However, these are referred to below for completeness as they may feature in the cumulative effect assessment for certain EIAR topics:

- Greenlink, a 500 MW capacity interconnector between Ireland (Wexford) and Wales (Pembrokeshire) which has obtained all necessary permits and consents. Construction and installation of Greenlink is due to commence in 2022 and the interconnector is anticipated to be commissioned in 2024 (Greenlink, 2019). Greenlink will be located approximately 13.3km from the boundary of the Coastal and Marine Infrastructures and Other Users Topic-specific Study Area and 44 km, in a straight line, from the Potential Turbine Array Infrastructure Zone.
- Celtic Interconnector, which will connect Ireland and France. Celtic Interconnector will have a capacity up to 700 MW, with a HVDC subsea cable spanning approximately 500 km (Wood, 2021). On the Irish side, the Celtic Interconnector will make landfall at Claycastle Beach, County Cork.

The Celtic Interconnector is located 87 km from Coastal and Marine Infrastructures and Other Users Topic-specific Study Area and 118 km from the Potential Turbine Array Infrastructure Zone at its closest point.

6.13.3.6 Oil and Gas Extraction

There are no existing or proposed oil and gas extraction infrastructure or activities within the boundary of the Potential Turbine Array and/or Potential Export Cable Corridor Infrastructure Zones.

There are several oil and gas explorations wells within the Coastal and Marine Infrastructures and Other Users Topic-specific Study Area, the closest being 5.7 km from the Potential Turbine Array Infrastructure Zone and 14.3 km from the Potential Export Cable Corridor Infrastructure Zone. All the exploration wells located in this region are plugged and abandoned, with no live wells.

One active oil and gas exploration licence is in place approximately 6 km to the southeast of the Potential Turbine Array Infrastructure Zone. The exploration licence is held by Providence Resources P.L.C, an Irish based oil and gas energy company.

In February 2021, The Minister for the Environment, Climate and Communications, obtained Cabinet approval to introduce legislation to ban licences for new oil and natural gas exploration.

6.13.3.7 Other Offshore Renewable Energy Projects

Currently, there is much interest in the development of OWFs around the coast of Ireland due to the good wind resource conditions and renewable energy targets set within the Irish Programme for Government (Department of the Taoiseach, 2020) of at least 5 GW offshore wind deployment by 2030.

The new marine planning and licensing regime introduced through the Maritime Area Planning Act 2021 enables certain proposed OWFs, termed “relevant projects” or “Phase One” projects to be invited to apply for a Maritime Area Consent (MAC) in from April 2022.

There is one Phase One project located within the Coastal and Marine Infrastructures and Other Users Topic-specific Study Area, namely Arklow Bank Phase 2, being developed by RWE. The proposed project will contain up to 76 WTGs, up to two offshore substations, inter-array cables and up to two offshore export cables (RPS, 2020). Arklow Bank Phase 2 is expected to be operational in 2028 and generate up to 800 MW. The proposed Arklow Bank Phase 2 site is located 16 km to the north of the Potential Turbine Array Infrastructure Zone and 3.4 km north of the Potential Export Cable Corridor Infrastructure Zone.

There is one operational OWF to the north of Shelmalere Offshore Wind Farm, this being Arklow Bank Phase 1. Arklow Bank Phase 1 completed construction in 2004 and comprises of seven WTG with a total capacity of 25.2 MW (SSE, 2022). The Arklow Bank Phase 1 site is located 26.5 km to the north of the Potential Turbine Array Infrastructure Zone and 8.94 km north of the Potential Export Cable Corridor infrastructure Zone.

Whilst there are other proposed OWFs located within the Coastal and Marine Infrastructures and Other Users Topic-specific Study Area, there is currently limited information or details of these projects so they have not been included within the receiving environment section of this EIAR Scoping Report.

No wave or tidal stream renewable energy projects are located within the topic-specific study area.

6.13.3.8 Aquaculture

There are multiple aquaculture sites located within the topic-specific study area. In particular, there are a number of facilities within Wexford Harbour, which is located 12.1 km to the east of the Turbine Array Infrastructure Zone. The aquaculture licence applications and activities within Wexford Harbour are primarily for mussels. Mussels within the Slaney Estuary are considered to be an important source of mussel spat for seed beds within the Wexford Harbour area (Emerald Marine, 2021).

6.13.3.9 Recreation and Tourism

There are many recreational sailing routes within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area. Details of these are provided in the Shipping and Navigation Chapter. A number of recreational clubs who utilise the sea area within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area are also located in the ports and harbours listed above. These include Arklow Sailing Club, Arklow Harbour Sea Angling Club, Arklow Sea Scouts and the Arklow Rowing Club; Wexford Harbour Boat and Tennis Club, Menapia Sea Angling Club, Ferrycarrig Rowing Club; Courtown Sailing Club.

A number of beaches exist within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area that will support amenity and tourism activities, including water-based activities such as swimming, kayaking, paddle-boarding, typically within 500 m of the beach. Two designated bathing waters lie within the boundary of the Potential Export Cable Corridor Infrastructure Zone: Ballymoney North Beach and Courtown North Beach (see Marine Water and Sediment Quality chapter for more details).

Boat-based recreational sea angling will also take place within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area.

6.13.4 Potential Additional Data and Proposed Surveys

The data sources listed above are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

Beyond ongoing consultation as detailed above, no specific surveys are proposed to inform this EIAR topic.

6.13.5 Proposed EIAR Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the future EIAR to assess potential effects of Shelmalere Offshore Wind Farm on Coastal and Marine Infrastructure and Other Users receptors.

Potential effects on Coastal and Marine Infrastructure and Other Users will be assessed within the EIAR using the standard EIA Methodology set out in Section 4.4.

The assessment will consider the potential for effects during the construction, operation and decommissioning phases of Shelmalere Offshore Wind Farm. Potential effects will be defined as:

- Direct effects: these may arise from impacts associated with the construction, operation or decommissioning of The Project.
- Indirect effects: these may be experienced by a receptor that is removed (e.g. in space or time) from the direct effect.
- Cumulative effects: these may occur as a result of The Project in conjunction with other existing or planned projects within the Coastal and Marine Infrastructure and Other Users Topic-specific Study Area for each receptor.

The assessment process will also rely heavily on targeted consultation with key stakeholders, such as the asset owners of existing subsea cables, local port operators and potential offshore wind farm developers.

6.13.5.1 Cumulative and Transboundary Effects

With respect to how potential cumulative effects will be assessed within the future EIAR, a key first stage will be to develop and agree (via consultation) an initial list of other plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm in a Cumulative Impact Assessment. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), aquaculture projects, subsea cable projects, maintenance and capital dredging schemes and coastal defence works. As additional plans, projects and activities will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the Cumulative Impact Assessment to be included in the EIAR fully considers other developments.

Once the other plans, projects and activities to be included in the Cumulative Impact Assessment of the EIAR have been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on Coastal and Marine Infrastructure and Other Users, will be collated and reviewed. These details will then be assessed in the context of project-specific potential effects associated with Shelmalere Offshore Wind Farm and an assessment of potential cumulative effects will be carried out.

With respect to potential transboundary impacts, based on current understanding, potential impacts on Coastal and Marine Infrastructure and Other Users receptors are expected to be restricted to areas within Irish waters only, i.e. not on any international territory. No impacts are also expected on any interests of another State, i.e. fishing/shipping which occurs within the Irish EEZ as a result of potential impacts on Coastal and Marine Infrastructure and Other Users receptors. Therefore, as there is no pathway for transboundary impacts it is currently proposed to scope out transboundary impacts on Coastal and Marine Infrastructure and Other Users from consideration in the future EIAR. This will be confirmed via the formal Transboundary Screening exercise that will be undertaken post EIAR Scoping.

6.13.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the receiving environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to Shelmalere Offshore Wind Farm will be assessed in the future EIAR with respect to the potential effects on Coastal and Marine Infrastructure and Other Users receptors.

6.13.5.3 Proposed Consultees

Table 6-52 summarises the proposed consultees for the Coastal and Marine Infrastructure and Other Users chapter of the future EIAR. It is proposed that these will be consulted via issue of this EIAR Scoping Report and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 6-52 Proposed consultees (Coastal and Marine Infrastructure and Other Users)

Proposed Consultee	Objective of Consultation
Department of Defence	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures that may be required with respect to military practice and exercise areas.
Rosslare Europort	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures that may be required with respect to port activities.
Department of Agriculture, Food and the Marine	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures that may be required with respect to any existing or planned aquaculture activities.
UK-Ireland 2 Telecom Operator	<ol style="list-style-type: none"> 1. To identify and discuss potential data collection that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures that may be required with respect to subsea cable activities.
Recreational Sailing Groups (Irish Sailing, Irish Cruising Club, Irish Cruising Association)	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures that may be required with respect to recreational sailing. Note that this consultation will be led by the specialist Shipping and Navigation Consultant (NASH) and will form part of the NRA process.
Various Commercial Fishing Organisations	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures may be required with respect to commercial fishing activities. Note that this consultation will be led by the

Proposed Consultee	Objective of Consultation
	Developer's Fisheries Liaison Officer (FLO) in the primary context of the Commercial Fisheries EIAR topic.
Sea Fisheries Protection Authority	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures may be required with respect to fishing and aquaculture activities. Note that this consultation will be led by the Developer's Fisheries Liaison Officer (FLO) in the primary context of the Commercial Fisheries EIAR topic.
Inland Fisheries Ireland	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures may be required with respect to recreational sea angling.
Wicklow County Council	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures may be required with respect to coastal activities.
Wexford County Council	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures may be required with respect to coastal activities and Wexford, Arklow and Courtown Harbours.
Environmental Protection Agency	<ol style="list-style-type: none"> 1. To identify and discuss potential data that could inform the coastal and marine infrastructure and other users EIAR. 2. To discuss potential mitigation measures may be required with respect to any marine disposal/dumping at sea activities/permits.

6.13.6 Potential Impacts to be Assessed within the EIAR

A range of potential impacts on Coastal and Marine Infrastructure and Other User receptors have been identified which may occur during the construction, operation and decommissioning phases of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential impacts will be assessed within the EIAR is set out above. This process is aimed at delivering a proportionate approach to the EIAR. Where experience and available evidence indicates an effect-receptor pathway will not lead to a potential significant effect with regards to the EPA EIAR Guidelines (2022), the pathway is proposed to be scoped out from future assessment within the EIAR.

Table 6-53 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Coastal and Marine Infrastructure and Other Users)

Potential Impact	Project Phase where Impact May Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Military Activities Disruption to existing military activities within the region and surrounding area, particularly Aberporth. Although a significant distance from The Project, there may be potential for interaction depending on the port base selected for construction, operation and decommissioning	Yes	Yes	Yes	In
Unexploded Ordnance (UXO) Interaction with UXO has potential to cause risk to life/human health and damage to ecological receptors	Yes	No	Yes	In
Interactions with ports and harbours Disruptions to routine port operations via project related activities.	Yes	Yes	Yes	In
Subsea Cables Damage to existing cables, including the Arklow Bank offshore wind farm export cable which passes through the Potential Export Cable Corridor Infrastructure Zone.	Yes	Yes	Yes	In
Oil and Gas Operations Potential impacts and disruption to licenced oil and gas exploration operations.	Yes	Yes	Yes	In
Other Offshore Renewable Energy Projects Potential interaction with planned offshore renewable energy projects planned within the region	Yes	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

6.13.7 EIAR Scoping Questions

The following questions are designed to assist the stakeholder in providing feedback to the EIAR Team on the Coastal and Marine Infrastructure and Other Users topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Coastal and Marine Infrastructure and Other Users chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Coastal and Marine Infrastructure and Other Users Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should the EIAR Team have regard to in the preparation of the Coastal and Marine Infrastructure and Other Users chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should the EIAR team have regard to in the preparation of the Coastal and Marine Infrastructure and Other Users chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects that you believe could be significant and which you wish to see assessed in the Coastal and Marine Infrastructure and Other Users chapter of the EIAR for Shelmalere Offshore Wind Farm?

6.13.8 References

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<http://lle.gov.wales/apps/marineportal/#lat=52.5145&lon=-3.9111&z=8&tgt=false>

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6.14 CHAPTER 14: OFFSHORE AIR QUALITY AND CLIMATE

6.14.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential effects of Shelmalere Offshore Wind Farm on Offshore Air Quality and Climate.

This chapter of the EIAR Scoping Report has been completed by MarineSpace.

6.14.2 Receiving Environment

Exhaust emissions from vessels associated with Shelmalere Offshore Wind Farm will be the main source of offshore atmospheric emissions. The main pollutants associated with vessel emissions are:

- Nitrogen oxides (NO_x);
- Particulate matter (PM);
- Sulphur Dioxide (SO₂)

Regulations are in place to reduce vessel emissions under Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL). A recently revised version of Annex VI of MARPOL introduced a global measure in January 2020 that requires a more stringent limit on the amount of sulphur found in fuel. This is known as “IMO 2020” and requires fuel to contain a mass of no more than 0.5% sulphur. Vessels operating within the Celtic Sea are required to comply with the IMO 2020 limit.

In the offshore environment there are few human receptors, and ecological marine receptors are considered to be unlikely to be exposed to impacts from air pollution. Therefore, receptors are limited to any residential areas along the shoreline, or terrestrial designated sites.

6.14.3 Potential Impacts

Potential impacts on Offshore Air Quality receptors have been identified which may occur during the construction, operation and decommissioning phases of Shelmalere Offshore Wind Farm. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

Table 6-54 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Offshore Air Quality and Climate)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Impacts of emissions from vessels on human receptors Increased vessel movement due to the Shelmalere offshore wind farm has the potential to increase emissions, however in the context of the vessels already present in the area this increase would be a small percentage and would therefore result in a negligible increase in emissions. Vessel movements will be intermittent and of short duration. Additionally, the majority of the works associated with construction, operation and decommissioning will take place offshore and are unlikely to interact with any human receptors.	No	No	No	Out
Impacts of emissions from vessels on ecological receptors Increased vessel movement due to the Shelmalere offshore wind farm has the potential to increase emissions, however in the context of the vessels already present in the area this increase would be a small percentage and would therefore result in a negligible increase in emissions. Vessel movements will be intermittent and of short duration. Additionally, the majority of the works associated with construction, operation and decommissioning will take place offshore and are unlikely to interact with any ecological receptors.	No	No	No	Out
Cumulative effects	No	No	No	Out
Transboundary effects	No	No	No	Out

6.14.4 Cumulative and Transboundary Effects

No impacts are predicted on Offshore Air Quality and Climate. Therefore, it is currently proposed to scope out cumulative and transboundary impacts on Offshore Air Quality and Climate from consideration in the future EIAR.

6.14.5 Summary

Vessels involved in the construction, operation and decommissioning phases of Shelmalere Offshore Wind Farm will produce emissions that have the potential to create emissions that may affect air quality in the offshore environment. However, the scale of such emissions will be negligible when compared to similar, daily emissions from existing shipping and other marine craft (including fishing vessels) in this part of the Irish Sea. They will also be intermittent and of short-duration, i.e. during the main construction phase, then during ongoing maintenance activities.



There is also a lack of relevant sensitive receptors to such air quality impacts in the offshore environment. Therefore, potential impacts on Offshore Air Quality and Climate are proposed to be scoped out of the EIAR.

6.15 Chapter 15 Offshore Airborne Noise

6.15.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential effects of Shelmalere Offshore Wind Farm on Offshore Airborne Noise.

This chapter of the EIAR Scoping Report has been completed by MarineSpace

6.15.2 Receiving Environment

There are two main sources of noise associated with the offshore environment:

- Natural noise – this is generated by natural systems such as wind, waves, and precipitation; and
- Anthropogenic noise – this is generated by human sources such as vessel traffic and other offshore users (e.g. oil and gas).

In the offshore environment there are few human receptors, and ecological marine receptors are assessed within Chapter 3: Underwater Noise and Vibration. Therefore, receptors are limited to any residential areas along the shoreline, or terrestrial designated sites.

6.15.3 Potential Impacts

Potential impacts on Offshore Airborne Noise receptors have been identified which may occur during the construction, operation and decommissioning phases of Shelmalere Offshore Wind Farm. The main sources of noise would be from increased vessel activity, cable laying and foundation installation and subsequent operation and maintenance of infrastructure. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

Table 6-55 Potential impacts (by project phase) to be assessed within/scoped out of the EIAR (Offshore Airborne Noise)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Impacts of offshore airborne noise from vessels on human receptors Activities producing offshore noise will be intermittent and of short duration. Additionally, the distance offshore of the works means that it is unlikely that there will be any impact on any onshore human receptors.	No	No	No	Out
Impacts of offshore airborne noise from vessels on ecological receptors Activities producing offshore noise will be intermittent and of short duration. Additionally, the distance offshore of the works means that it is unlikely that there will be any impact on any onshore ecological receptors.	No	No	No	Out
Cumulative effects	No	No	No	Out
Transboundary effects	No	No	No	Out

6.15.4 Cumulative and Transboundary Effects

No impacts are predicted on Offshore Airborne Noise. Therefore, it is currently proposed to scope out cumulative and transboundary impacts on Offshore Airborne Noise from consideration in the future EIAR.

6.15.5 Summary

Activities undertaken in the construction, operational and decommissioning phases of Shelmalere Offshore Wind Farm, such as piling of foundations and cable installation, have the potential to increase airborne noise within the Potential Turbine Array and/or Potential Export Cable Corridor Infrastructure Zones. Potential impacts on onshore receptors, including local residents/coastal users will be assessed and presented within the Onshore Noise and Vibration Chapter. Potential impacts on offshore receptors, in particular marine mammals, fish, birds and invertebrates, will be assessed fully in the respective chapters of the EIAR.

Details of the proposed approach to these assessments are presented in the following Offshore chapters of this EIAR Scoping Report: Chapter 3: Underwater Noise and Vibration; Chapter 5: Marine Mammals and Reptiles; Chapter 8: Fish and Shellfish Ecology; and Chapter 6: Offshore Ornithology. Therefore, potential impacts on Offshore Airborne Noise are proposed to be scoped out of the EIAR.

7 VOLUME 2B ONSHORE CHAPTERS ENVIRONMENTAL CONSIDERATION

7.1 CHAPTER 1: LAND, SOILS AND GEOLOGY

7.1.1 Introduction

This chapter of the EIAR will address the potential effects of Shelmalere Offshore Wind Farm on Land, Soils and Geology receptors and sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Land, Soils and Geology;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Land, Soils and Geology Topic specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Land, Soils and Geology chapter of the EIAR is based on the expert judgement of FT and precedents from previous projects in Ireland of this nature and scale. The Land, Soils and Geology Topic specific Study Area is the Potential Onshore Infrastructure Zone shown in Figure 1-1. However the Land, Soils and Geology Topic specific Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process. For example, the study area for onshore buried grid connection cables will encompass an overall minimum corridor width of 500m, i.e. a minimum of 250m from the centre line of a cable route alignment.

The chapter of the EIAR Scoping Report deals with potential effects on terrestrial Land, Soils and Geology only. Potential effects on the marine environment are set out in Section 7.1, Chapter 1: Marine Geology, Oceanography and Physical Processes of the EIAR Scoping Report.

7.1.2 Relevant Policy and Guidance

The assessment in the EIAR shall comply with guidance relevant to the design and acquisition of data, standards in terms of data quality and coverage of both the baseline and assessment in the EIAR for land, soils and geology, as presented in Section 4.3.1. of this EIAR Scoping Report.

In addition, key relevant policy and guidance that will inform the EIAR are set out in Table 7-1 below:

Table 7-1 Relevant Policy and Guidance Documents (Land, Soils and Geology)

Policy / Guidance	Reference	Geographic Coverage
Policy		
Waste Management Act (1996-2020)111 and associated Waste Management Regulations	111, 1996	Ireland
Guidance		
Institute of Geologists of Ireland (IGI). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements	IGI, 2013	Ireland
National Roads Authority (NRA). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes	NRA, 2008	Ireland

7.1.3 Receiving Environment

7.1.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

Baseline information to establish the receiving environment for the Land, Soil and Geology chapter of the EIAR will comprise a description of existing land use, soil cover, subsoil deposits and geological formations within the Potential Onshore Infrastructure Zone. Baseline information on historic and proposed project specific ground investigations that will be undertaken to inform the EIAR will also be presented, together with information about geological heritage and aggregate potential.

Baseline information to establish the receiving environment to inform the Receiving Environment section of the Land, Soil and Geology chapter of the EIAR will be obtained from:

- GSI Bedrock Geology mapping (www.gsi.ie);
- GSI Quaternary subsoil mapping (www.gsi.ie);
- GSI Physiographic data (www.gsi.ie);
- GSI Mineral localities (www.gsi.ie);
- GSI Groundwater karst data (www.gsi.ie);
- GSI Aggregate Potential Mapping (www.gsi.ie);
- GSI geotechnical borehole records (www.gsi.ie);
- Historic landfills (Wicklow and Wexford County Councils);
- Teagasc / EPA Soil and Subsoil mapping (www.gsi.ie and <https://gis.epa.ie/EPAMaps/>);
- Irish Soils Information System (www.teagasc.ie/soils);
- Irish Geological Heritage (IGH) Programme - GSI (www.gsi.ie);
- Historical Ordnance Survey Ireland (OSi) mapping to establish historical development patterns and former land uses (www.geohive.ie and www.gsi.ie);

- Historical geological field maps held by Geological Survey of Ireland (GSI);
- Available aerial photography such as flyover survey photography from a drone or aeroplane, and satellite imagery;
- OPW Report on 'Irish Coastal Protection Strategy (ICPSS) - Phase 2 (Southeast Coast);
- Review of any project specific geotechnical investigation (GI) / service trench data, geological cross-sections and soil quality data sourced as part of the project design process;
- Wicklow County Development Plan 2022-2028 (www.wicklow.ie);
- Draft Wexford County Development Plan 2022-2027 (www.wexfordcoco.ie);
- Field walkovers / inspections; and,
- Consultation.

7.1.3.2 Overview of the Receiving Environment

Much of the onshore infrastructure associated with Shelmalere Offshore Wind Farm and located within the Potential Onshore Infrastructure Zone (See Section 3.4 Project Description and Figure 1-1) is expected to run through largely undeveloped agricultural lands and along public roads.

However, a portion of the works could potentially be situated in and around urban and urban fringe environments, such as the areas of Arklow, Gorey, Courtown and Enniscorthy (as well as a number of smaller towns and villages), where some of the available land has been subject to prior development, principally housing, commercial and industrial with attendant transport infrastructure, and amenity areas.

Three existing electrical substations are located within the onshore infrastructure zone at Arklow, Lodgewood and Great Island. The underground grid connection cabling is expected to consist entirely of underground cable running through a combination of public and private lands. These underground cables may run parallel to or cross existing public roads within the Potential Onshore Infrastructure Zone. The proposed onshore works may also potentially cross the Dublin to Rosslare main rail line, which runs between Arklow and Wexford Town and traverses the Potential Onshore Infrastructure Zone.

Geomorphology

The geomorphology of the Potential Onshore Infrastructure Zone has been affected by the last two glaciation events in Ireland, shaping much of the region's landscape. The main geomorphological features present are a complex and pervasive network of meltwater channels, which are found across much of the Potential Onshore Infrastructure Zone. Other notable features include glaciofluvial terraces along the Bann and Slaney rivers between Camolin and Enniscorthy which are synonymous with mapped gravel deposits.

The topography of the Potential Onshore Infrastructure Zone ranges from mountainous to hill along the north-western edge to flat gently undulating terrain and rolling lowland moving south. As a result, landslide geohazards are not expected to be a major constraint with the exception of some localised steeper upland areas and along portions of the coast, where cliffs and bluffs may be present.

Soil and Subsoil Geology

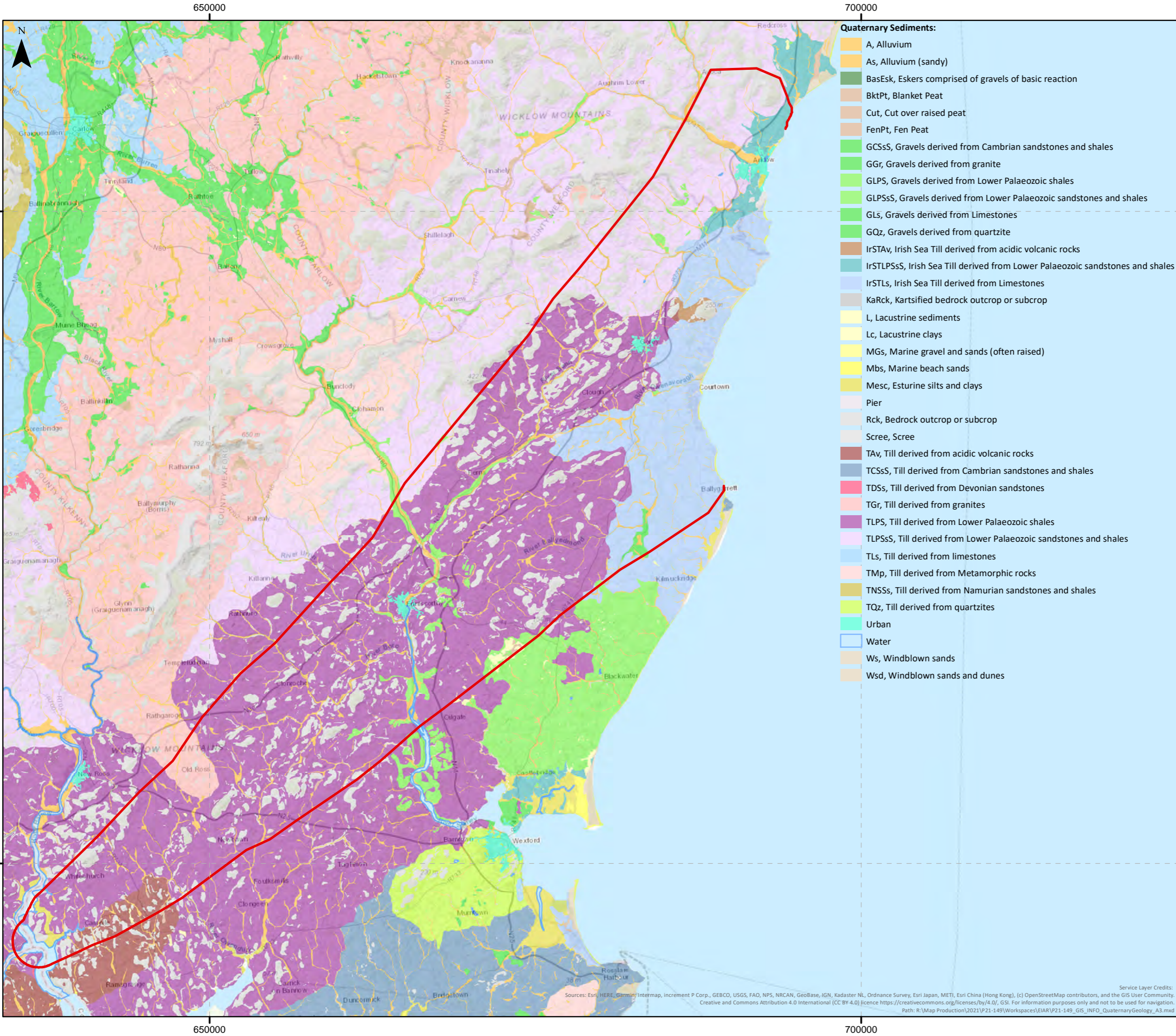
Soil mapping (Teagasc) indicates that much of the Potential Onshore Infrastructure Zone is underlain by poorly drained strata comprising acidic soils derived from lower Palaeozoic rocks and basic soils derived from calcareous parent material. Localised alluvial soils that may be associated with watercourses are also present. Thin bands of marine beach sands and wind-blown (aeolian) sands are present along much of the coastline between Arklow and Cahore Point. Made Ground typically underlies areas of urban development and is most prominent around the larger towns of Arklow, Gorey, Courtown and Enniscorthy. However, smaller more localised deposits of Made Ground can be found throughout the Potential Onshore Infrastructure Zone.

GSI Quaternary subsoil mapping shown in Figure 7.1 indicates that much of the coastal portion of the Potential Onshore Infrastructure Zone is underlain by Irish Sea Till derived either from Lower Palaeozoic sandstones and shales or limestone (most prominent and makes up much of the central and southern portion of this coastal band of till). The inland portion of the Potential Onshore Infrastructure Zone is predominantly underlain by till derived from Lower Palaeozoic non-calcareous sandstones and shales. Linear deposits of Gravel and Alluvium, derived from contemporary fluvial processes, traverse the Potential Onshore Infrastructure Zone and are most prominent along the rivers Slaney, Bann and Avoca. Localised Estuarine Deposits (silts and clays) can be found at two locations, immediately south of Arklow South Pier and at the southern extent of the Potential Onshore Infrastructure Zone along the banks of the River Barrow. Soft sediments comprising of alluvium and estuarine deposits can cause differential settlement where encountered.

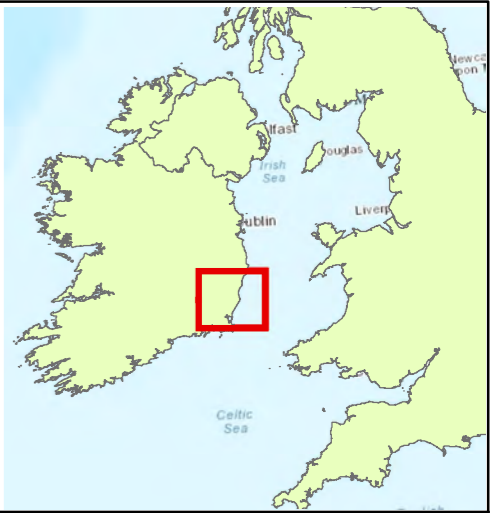
Bedrock Geology

Bedrock geology mapping (GSI), shown on Figure 7-2, indicates that the Potential Onshore Infrastructure Zone is predominantly underlain by a heavily faulted sequence of Ordovician slates, siltstones and volcanics. Limited occurrences of Caledonian intrusive rocks (Granite) are mapped along the southeast boundary of the Potential Onshore Infrastructure Zone between Adamstown and Oulart. The only mapped calcareous rocks belong to the Courtown Formation found south of Gorey and along the coastline north of Courtown. There are no known karst features associated with these rocks.


A regional northeast-southwest trending synclinal structure runs almost the full length of the Potential Onshore Infrastructure Zone. This feature is cut by a series of north-south trending regional faults, connected by smaller east-west trending accommodation faults. This faulting is a result of the region's geological history, which has been subject to multiple phases of structural deformation spanning the last circa 438 million years.



- Quaternary Sediments:**
- A, Alluvium
 - As, Alluvium (sandy)
 - BasEsk, Eskers comprised of gravels of basic reaction
 - BktPt, Blanket Peat
 - Cut, Cut over raised peat
 - FenPt, Fen Peat
 - GCSsS, Gravels derived from Cambrian sandstones and shales
 - GGr, Gravels derived from granite
 - GLPS, Gravels derived from Lower Palaeozoic shales
 - GLPSsS, Gravels derived from Lower Palaeozoic sandstones and shales
 - GLs, Gravels derived from Limestones
 - GQz, Gravels derived from quartzite
 - IrSTAv, Irish Sea Till derived from acidic volcanic rocks
 - IrSTLPsS, Irish Sea Till derived from Lower Palaeozoic sandstones and shales
 - IrSTLs, Irish Sea Till derived from Limestones
 - KaRck, Kartsified bedrock outcrop or subcrop
 - L, Lacustrine sediments
 - Lc, Lacustrine clays
 - MGs, Marine gravel and sands (often raised)
 - Mbs, Marine beach sands
 - Mesc, Esturine silts and clays
 - Pier
 - Rck, Bedrock outcrop or subcrop
 - Scree, Scree
 - TAv, Till derived from acidic volcanic rocks
 - TCSsS, Till derived from Cambrian sandstones and shales
 - TDSs, Till derived from Devonian sandstones
 - TGr, Till derived from granites
 - TLPS, Till derived from Lower Palaeozoic shales
 - TLPSsS, Till derived from Lower Palaeozoic sandstones and shales
 - TLs, Till derived from limestones
 - TMp, Till derived from Metamorphic rocks
 - TNSSs, Till derived from Namurian sandstones and shales
 - TQz, Till derived from quartzites
 - Urban
 - Water
 - Ws, Windblown sands
 - Wsd, Windblown sands and dunes



Legend

 Potential Onshore Infrastructure Zone

Title: Quaternary (Subsoil) Geology

Project: Shelmalere OWF



Projection: IREN95 UTM Zone 29N

Scale: 0 2 4 8 Kilometers

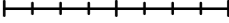
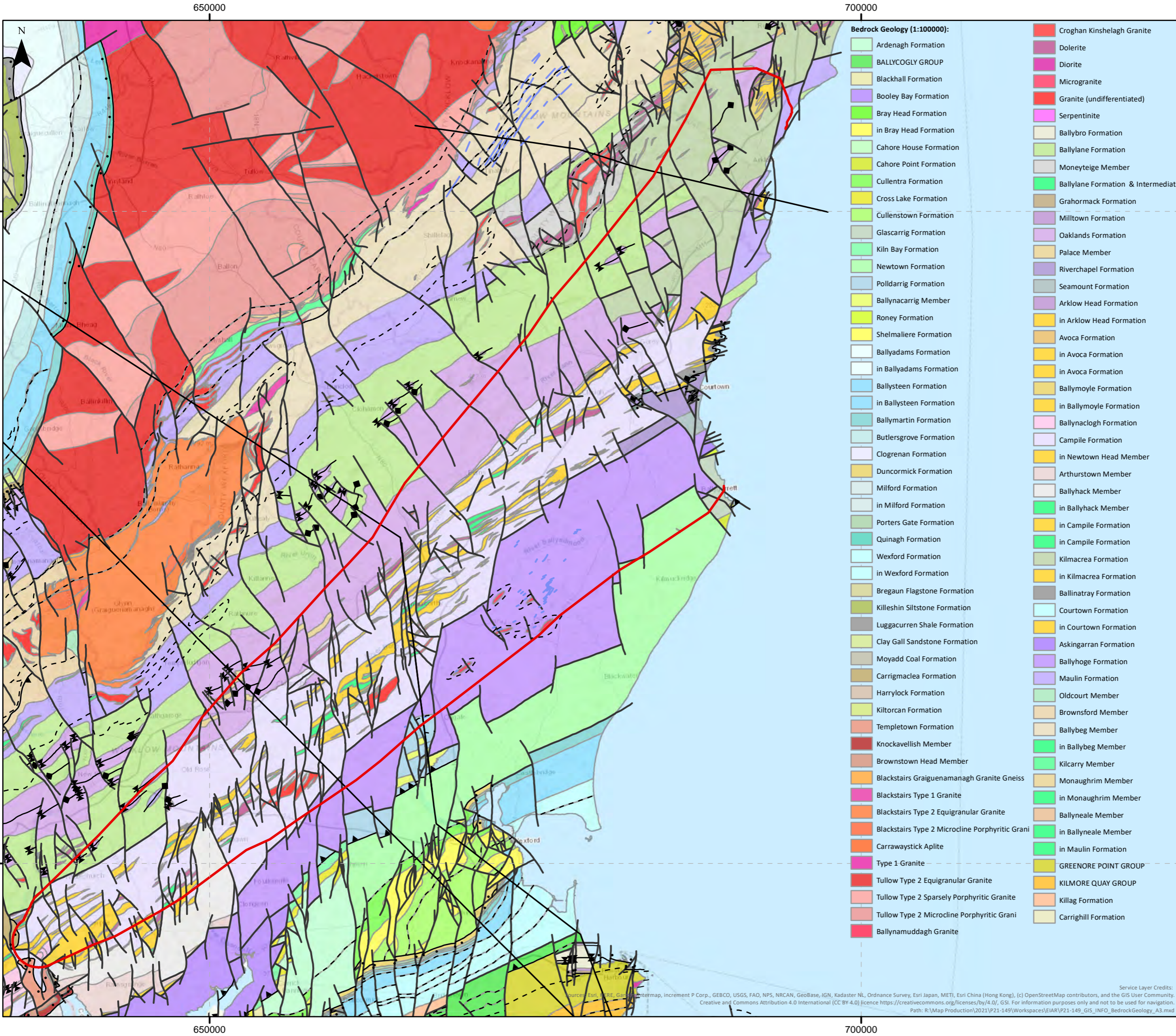


Figure Number 7.1	Drawn By CE	Checked By AC	Date 13/06/2022
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Legend

— Potential Onshore Infrastructure Zone

Stratigraphic and Structural Linework:

- ◆ Anticlinal Axis
- - - Area
- Dyke
- Fault
- Lithological boundary offshore
- ✕ Synclinal Axis
- ▲ Thrust, barbs on hanging-wall side
- Unconformity, dots on younger side
- X-Section

Title: Bedrock Geology			
Project: Shelmalere OWF			
Client:  			
Projection: IREN95 UTM Zone 29N			
Scale: 0 2 4 8 Kilometers			
Figure Number 7.2	Drawn By CE	Checked By AC	Date 13/06/2022
			

- Bedrock Geology (1:100000):**
- Ardenagh Formation
 - BALLYCOGLY GROUP
 - Blackhall Formation
 - Booley Bay Formation
 - Bray Head Formation
 - in Bray Head Formation
 - Cahore House Formation
 - Cahore Point Formation
 - Cullentra Formation
 - Cross Lake Formation
 - Cullinstown Formation
 - Glascarrig Formation
 - Kiln Bay Formation
 - Newtown Formation
 - Poldarrig Formation
 - Ballynacarrig Member
 - Roney Formation
 - Shelmaliere Formation
 - Ballyadams Formation
 - in Ballyadams Formation
 - Ballysteen Formation
 - in Ballysteen Formation
 - Ballymartin Formation
 - Butlersgrove Formation
 - Clogrenan Formation
 - Duncormick Formation
 - Milford Formation
 - in Milford Formation
 - Porters Gate Formation
 - Quinagh Formation
 - Wexford Formation
 - in Wexford Formation
 - Bregaun Flagstone Formation
 - Killeshin Siltstone Formation
 - Luggacurran Shale Formation
 - Clay Gall Sandstone Formation
 - Moyadd Coal Formation
 - Carrigmaclea Formation
 - Harrylock Formation
 - Kiltorcan Formation
 - Templetown Formation
 - Knockavellish Member
 - Brownstown Head Member
 - Blackstairs Graiguenamanagh Granite Gneiss
 - Blackstairs Type 1 Granite
 - Blackstairs Type 2 Equigranular Granite
 - Blackstairs Type 2 Microcline Porphyritic Grani
 - Carrawaystick Aplite
 - Type 1-Granite
 - Tullow Type 2 Equigranular Granite
 - Tullow Type 2 Sparsely Porphyritic Granite
 - Tullow Type 2 Microcline Porphyritic Grani
 - Ballynamuddagh Granite
 - Croghan Kinshelagh Granite
 - Dolerite
 - Diorite
 - Microgranite
 - Granite (undifferentiated)
 - Serpentinite
 - Ballybro Formation
 - Ballylane Formation
 - Moneyteige Member
 - Grahormack Formation
 - Milltown Formation
 - Oaklands Formation
 - Palace Member
 - Riverchapel Formation
 - Seamount Formation
 - Arklow Head Formation
 - in Arklow Head Formation
 - Avoca Formation
 - in Avoca Formation
 - in Avoca Formation
 - Ballymoyle Formation
 - in Ballymoyle Formation
 - Ballynaclogh Formation
 - Campile Formation
 - in Newtown Head Member
 - Arthurstown Member
 - Ballyhack Member
 - in Ballyhack Member
 - in Campile Formation
 - in Campile Formation
 - Kilmacrea Formation
 - in Kilmacrea Formation
 - Ballinatray Formation
 - Courtown Formation
 - in Courtown Formation
 - Askingarran Formation
 - Ballyhoge Formation
 - Maulin Formation
 - Oldcourt Member
 - Brownsford Member
 - Ballybeg Member
 - in Ballybeg Member
 - Kilcarrig Member
 - Monaughrim Member
 - in Monaughrim Member
 - Ballyneale Member
 - in Ballyneale Member
 - in Maulin Formation
 - GREENORE POINT GROUP
 - KILMORE QUAY GROUP
 - Killag Formation
 - Carrighill Formation

Mineral Localities

There are several metallic and non-metallic mineral occurrences across the Potential Onshore Infrastructure Zone. GSI mapping indicates the presence of four shafts within the northern portion of the Potential Onshore Infrastructure Zone. A list of these locations is presented in Table 7-2.

Table 7-2 Mapped mine shaft locations (GSI)

Name	Approximate ITM Coordinates	Comments (GSI mineral localities)
Mineral Locality 3475	E 719994, N 675768	Lead shaft noted on old 6" map.
Mineral Locality 886	E 718804, N 673579	Shaft sunk for SSW trending lead gold lode. Noted on old 6" map.
Mineral Locality 906	E 725083, N 670540	Shaft sunk into ironstone at this locality. Noted on old 6" map.
Mineral Locality	E 725063, N670380	Shaft on lode of pyrite in tuffs.

Geological Heritage

There are nine County Geological Sites (CGS) within the Potential Onshore Infrastructure Zone (IGH Programme - GSI). A list of these designated geological heritage sites is presented in Table 7-3.

Table 7-3 Designated Geological Heritage Sites (IGH Programme - GSI)

Site	Location ITM Coordinates	Comments (IGH Programme – GSI)
Snugborough (CGS)	E 724370, N 678404	The Snugborough CGS comprises “a deep hollow along a hedgerow, which separate two fields under pasture. This hollow is a ‘pingo rampart’ feature, which looks like a man-made rampart, but the embankment is actually a natural feature”. This site is not recommended for further designation. (IGH Programme)
Woodenbridge Wellfield (CGS)	E 720325, N 676306	The Woodenbridge Wellfield CGS is “the public water supply source for the Arklow area. The source consists of five bored wells which together provide approximately 10,000m ³ of water per day”. This site is not recommended for further designation (IGH Programme).
Ballymoney Strand (CGS)	E 721374, N 659800	The Ballymoney Strand CGS is “an approximate 2.2km long coastal exposure of Upper and Lower Ordovician rocks along Ballymoney Strand”. The site is recommended for Geological NHA status (IGH Programme).
Coolishall Quarry (CGS)	E 712710, N 657997	The Coolishall Quarry CGS is “a good representation of Upper Ordovician felsic volcanics”. This site is not recommended for further designation (IGH Programme).

Site	Location ITM Coordinates	Comments (IGH Programme – GSI)
Pollshone Head to Roney Point (CGS)	E 720660, N 652570	The Pollshone Head to Roney Point CGS is “an approximate 2km long coastal exposure of Ordovician mudstone siltstone and quartzites”. The site is recommended for Geological NHA status (IGH Programme).
Greenville Farmyard (CGS)	E 696242, N 641409	The Greenville Farmyard CGS is “a representative example of many fossil localities in the rocks running across Co. Wexford and adjoining counties”. The site is recommended for Geological NHA status (IGH Programme).
Kiltrea (CGS)	E 691847, N 640495	The Kiltrea CGS comprises a number of “Small quarries worked intermittently over a long period near Kiltrea House”. “This site has significance in understanding the entire stratigraphy of the Ordovician of County Wexford and southeast Ireland”. and is recommended for Geological NHA status (IGH Programme).
Camacross Pingos (CGS)	E 689030, N 624830	The Camacross CGS “is unique in the number and variety of pingo forms which lie side by side in a relatively small area. The site is of international importance and is recommended for Geological NHA status” (IGH Programme).
Carrigadaggan (CGS)	E 681331, N 624017	The Carrigadaggan CGS “is one of the richest mid Ordovician fossil localities in Ireland, providing museum collections of biostratigraphical and taxonomic importance”. The site is recommended for Geological NHA status (IGH Programme).

Aggregate Potential

Available aggregate potential mapping from the GSI indicates localised areas of “high potential” extractable granular aggregate in the northern portion of the Potential Onshore Infrastructure Zone between Arklow and Gorey and “very high potential” in the southeast portion of the Potential Onshore Infrastructure Zone at Ballymurray. There is “high” to “very high” crushed rock aggregate potential throughout much of the Potential Onshore Infrastructure Zone with the exception of the southeast and east of the Potential Onshore Infrastructure Zone, which generally displays “low” to “very low potential”.

Sensitive Receptors

In terms of land-use issues and the soil and geology environment, it is considered that the most sensitive receptors to Shelmalere Offshore Wind Farm are likely to be land and soils in those areas with little prior development history, where there is minimal anthropogenic (human) effect to-date and minimal loss or degradation of *in-situ* soil or geology resources. The County Geological Sites at Ballymoney Strand and Pollshone Head to Roney Point could also potentially be impacted by onshore construction works. Undesignated coastal bluff and cliff sections shall also be considered.

7.1.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.1.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR.

Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

7.1.5 Proposed EIAR Assessment Methodology

Baseline information to establish the receiving environment in relation to the Land, Soil and Geology will be obtained by way of a desk-based review of the information sources identified in Section 7.1.3.1, followed by a walkover survey to inspect lands and soil / geology features (where visible) along the Potential Onshore Infrastructure Zone.

The walkover survey will provide an opportunity to ‘ground truth’ and verify ground conditions at key development locations and assist in the identification of potential effects of past / recent development on Land, Soil and Geology.

All geological and geotechnical data gathered during any future project-specific geophysical surveys, service trench excavations and intrusive ground investigations will also be reviewed and collated to inform the EIAR. The significance of any established land-use and or any existing soil / geological features or attributes will be determined in terms of their local, regional and/ or national importance and the duration and scale of any development works which might impact them. Where potential effects are identified as likely and significant, potential mitigation measures will be identified where possible to avoid or minimise the scale of any potential effect. The residual effect, following implementation of the proposed mitigation measures, will then be assessed.

7.1.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect impacts on Land, Soils and Geology due to Shelmalere Offshore Wind Farm will be examined in the EIAR and potential significant effects will be identified and set out in the EIAR. Where the potential for significant cumulative effect is identified in the EIAR, such effects and interaction of effects will be included and addressed in the Potential Impacts sections of the Land, Soils and Geology chapter of the EIAR’.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to Land, Soils and Geology.

7.1.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, A description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Land, Soils and Geology receptors.

7.1.5.3 Proposed Consultees

Table 7-4 summarises the proposed consultees for Land, Soils and Geology that will be consulted as part of this EIAR Scoping Exercise and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 7-4 Proposed Consultees (Land, Soils and Geology)

Proposed Consultee	Objective of Consultation
GSI - Irish Geological Heritage (IGH) Programme	To discuss and agree approach to assessment and potential mitigation measures at identified County Geological Sites.

7.1.6 Potential Impacts to be Assessed within the EIAR

The potential impacts on land, soils and geology are shown in Table 7-5. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table:

Table 7-5 Potential Impacts to be Assessed within the EIAR (Land Soils and Geology)

Potential Impacts	Project Phase where Impact will Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Direct degradation of existing soil / subsoil cover where compaction may occur due to movement of construction and maintenance traffic.	Yes	Yes	Yes ¹	In
Direct loss or degradation of existing soil / subsoil cover where the planned development works occur on largely undeveloped land due to excavation and removal / stockpiling, erosion, compaction and/or rutting.	Yes	Yes	No	In
Direct or indirect contamination of soil / geology resources from accidental spillage or leakage of chemicals, runoff from vehicle washing facilities, unset concrete, storage of fuels or refuelling activities, and handling of potentially contaminated soil / wastes encountered in excavations.	Yes	Yes ¹	Yes ¹	In

Potential Impacts	Project Phase where Impact will Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Direct or indirect contamination of soil / geology resources as a result of sanitary waste arising from temporary construction compounds.	Yes	No	Yes ¹	In
Direct effect on ground support and stability arising from excavation of cable trenches near property assets / buried utilities, directional drilling beneath road and rail infrastructure or the excavation of a cable trench across sloping ground.	Yes	Yes ¹	No	In
Direct and permanent effect on geological heritage site along coastal cliff/bluff sections adjacent to Cable Landfall.	Yes	Yes ¹	Yes ¹	In
Direct and permanent effect in sterilising potential aggregate resource across areas of largely undeveloped land.	Yes	Yes	No	In
Soil and geology effects arising during the operational stage of the proposed development (assuming no potential long-term degradation of cable and its surrounding insulation system).	No	Yes ¹	No	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out
Note ¹ - No significant effect is anticipated as a result of the proposed development; appropriate evidence will be provided in the EIAR to support this.				

7.1.7 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Land, Soils and Geology topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Land, Soils and Geology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Land, Soils and Geology Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Land, Soils and Geology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Land, Soils and Geology chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects you believe could be significant and you wish to see assessed in the Land, Soils and Geology chapter of the EIAR for Shelmalere Offshore Wind Farm?

7.2 CHAPTER 2: HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

7.2.1 Introduction

This chapter of the EIAR will address the potential effects of Shelmalere Offshore Wind Farm on Hydrology, Hydrogeology and Water Quality receptors and sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Hydrology, Hydrogeology and Water Quality;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Hydrology, Hydrogeology and Water Quality Topic specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of the Topic-specific Study Area for the Hydrology, Hydrogeology and Water Quality Chapter of the EIAR is based on the expert judgement of FT and precedents from previous projects in Ireland of this nature and scale. The Hydrology, Hydrogeology and Water Quality Topic specific Study Area is shown in Figure 7.3 and is defined by the hydrological catchments which have a physical interaction with the Potential Onshore Infrastructure Zone. The Hydrology, Hydrogeology and Water Quality Topic specific Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process.

This chapter assesses potential effects on water quality associated with terrestrial hydrological features. Impacts on the marine environment with respect to water quality are considered in Section 6.2: Chapter 2 Marine Water and Sediment Quality.

7.2.2 Relevant Policy and Guidance

The assessment in the EIAR shall comply with guidance relevant to the design and acquisition of data, standards in terms of data quality and coverage of both the baseline and assessment in the EIAR for Hydrology, Hydrogeology and Water Quality, as presented in Section 4.3.1. of this EIAR Scoping Report.

Water Framework Directive (WFD)

The WFD established a new system for the protection and improvement of water quality and water dependent ecosystems. The overriding purpose of the WFD is to achieve at least ‘good status’ in all European waters and to ensure that no further deterioration occurs in these waters. European waters are classified as ground waters, rivers, lakes, transitional and coastal waters.

The WFD has been implemented in Ireland by dividing the island of Ireland into eight river basin districts. The River Basin Management Plan 2018-2021 has been prepared by Department of Housing, Planning and Local Government. This plan sets out the actions that Ireland will take to improve water quality and achieve ‘good’ ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027.

The Minister for Housing, Local Government and Heritage, has published the draft River Basin Management Plan for Ireland 2022-2027 for public consultation. Submissions, observations and comments on the proposed plan are currently being reviewed by the Minister. A key commitment in the Programme for Government, launching a new strengthened River Basin Management Plan will help Ireland protect, improve and sustainably manage our water environment to 2027. Achieving good water quality in our rivers, lakes, estuaries and seas is essential for protecting Ireland’s drinking water sources, environment and the population’s quality of life.

Water Framework Directive Waterbody Status

The European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009)²⁵ (the Surface Water Regulations), give effect to the criteria and standards used for classifying surface waters in accordance with the WFD. There are five categories of surface water status: ‘High’, ‘Good’, ‘Moderate’, ‘Poor’ and ‘Bad’. A surface waterbody must achieve both good ecological status and good chemical status before it can be considered to be of ‘Good’ status.

The European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010)²⁶ (the Groundwater Directive) establishes a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The Groundwater Directive establishes quality criteria that take account of local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge.

The Groundwater Directive thus represents a proportionate and scientifically-sound response to the requirements of the WFD as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations in groundwater.

²⁵ Amended in 2012 (S.I. No. 327 of 2012) and 2015 (S.I. No. 386 of 2015)

²⁶ Amended in 2011 (S.I. No 389/2011), 2012 (S.I. No 149/2012) and 2016 (S.I. No 366/2016)

Key relevant policy and guidance that will inform the EIAR are set out in Table 7-6 below:

Table 7-6 Relevant Policy and Guidance Documents (Hydrology, Hydrogeology and Water Quality)

Policy / Guidance	Reference	Geographic Coverage
Policy		
European Communities (Water Policy) Regulations	S.I. No. 722, 2003	European Union
European Union (Water Policy) Regulations	S.I. No. 350, 2014	European Union
European Communities Environmental Objectives (Surface Waters) Regulations	S.I. No. 272, 2009	European Union
European Communities Environmental Objectives (Groundwater) Regulations	S.I. No. 9, 2010	European Union
European Communities (Good Agricultural Practice for Protection of Waters) Regulations	S.I. No. 610, 2010	European Union
European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations	S.I. No. 489, 2011	European Union
Guidance		
The Planning System and Flood Risk Management - Guidelines for Planning Authorities - Department of Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW)	ISBN 9781406424676, 2009	Ireland
River Basin Management Plan 2018-2021 (Department of Housing, Planning and Local Government);	2018	Ireland
Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland);	2016	Ireland
Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements - Institute of Geologists of Ireland	2013	Ireland
Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes - National Roads Authority ;	2008	Ireland
Towards Setting Guideline Values for the Protection of Groundwater in Ireland – EPA	2003	Ireland

7.2.3 Receiving Environment

7.2.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

Information on Hydrology, Hydrogeology and Water Quality to inform the EIAR will be identified, collated and presented in accordance with relevant EIA assessment policy and guidance described in Section 7.2.2 and 4.3.1. The status and sensitivity of all waterbodies within the Hydrology, Hydrogeology and Water Quality Topic Specific Study Area will be determined as part of the EIAR assessment.

Baseline information to establish the receiving environment of the Hydrology, Hydrogeology and Water Quality chapter of the EIAR will be obtained from:

- Current and historical OSI mapping;
- Geological Survey of Ireland to confirm hydrogeological features;
- EPA consented abstractions, discharges and licences;
- EPA water quality results and WFD surface water status;
- River Basin Management Plan (RBMP);
- Inland Fisheries Ireland (IFI) survey and water quality information;
- Field surveys and waterbody sampling;
- Science and Stories about Integrated Catchment Management (<https://www.catchments.ie/>);
- OPW Indicative Flood Maps (<https://www.floodinfo.ie/map/floodplans/>);
- WFD online mapping and data (<http://www.wfdireland.ie/maps.html>);
- EPA online mapping (<https://gis.epa.ie/EPAMaps/>);
- History of flooding and status of drainage in the vicinity of the proposed development (available at <http://www.floodinfo.ie/map/floodmaps/>).
- Met Eireann Meteorological Database (available at <https://www.met.ie>);
- County Development Plans;
- Review of any project specific geotechnical investigation (GI) data sourced as part of the project design process.

7.2.3.2 Overview of the Receiving Environment

There are a number of rivers within the Potential Onshore Infrastructure Zone including the River Bann, River Owenavorrhagh, the River Boro and River Urrin. In terms of hydrogeology, the Potential Onshore Infrastructure Zone lies within several Groundwater Bodies (GWBs) including Wicklow, Inch, Gorey and Cahore Point. The Potential Onshore Infrastructure Zone also lies within the Ballyglass, Enniscorthy, Adamstown and Fethard GWBs. Locally important gravel aquifers are present along the Avoca River flowing into Arklow Town and between Bunclody and Enniscorthy along the River Slaney. Several bedrock aquifers are present within the Potential Onshore Infrastructure Zone. The majority of the Potential Onshore Infrastructure Zone between Gorey and the existing Great Island substation is located within a Regionally Important Fissured Bedrock Aquifer (Rf). Other bedrock aquifer types within the Potential Onshore Infrastructure Zone include Locally Important Aquifer where Bedrock which is Moderately Productive only in Local Zones (LI), Poor Aquifer where Bedrock is Generally Unproductive except for Local Zones (PI), and Poor Aquifer where Bedrock is Generally Unproductive (Pu).

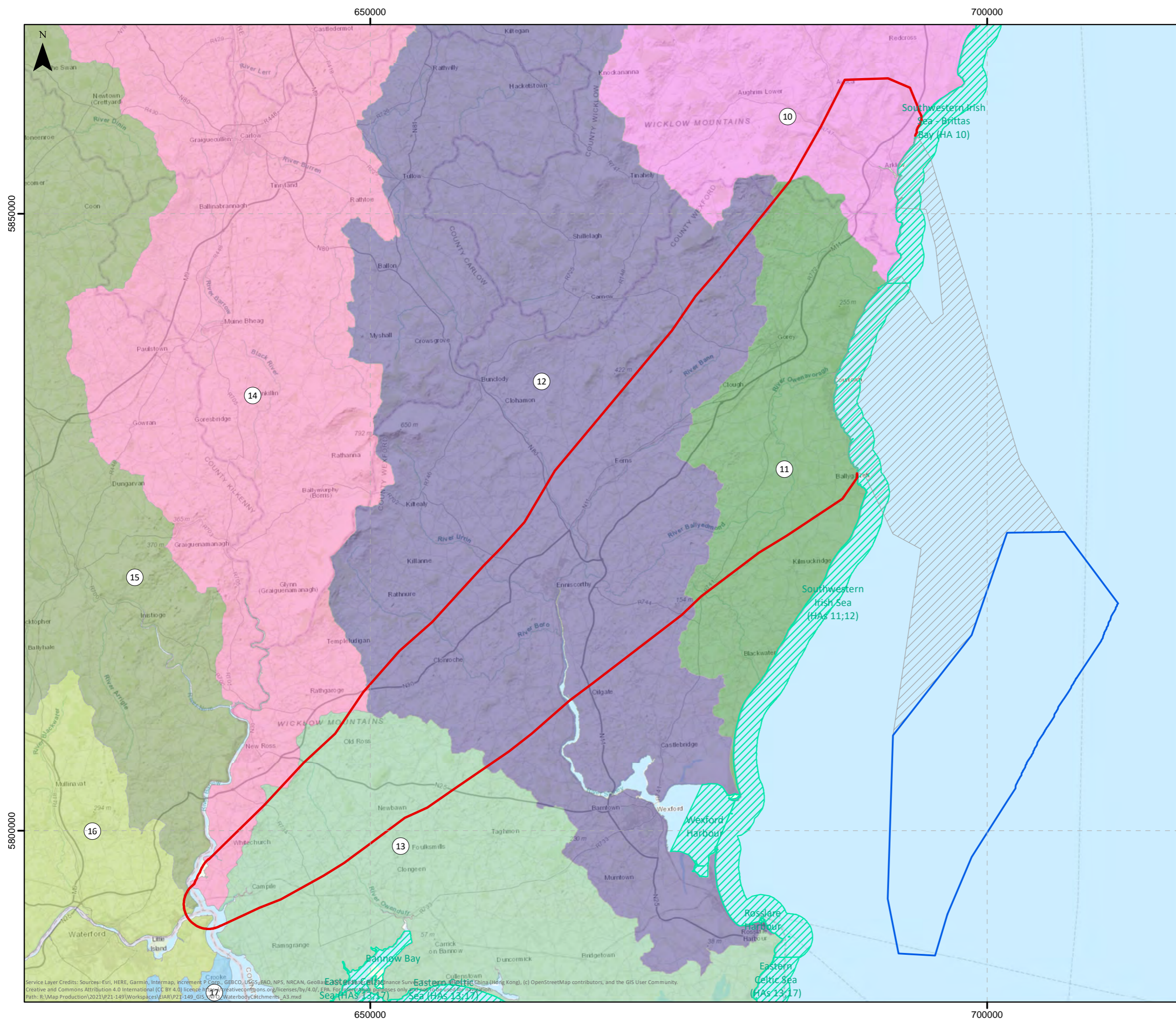
WFD Catchments with the potential for interaction with onshore infrastructure associated with The Project include:

- Ovoca-Vartry;
- Owenavorrhagh;
- Slaney and Wexford Harbour;
- Ballyteigue-Bannow;







-
- Barrow;
 - Nore;
 - Suir;
 - Colligan-Mahon.

The location of the above catchments in relation to the Potential Onshore Infrastructure Zone are shown on Figure 7-3.



Legend

-  Potential Onshore Infrastructure Zone
 Potential Export Cable Corridor Infrastructure Zone
 Potential Turbine Array Infrastructure Zone
 WFD Coastal Water Bodies

WFD Catchments

Catchment ID and Name:

- | |
|------------------------------|
| 10: Ovoca-Vartry |
| 11: Owenavorrhagh |
| 12: Slaney & Wexford Harbour |
| 13: Ballyteigue-Bannow |
| 14: Barrow |
| 15: Nore |
| 16: Suir |
| 17: Colligan-Mahon |

Title:	Waterbody Catchments
--------	----------------------

Project:	Shelmalere OWF
----------	----------------

Client:  

Projection:	IBENET95 UTM Zone 29N
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Scale: 0 2 4 8 Kilometers

Figure Number	Drawn By	Checked By	Date
7.3	CE	TB	31/05/2022



7.2.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.2.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

7.2.5 Proposed EIAR Assessment Methodology

The The Hydrology, Hydrogeology and Water Quality assessment in the EIAR will be informed by a review of existing baseline data including water quality data from the EPA, River Basin Management Plans and flood risk data from the Office of Public Works (OPW). The objectives of the relevant River Basin Management Plans in relation to water quality will be considered.

The review will include the Wicklow and Wexford County Development Plans and consideration of the policies and objectives of those plans in relation to surface water, groundwater and flooding. The assessment will be prepared in accordance with the EPA, NRA, IGI and OPW guidance. Any concerns expressed by consultees such as Inland Fisheries Ireland and relevant local authorities, relating to hydrology and drainage, will be addressed.

The review will have regard to the baseline data and the studies undertaken for the assessment of potential effects on terrestrial and freshwater ecology, geology and hydrogeology in relation to environmentally protected areas, receiving waters and soil conditions.

It is proposed to conduct grab sampling of water courses which could potentially be impacted by construction of the onshore infrastructure, where gaps are identified in the review of published data. The scope of this sampling will be agreed with Inland Fisheries Ireland and will also follow relevant guidance for determining baseline water quality.

Site visits consisting of a walkover of the study area will be undertaken following the confirmation of onshore infrastructure positioning within the Potential Onshore Infrastructure Zone. These surveys will include noting and examining the hydrological and hydrogeological features and land use within the area covered by the site walkover. The information obtained on these site visits will be provided to the project design team to inform the layout and positioning of infrastructure with the aim of minimising river/stream crossings, providing a buffer to hydrological and hydrogeological features and avoiding areas of significant flood risk.

The Hydrology, Hydrogeology and Water Quality Chapter will include a section on flood risk identification and assessment. Flood Risk Assessment (FRA) will be carried in accordance with flood risk management guidelines listed in Section 7.2.2. This will include an assessment of the potential increase to flooding elsewhere and it will examine the potential flood risk to Shelmalere Offshore Wind Farm.

Any increase in hard surfaces will be quantified and the potential effect of this modelled in the downstream structures over watercourses, where flood incidents have been recorded by the OPW. Potential cumulative impacts with neighbouring developments will also be modelled where required.

Where parts of Shelmalere Offshore Wind Farm are located on areas encroaching on floodplains, this may require additional drainage measures and further measures required to mitigate flood risk. Mitigation, such as attenuation of surface water run-off from Shelmalere Offshore Wind Farm, will be proposed where increases in flood risk are deemed to be significant.

The following will also be included as part of the assessment for the Hydrology, Hydrogeology and Water Quality Chapter of the EIAR:

- Identify potential effects of The Project on hydrology (hydrodynamics and flooding) and hydrogeology;
- Identify potential cumulative hydrological and hydrogeological effects of Shelmalere Offshore Wind Farm with any neighbouring wind farms or significant projects and plans;
- Identification of past and present land use on the site (grazing, forestry etc.) and their current effect on the existing ground conditions;
- Consider potential drainage into sensitive catchments;
- Drainage investigation will involve identification of drainage sub-catchments, studying the requirement(s) of cross-drainage works, if any, exploring the infiltration potential of the soils in the area, etc.;
- Identification of mitigation measures for flooding and pollution of receiving waters;
- Identification of residual effects.

7.2.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect impacts will be examined and potential effects will be identified. Where the potential for significant cumulative effect is identified, such effects and interaction of effects will be included in the scope and addressed in the impact assessment.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to onshore Hydrology, Hydrogeology and Water Quality.

7.2.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, A description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Hydrology, Hydrogeology and Water Quality receptors.

7.2.5.3 Proposed Consultees

Table 7-7 summarises the proposed consultees for Hydrology, Hydrogeology and Water Quality that will be consulted as part of this EIAR Scoping Exercise and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 7-7 Proposed Consultees (Hydrology, Hydrogeology and Water Quality)

Proposed Consultee	Objective of Consultation
<i>IFI</i>	<i>To inform of The Project, the proposed approach to The Project and to invite potential feedback. To discuss and agree approach to impact assessment and potential mitigation measures</i>
<i>OPW</i>	<i>To inform of The Project, the proposed approach to The Project and to invite potential feedback.</i>
<i>Local Authorities/ ABP</i>	<i>To inform of The Project, the proposed approach to The Project and to invite potential feedback. To discuss and agree approach to impact assessment and potential mitigation measures.</i>
<i>GSI</i>	<i>To inform of The Project, the proposed approach to The Project and to invite potential feedback.</i>
<i>Irish Water</i>	<i>To inform of The Project, the proposed approach to The Project and to invite potential feedback.</i>

7.2.6 Potential Impacts to be Assessed within the EIAR

The potential impacts on land, soils and geology are shown in Table 7-8. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table:

Table 7-8 Potential Impacts to be Assessed within the EIAR (Hydrology, Hydrogeology and Water Quality)

Potential Impacts	Project Phase where Impact may Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Increase in Surface Runoff <i>Potential for an increase in surface runoff due to the increase hardstanding of the new substation</i>	Yes	Yes	Yes	In
Release of Hydrocarbons <i>Potential for release of hydrocarbons into nearby watercourse when refuelling plant and machinery</i>	Yes	Yes	Yes	In
Flood Risk <i>Potential risk of flooding if construction is undertaken in a flood zone</i>	Yes	Yes	Yes	In
Suspended Solids <i>Potential for suspended solids to enter watercourse during construction activities</i>	Yes	No	Yes	In
Groundwater Levels <i>Potential risk of modifying natural groundwater levels adjacent to infrastructure</i>	Yes	Yes	Yes	In
Groundwater Protection <i>Removal of sub soils may result in the exposure of any underlying rock to sources of contamination and may increase the vulnerability of the aquifer</i>	Yes	Yes	Yes	In
Groundwater Quality <i>Potential for chemical pollution which may occur as a result of accidental release to enter groundwater having implications for ecology and any wells within the area or downgradient of the release</i>	Yes	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

7.2.7 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Hydrology, Hydrogeology and Water Quality topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Hydrology, Hydrogeology and Water Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Hydrology, Hydrogeology and Water Quality Topic specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Hydrology, Hydrogeology and Water Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Hydrology, Hydrogeology and Water Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects you believe could be significant and you wish to see assessed in the Hydrology, Hydrogeology and Water Quality chapter of the EIAR for Shelmalere Offshore Wind Farm?

7.3 CHAPTER 3: ONSHORE AIR QUALITY AND CLIMATE

7.3.1 Introduction

This chapter of the EIAR will address the potential effects of Shelmalere Offshore Wind Farm on Onshore Air Quality and Climate receptors and sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Onshore Air Quality and Climate;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Onshore Air Quality and Climate Topic specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Onshore Air Quality and Climate chapter of the EIAR is based on the expert judgement of FT and precedents from previous projects in Ireland of this nature and scale. The Onshore Air Quality and Climate Topic specific Study Area is the same as the Potential Onshore Infrastructure Zone shown in Figure 1.1. However the Onshore Air Quality and Climate Topic specific Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process.

The climate in the immediate local area of a proposed development is known as the micro-climate whereas the climate of a large geographical area (global) is the macro-climate. The potential effects of Shelmalere Offshore Wind Farm on micro-climate and macro-climate will be addressed in the Onshore Air Quality and Climate chapter of the EIAR. Shelmalere Offshore Wind Farm will also be assessed for compliance with the Climate Action Plan 2021 in the Onshore Air Quality and Climate chapter of the EIAR.

With respect to Offshore Air Quality and Climate, potential impacts from the construction, operation and decommissioning of Shelmalere Offshore Wind Farm are addressed in Section 6.14 - Chapter 14: Offshore Air and Climate.

7.3.2 Relevant Policy and Guidance

Air Quality

In order to protect our health, vegetation and ecosystems, EU Directives have set out air quality standards for Ireland and the other member states for a wide variety of pollutants. These Directives include how we should monitor, assess and manage ambient air quality. The European Commission set down the principles to this approach in 1996 with its Air Quality Framework Directive (96/62/EC).

Four "daughter" directives lay down limits for specific pollutants:

- 1st Daughter Directive (99/30/EC): Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead;
- 2nd Daughter Directive (2000/69/EC): Carbon monoxide and benzene;
- 3rd Daughter Directive (2002/69/EC): Ozone;
- 4th Daughter Directive (2001/107/EC): Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air.

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008. It replaced the Framework Directive and the first, second and third Daughter Directives. The fourth Daughter Directive (2004/107/EC) will be included in CAFE at a later stage.

Climate

In July 2021 Ireland signed the Climate Action and Low Carbon Development (Amendment) Bill into law. This support Irelands transition to Net Zero by 2050 with set legally binding commitments and targets. Actions for each sector will be detailed in the Climate Action Plan that is to be updated annually. The Climate Action Plan 2021 was recently published. It set the following targets for Ireland to achieve by 2030:

- Deliver an early and complete phase-out of coal- and peat-fired electricity generation;
- Increase electricity generated from renewable sources to up to 80%, indicatively comprised of:
 - at least 5 GW of offshore renewable energy;
 - between 1.5 – 2.5 GW of indicative solar PV capacity;
 - up to 8 GW total of onshore wind capacity.

Achieving up to 80% renewable electricity generation by 2030 will involve phasing out coal and peat-fired electricity generation plants, increasing our renewable electricity production, reinforcing our grid (including greater interconnection to allow electricity to flow between Ireland and other countries), and putting systems in place to manage intermittent sources of power, from renewable energy resources.

In addition to the above, key relevant policy and guidance that will inform the EIAR are set out in Table 7-9 below:

Table 7-9 Relevant Policy and Guidance Documents (Onshore Air Quality and Climate)

Policy / Guidance	Reference	Geographic Coverage
Policy		
Air Quality Standards Regulations 2011	S.I. No. 180, 2011	European Union
European Union (Medium Combustion Plant) Regulations	S.I. No. 121, 2017	European Union
Local Planning Policy in relation to Air Quality Objectives	DRLCC	Ireland
Air Quality Monitoring in the vicinity of Demolition and Construction Sites	IAQM 118; 2018	UK
Guidance		
Technical Instructions on Air Quality;	TA Luft, 2002	Germany
Assessment of dust from demolition and construction sites	IAQM 117, 2014	UK
Assessing Greenhouse Gas Emissions and Evaluating Their Significance'	IEMA 116, 2017	UK
Climate Change Resilience and Adaption'	IEMA 119, 2020	UK
Guidance on the assessment of the air quality effects of development on designated nature conservation sites prepared by the Institute of Air Quality Management	IAQM 120, 2019	UK

7.3.3 Receiving Environment

7.3.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

Receiving environment information used in the Onshore Air Quality and Climate assessment chapter of the EIAR will primarily be sourced from existing EPA monitoring stations and meteorological data from Met Eireann.

7.3.3.2 Overview of the Receiving Environment

Air Quality

European air quality legislation requires that each member state be defined in terms of Zones and Agglomerations for air quality, with Ireland divided into four zones.

The EPA has designated four zones within Ireland²⁷:

- Zone A: Dublin City and its environs;
- Zone B: Cork City and its environs;
- Zone C: 24 cities and towns (such as Galway, Limerick and Waterford cities and towns such as Naas, Newbridge, Celbridge, Leixlip) with a population of greater than 15,000;
- Zone D covers the remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The proposed Potential Onshore Infrastructure Zone is located in Zone D. Towns within the Potential Onshore Infrastructure Zone are shown in Figure 1.1 and include Arklow, Enniscorthy, Gorey, Courtown, Ballygarrett.

The air quality in each zone is monitored by the EPA and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold. The Air Quality In Ireland 2019 – Indicators of Air Quality (EPA 2020) noted that Ireland’s overall air quality was good, however there are localised issues across the country with multiple air pollutants. Ireland exceeded the EU limit value for NO₂ at one monitoring location in Dublin in 2019. This exceedance was due to high levels of traffic.

Ireland is also above the WHO guidelines for PM_{2.5} at 33 monitoring stations and the EEA reference level for PAH, a toxic chemical at 4 monitoring locations due to the residential burning of solid fuels such as coal, peat and wood. PM_{2.5} has been highlighted by the EEA as being predominantly responsible for most of the 1,300 estimated premature deaths. The Air Quality Index for Health map on the EPA website, shows that the current air quality within the proposed wind farm, grid connection and turbine delivery route is classed as ‘Good’.

The WHO²⁸ defines dust as: *“Airborne contaminants (which) occur in the gaseous form (gases and vapours) or as aerosols. In scientific terminology, an aerosol is defined as a system of particles suspended in a gaseous medium, usually air in the context of occupational hygiene, is usually air. Aerosols may exist in the form of airborne dusts, sprays, mists, smokes and fumes”*. In more general terms, dust is an airborne particulate matter ranging in diameter from 10 to 50 microns which is generated by organic and inorganic matter such as coal, grain, metal, ore, rock and wood. Dust can be generated by activities which process organic and inorganic matter. Dust can be stirred up from inert states through weather and wind conditions and deposit on all parts of the surrounding environment.

²⁷ EPA. Air Quality Zones

²⁸ https://www.who.int/occupational_health/publications/en/oehairbornedust3.pdf

There are no statutory limits for dust deposition in Ireland. However, EPA guidance suggests that a deposition of 10 mg/m²/hour can generally be considered as posing a soiling nuisance. This equates to 240 mg/m²/day. The EPA recommends a maximum daily deposition level of 350 mg/m²/day when measured according to the TA Luft Standard 2002.

Construction dust has the potential to be generated from on-site activities such as earthworks, transport of materials, concrete cutting etc. The extent of dust generation at any site depends on the type of activity undertaken, the location, the nature of the dust, (i.e. soil, sand, peat) and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

Climate

Climate is defined by the EPA as “the average weather over a period of time”. Climate change is a term that is used to describe a “significant change in the measures of climate, such as temperature, rainfall, or wind, lasting for an extended period – decades or longer.”²⁹ There is scientific evidence³⁰ which suggests that the current climate is rapidly warming, having reached approximately 1°C above pre-industrial levels in 2017, increasing at a rate of 0.2 °C per decade. Warmer weather places pressure on flora and fauna which cannot adapt to a rapidly changing environment. In Ireland, the pressure on flora and fauna is mitigated due to the dominant influence of the Gulf Stream on Ireland's climate. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitudes.

The climatic conditions for the wider geographical area will be derived from historical meteorological measurements compiled by Met Éireann, the national meteorological service of Ireland.

The nearest weather station to Shelmalere Offshore Wind Farm is the Johnstown Castle weather station which is approximately 25km south of the Potential Onshore Infrastructure Zone.

7.3.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.3.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

²⁹ <https://www.epa.ie/climate/communicatingclimatescience/whatisclimatechange/>

³⁰ IPCC Special Report “Global Warming of 1.5°C”: <https://www.ipcc.ch/sr15/download/#chapter>

7.3.5 Proposed EIAR Assessment Methodology

Air Quality

As part of the Onshore Air Quality and Climate assessment in the EIAR, a review of existing air quality monitoring data undertaken by the Environmental Protection Agency (EPA) will be carried out and used to characterise the receiving environment.

The impact assessment methodology will involve the review and assessment of the construction methods for Shelmalere Offshore Wind Farm to identify the potential for air emissions during construction and decommissioning.

To assess the potential effects of construction dust emissions, the NRA's *Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation In Place* will be used.

Climate

As part of the Onshore Air Quality and Climate assessment in the EIAR, a desk-top study assessment of available climatic information will be undertaken to characterise the receiving environment. In terms of climatic potential effect, the assessment considers the net potential effect that operating Shelmalere Offshore Wind Farm will have in terms of CO₂ and its displacement of CO₂ from other energy sources over the carbon losses caused by its manufacturing, transportation, construction and decommissioning using the Scottish Carbon Calculator tool. Monthly meteorological data from Met Eireann will be reviewed to gain an understanding of the existing climatic conditions of the site.

The potential effect of Climate Change on Shelmalere Offshore Wind Farm would be undertaken in accordance with the IEMA guidance 'Climate Change Resilience and Adaption' (2020)', which presents a framework for the consideration of climate change resilience and adaption in the EIA process.

Consistent with the guidance, climate change concerns in relation to the proposed development would be identified through the use of future climate projections. The results would include projections of climate change adaptation measures and adaptive management.

7.3.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect effects will be examined and any such potential effects will be identified. Where the potential for significant cumulative effect is identified, such effects and interaction of effects will be included in the scope and addressed in the impact assessment.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to Air and Climate.

7.3.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Onshore Air Quality and Climate receptors.

7.3.5.3 Proposed Consultees

Table 7-10 summarises the proposed consultees for Onshore Air Quality and Climate that will be consulted as part of this EIAR Scoping Exercise and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 7-10 Proposed Consultees (Onshore Air Quality and Climate)

Proposed Consultee	Objective of Consultation
ABP	To inform of The Project and discuss project progress to date and current status of project.
Wicklow/ Wexford County Councils	To inform of The Project and discuss project progress to date and current status of project.

7.3.6 Potential Impacts to be Assessed within the EIAR

The potential impacts on Onshore Air Quality and Climate are shown in Table 7-11. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table:

Table 7-11 Potential Impacts to be Assessed within the EIAR (Onshore Air Quality and Climate)

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Emissions from Plant and Machinery Plant and machinery such as back-up generators, generators, excavators, rollers, vans etc. will be required at various stages of the construction works. These will be relatively small units which will be operated on an intermittent basis.	Yes	Yes	Yes	In

Potential Impact	Project Phase where Impact may Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Dust Arising from Construction Activities <i>The principal sources of potential air emissions during the construction of the proposed project from dust arising from earthworks, trench excavation along cable routes, the temporary storage of excavated materials, the construction of the substation, the movement of construction vehicles, loading and unloading of aggregates/materials and the movement of material around the site.</i>	Yes	No	Yes	In
Climate change potential effects as a result of greenhouse gas emissions to the atmosphere during the construction, operation and decommissioning phases of the proposed wind farm and proposed grid connection such as those arising from construction vehicles, the use of on-site generators, pumps, back-up generators, excavation works and gasses used for the regulation of equipment at the onsite substation (e.g. SF6-4 or PFCs ³¹).	Yes	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

7.3.7 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Onshore Air Quality and Climate topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Onshore Air Quality and Climate chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Onshore Air Quality and Climate Topic specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Onshore Air Quality and Climate chapter of the EIAR for Shelmalere Offshore Wind Farm?

³¹ Fluorinated greenhouse gasses commonly used in high-voltage gas insulated switchgear.



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- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Onshore Air Quality and Climate chapter of the EIAR for Shelmalere Offshore Wind Farm?
 - Are there any other potential effects you believe could be significant and you wish to see assessed in the Onshore Air Quality and Climate chapter of the EIAR for Shelmalere Offshore Wind Farm?

7.4 CHAPTER 4: ONSHORE NOISE AND VIBRATION

7.4.1 Introduction

This chapter of the EIAR will address the potential effects of Shelmalere Offshore Wind Farm on Onshore Noise and Vibration receptors and sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Onshore Noise and Vibration;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Onshore Noise and Vibration Topic specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Onshore Noise and Vibration chapter of the EIAR is based on the expert judgement of FT and precedents from previous projects in Ireland of this nature and scale. The Onshore Noise and Vibration Topic specific Study Area is the same as the Potential Onshore Infrastructure Zone shown in Figure 1.1. However the Noise and Vibration will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process. Typical example Study Area distances (i.e. the distance from the element of infrastructure in which potential significant Onshore Noise and Vibration impacts on receptors could occur as a result of construction, operation and decommissioning activities associated with The Project) from particular onshore infrastructure include (non-exhaustive list):

- Cable Landfall Transition Joint Bays and associated infrastructure (500m);
- Underground grid connection cabling (100m);
- Onshore Project Substation and grid connection works (500m);
- Temporary construction compounds (500m);
- Operation and Maintenance Facility (500m).

The above distances are indicative and may be adjusted. For example, for underground grid connection cabling construction works, potential noise effects on receptors within 100m of the cable alignment will be modelled

as part of the assessment. This may be adjusted depending on the site-specific environment (for example in a quiet rural area this distance may be extended).

The section of the EIAR Scoping Report deals with potential effects on Onshore Noise and Vibration only. Potential effects in the marine environment associated with noise and vibration are detailed in Section 6.3: Chapter 3 - Underwater Noise and Vibration and Section 6.15: Chapter 15 - Offshore Airborne Noise.

7.4.2 Relevant Policy and Guidance

The assessment in the EIAR shall comply with guidance relevant to the design and acquisition of data, standards in terms of data quality and coverage of both the baseline and assessment in the EIAR for Onshore Noise and Vibration as presented in Section 4.3.1. of this EIAR Scoping Report.

Key relevant policy and guidance that will inform the EIAR are set out in Table 7-12 below:

Table 7-12 Relevant Policy and Guidance Documents (Onshore Noise and Vibration)

Policy / Guidance	Reference	Geographic Coverage
Policy		
International Standard ISO 9613-2:1996, Attenuation of sound during propagation outdoors, Part 2: General method of calculation;	ISO 9613-2:1996	International
British Standard BS 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound;	BS 4142:2014+A1:2019	UK
British Standard BS5228-1:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites – Part 1: Noise;	BS5228-1:2009+A1:2014	UK
British Standard BS5228-2:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration;	BS5228-2:2009+A1:2014	UK
British Standard BS6472: 2008 Guide to evaluation of human exposure to vibration in buildings;	BS6472: 2008	UK
BS 7385-2:1993, Evaluation and measurement for vibration in buildings: Guide to damage levels from ground borne vibration;	BS 7385-2:1993	UK
Guidance		
Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004, National Roads Authority (currently Transport Infrastructure Ireland);	Rev 1, 25 th Oct 2004	Ireland
Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, 2014, National Roads Authority (currently Transport Infrastructure Ireland);	March 2014	Ireland

Policy / Guidance	Reference	Geographic Coverage
Design Manual for Roads and Bridges, LA111 Revision 2 Noise and Vibration;	DMRB, LA111	Ireland
ESTU The assessment and rating of noise from windfarms, ESTU-U-97, 1996;	ESTU-U-97, 1996	UK
IOA Good Practice Guide to the Application of ESTU-R-97 for the Assessment and Rating on Wind Turbine Noise, Institute of Acoustics– May 2013;	IOA GPG 2013	International
Draft revised Wind Energy Design Guidelines December 2019; Department of Housing, Planning and Local Government;	WEDG 2019	Ireland
AQTAG09 (Air Quality Technical Advisory Group 09) Guidance on the effects of industrial noise on wildlife UK Environment Agency;	AQTAG09	UK
UK Defra research NO0235 The Effects of Noise on Biodiversity;	NO0235	UK
The Merchant Shipping and Fishing Vessels Control of Noise at Work Regulations 2007;	2007	UK
Offshore Technology Report 2001 , Health and Safety Executive, 2001/068	2001/068	UK
Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), Environmental Protection Agency, January 2016;	NG4, 2016	Ireland
Calculation of Road Traffic Noise (CRTN), Department of Transport Welsh Office, HMSO 1988;	CRTN, 1988	UK

7.4.3 Receiving Environment

7.4.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

Baseline information to establish the receiving environment section of the Onshore Noise and Vibration chapter of the EIAR will be obtained from appropriate guidance and specification of suitable construction and operational noise / vibration criteria. Characterisation of the receiving noise environment shall be carried out through field measurements and with appropriate guidance outlined in Section 7.4.2. Other sources of information to inform the Onshore Noise and Vibration assessment as part of the EIAR shall include outline designs, specifications and construction methodologies associated with The Project provided by the project design team.

7.4.3.2 Overview of the Receiving Environment

The extent of the Potential Onshore Infrastructure Zone extends from substation connection points at Great Island Power Station, Co Wexford, to the south, Lodgewood, near Ferns, at the midpoint and Arklow to the north (refer to Figure 1.1). The shore part of the Potential Onshore Infrastructure Zone extends from just north of Arklow town to the shore near to Ballygarrett Village, north of Cahore Pier.

The Potential Onshore Infrastructure Zone is extensive and includes a variety of noise environments, ranging from more densely populated urban areas within towns, and rural and agricultural, less densely populated areas. Noise within the Potential Onshore Infrastructure Zone includes noise from road traffic sources. The M11 and N11 run through much of the Potential Onshore Infrastructure Zone and there are national roads to the south of the scheme (N25 and N30). The main east coast railway line between Arklow and Wexford also runs through the Potential Onshore Infrastructure Zone. Within more rural areas, noise sources will comprise traffic on more local roads and agricultural machinery. The coastal portion of the Potential Onshore Infrastructure Zone includes popular leisure/tourist areas with holiday parks along eastern coastal locations.

7.4.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.4.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

7.4.5 Proposed EIAR Assessment Methodology

The Onshore Noise and Vibration assessment of the EIAR will consider each phase of the activities associated with Shelmalere Offshore Wind Farm and will assess potential Onshore Noise And Vibration effects during the:

- Construction phase;
- Operation phase;
- Maintenance works that will normally occur during the operational phase;
- Decommissioning phase.

The stages of the assessment are outlined below:

- Identification of noise sensitive locations to determine locations for baseline noise survey;
- The baseline survey will be focused at locations near the onshore infrastructure located in the Potential Onshore Infrastructure Zone. Existing background noise levels will be monitored at selected locations. This will be a combination of unattended and attended noise monitoring;
- Onshore Noise and Vibration from temporary construction works will be predicted and assessed using BS5228 Code of Practice for Control of noise on Open and Construction Sites. Onshore Noise and Vibration from traffic generated as a result of the construction works in addition to increased port activity required for the offshore works will be assessed;
- Noise from offshore construction works will be assessed, if required. This may include assessment of piling activities, rockbreaking and cutting activities. This occurs on a 24/7 basis and there is a potential for this to be audible at onshore locations;
- Operational noise from the proposed O&M Facility, BESS and Onshore Project Substation will be assessed. Noise will be predicted using ISO9613 Attenuation of Sound during propagation outdoors. Noise limits for operational noise will be based on EPA guidance note (NG4). Consideration will also be given to BS4142: Methods for rating and assessing industrial and commercial sound;

- Operational noise from the offshore windfarm will be assessed in line with ETSU-R-97 and IOA Good Practice Guidance and Revised Wind Energy Guidance where appropriate;
- Noise from onshore construction works affecting offshore noise sensitive locations, including commercial and leisure vessels will be assessed based on criteria in The Merchant Shipping and Fishing Vessels Control of Noise at Work Regulations 2007 and Offshore Technology Report 2001.

7.4.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect effects will be examined and any such potential effects will be identified. Where the potential for significant cumulative effect is identified, such effects and interaction of effects will be included in the scope and addressed in the impact assessment.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to onshore Onshore Noise and Vibration.

7.4.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, A description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Onshore Noise and Vibration receptors.

7.4.5.3 Proposed Consultees

Table 7-7 summarises the proposed consultees for Onshore Noise and Vibration that will be consulted as part of this EIAR Scoping Exercise and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 7-13 Proposed Consultees (Onshore Noise and Vibration)

Proposed Consultee	Objective of Consultation
Wexford County Council and Waterford City and County Council Environment Department	To discuss and agree approach to baseline noise surveys to inform the EIA process Identify any area specific criteria to be adopted, special protection areas
EPA	Identify any specific criteria to be adopted

7.4.6 Potential Impacts to be Assessed within the EIAR

The potential impacts on Onshore Noise and Vibration are shown in Table 7-14. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table:

Table 7-14 Potential Impacts to be Assessed within the EIAR (Onshore Noise and Vibration)

Potential Impacts	Project Phase where Impact may Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Increase in airborne noise due to onshore construction activities including impact piling, construction vessels and cable installation, substation and grid connection works installation.	Yes	Yes	Yes	In
Increase in airborne noise due to offshore construction activities (including piling)	Yes	No	Yes	In
Increase in vibration due to onshore construction works.	Yes	Yes	No	In
Increase in airborne noise due to windfarm operation.	No	Yes	No	In
Increase in airborne noise due to onshore noise from substation, Operations and Maintenance Building, Battery Energy Storage.	No	Yes	No	In
Increase in airborne noise due to construction activities on wildlife	Yes	No	No	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

7.4.7 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Onshore Noise and Vibration topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Onshore Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm'?
- Are you satisfied the proposed Onshore Noise and Vibration Topic specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Onshore Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?



-
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Onshore Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?
 - Are there any other potential effects you believe could be significant and you wish to see assessed in the Onshore Noise and Vibration chapter of the EIAR for Shelmalere Offshore Wind Farm?

7.5 CHAPTER 5: ONSHORE BIODIVERSITY

7.5.1 Introduction

This chapter of the EIAR will address the terrestrial, freshwater and intertidal habitats and species, including those of conservation concern within and in close proximity to The Project.

This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Onshore Biodiversity;
- A preliminary review of the receiving environment relevant to Onshore Biodiversity within the Onshore Biodiversity Topic-specific Study Area;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets it is proposed to be used to inform the EIAR for this topic;
- Potential surveys proposed to inform this EIAR topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

In determining the potential for likely significant effects from The Project on Onshore Biodiversity, the EIAR will in particular focus on the following:

- Sites of International importance i.e. European designated sites: Special Areas of Conservation designated under the EU Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EU Birds Directive (Directive 2009/147 EC);
- Other designated sites such as Natural Heritage Areas, proposed Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora;
- Ecologically important habitats including habitats listed in Annex I of the Habitats Directive;
- Species protected under Annex II and IV of the Habitats Directive;
- Species protected under the Wildlife Act 1976 (as amended);
- Rare and protected flora including species listed under the Flora Protection Order (2015);
- Habitats that can be considered as corridors and 'stepping stones' for the purposes of article 10 of the Habitats Directive;
- Species at high risk of global extinction as identified under Ireland's Red Lists as per the International Union for the Conservation of Nature and Natural Resources (IUCN) criteria; and
- Birds identified as Red or Amber listed in the 'Birds of Conservation Concern in Ireland 2020 –2026', plus rare/scarce Irish birds.

The potential for The Project to cause the spread of invasive species, particularly those listed in Schedule III of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011, will also be assessed.

This chapter of the EIAR Scoping Report has been completed by FT , an Environment and Engineering consultancy with which has extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Onshore Biodiversity chapter of the EIAR is based on the expert judgement of FT and precedents from previous projects in Ireland of this nature and scale. The Onshore Biodiversity Topic-specific Study Area is the same as the Potential Onshore Infrastructure Zone shown in Figure 1.1. However the Onshore Biodiversity Topic-specific Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process.

The chapter addresses potential effects on terrestrial, freshwater and intertidal Biodiversity only. Potential effects on the marine environment (offshore biodiversity) are set out in Sections 6.5 (Chapter 5: Marine Mammals and Reptiles), 6.6 (Chapter 6: Offshore Ornithology), 6.7 (Chapter 7: Offshore Bats) and 6.8 (Chapter 8: Fish and Shellfish Ecology) of the EIAR Scoping Report.

7.5.2 Relevant Policy and Guidance

The assessment in the EIAR shall have regard to guidance relevant to the design and acquisition of data, standards in terms of data quality and coverage of both the baseline and assessment in the EIAR for terrestrial Biodiversity, as presented in Section 4.3.1 of this EIAR Scoping Report. The European, national and local planning policy and legislation relating to Onshore Biodiversity which is considered relevant is set out in Table 7-15 below:

Table 7-15 Relevant Policy and Guidance Documents (Onshore Biodiversity)

Policy/Guidance	Reference	Geographic Coverage
Policy		
EU Biodiversity Strategy for 2030 and EU Strategy on Green Infrastructure	Doc Ref: EU Biodiversity Strategy for 2030 ISBN 978-92-76-36472-6 Date: 2021 Doc Ref: Building a Green Infrastructure for Europe Infrastructure ISBN: 978-92-79-33428-3 Date: 2013	European
National Biodiversity Action Plan for 2017-2021	Doc Ref: National Biodiversity Action Plan for 2017-2021 Date: 2017	National
NPWS Threat Response plans	Doc Ref: Red Grouse Species Action Plan 2013 Date: 2013 Doc Ref: Dundalk Bay SAC (site code 455) Conservation objectives supporting document -coastal habitats Date: 2011 Doc Ref: Threat Response Plan Kerry Slug Geomalacus maculosus	National

Policy/Guidance	Reference	Geographic Coverage
Policy		
	Date: 2010 Doc Ref: Conservation Plan for Cetaceans in Irish waters Date: 2009 Doc Ref: Otter Lutra lutra Date: 2009 Doc Ref: Vesper bats Date: 2009 Doc Ref: All- Ireland Species Action Plan Bats Date: 2008 Doc Ref: All- Ireland Species Action plan Killarney Fern Date: 2008 Doc Ref: All-Ireland Species Action Plan Red Squirrel Date: 2008 Doc Ref: All Ireland Species Action Plans Date: 2005	
Wicklow County Development Plan 2016-2022 and County Wicklow Biodiversity Action Plan 2010-2015	Doc Ref: Wicklow County Development Plan 2016 - 2022 Date: 2016 Doc Ref: County Wicklow Biodiversity Action Plan Date: 2010	County
Wexford County Development Plan 2013-2019 and County Wexford Biodiversity Action Plan 2013-2018	Doc Ref: Wexford County Development Plan 2013-2019 Date: 2013 Doc Ref: County Wexford Biodiversity Action Plan 2013-2018 Date: 2013	County
Guidance		
Good Practice Guidance for Habitats and Species. Version 3	Chartered Institute of Ecology and Environmental Management, Winchester (May 2021)	UK and Ireland
Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2.	Chartered Institute of Ecology and Environmental Management, Winchester (2018)	UK and Ireland

Policy/Guidance	Reference	Geographic Coverage
Policy		
Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters	Inland Fisheries Ireland (2016)	Ireland
Environmental Impact Assessment of National Road Schemes – A Practical Guide	(National Roads Authority (NRA), 2009)	Ireland
Guidelines for assessment of Ecological Impacts of National Road Schemes	(National Roads Authority (NRA), 2009)	Ireland
Ecology Guidelines for Electricity Transmission Projects A Standard Approach to Ecological Impact Assessment of High Voltage Transmission Projects	EirGrid (2020)	Ireland
Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects.	Department of Communications, Climate Action and Environment (April 2017)	Ireland

7.5.3 Receiving Environment

7.5.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

Baseline information to establish the receiving environment for the Onshore Biodiversity chapter of the EIAR will comprise a description of existing habitats and any associated ecosystem services, identification of flora and fauna and their representativeness on a local, county national or European level, and breeding and resting places for protected, rare and threatened fauna, within the Potential Onshore Infrastructure Zone.

Information on the receiving environment to inform the Receiving Environment section of the Onshore Biodiversity chapter of the EIAR will be obtained from:

- Online web-mappers e.g. <https://gis.epa.ie/EPAMaps>, <https://www.npws.ie/maps-and-data>, and <http://wfdfish.ie/index.php/wfd-map-viewer/>;
- Available rare and protected species datasets available from National Parks and Wildlife Services (NPWS), National Biodiversity Data Centre (NBDC), BirdWatch Ireland (BWI), Botanical Society of Britain and Ireland (BSBI), Inland Fisheries Ireland (IFI);
- Available aerial photography such as flyover survey photography from a drone or aeroplane, and satellite imagery;
- Field walkovers / inspections; and
- Consultation.

7.5.3.2 Overview of the Receiving Environment

Sites of European and National Importance

Consideration will be given to potential for significant effects on sites of European and National importance. In Ireland, sites of European importance includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds (including migratory) and their habitats. The Annex habitats and species, for which each site is selected, are the qualifying interests (QI) and special conservation interests (SCIs) of the site. Conservation objectives (CO) for the site are defined for these QIs and SCIs. Examples of European sites within the Potential Onshore Infrastructure Zone are Cahore Polders and Dunes SAC (000700), Slaney River Valley SAC (000781) and Cahore Marshes SPA (004143). It should be noted that the assessment of significant effects will not be limited to these European sites. As the design of The Project evolves the potential for significant effects on all European sites will be assessed through screening for Appropriate Assessment. Where significant effects are determined to be likely or in certain, the potential for adverse effects on the integrity of European Sites in the context of Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) will be considered in the Natura Impact Statement for The Project.

The basic designation for the protection of wildlife in Ireland is the Natural Heritage Area (NHA), designated under the Wildlife Act 1976 (as amended). NHAs are areas considered important for the habitats present or for species of plants and animals whose habitat needs protecting. There are no NHAs within the Potential Onshore Infrastructure Zone. There are several proposed Natural Heritage Areas (pNHA) in the Potential Onshore Infrastructure Zone. These sites were published on a non-statutory basis in 1995, however, have not since been statutorily designated. However, their importance for flora and fauna is recognised in the Wicklow and Wexford County Development Plans. In particular, the Development Plans require ecological impact assessment for any proposed development likely to have a significant impact on pNHA. Examples of pNHAs within the Potential Onshore Infrastructure Zone include the following listed below, it should however be noted that this is not an exhaustive list, and as the design of The Project evolves consideration will be given to the potential spatial and temporal extent of potential impacts and how these might effect pNHAs:

- Arklow Sand Dunes (001746);
- Arklow Rock-Askintinny (001745);
- Avoca River Valley (001748);
- Buckronev-Brittis Dunes And Fen (000729);
- Kilpatrick Sandhills (001742);
- Ballymoney Strand (000745);
- Courtown Dunes And Glen (000757);
- Ardamine Wood (001733);
- Donaghmore Sandhills (001737);
- Cahore Point North Sandhills (001736);
- Cahore Polders And Dunes (000700);
- Clone Fox Covert (000755);
- Slaney River Valley (000781);

Habitats and Flora

The Potential Onshore Infrastructure Zone is host to a range of habitats including coastal, intertidal, agricultural, freshwater, woodland, hedgerow and built environment. These habitats will be assessed and evaluated according to their occurrence as protected habitats under Annex I of the EU Habitats Directive (92/43/EEC) and for their capacity to support rare, threatened and endangered species.

A desktop review of biological records has identified several habitats of ecological value within the Potential Onshore Infrastructure Zone, including areas of mobile dune and embryonic dune associated at Cahore Point North and at Donaghmore Sandhills identified in the Sand Dunes Monitoring Project (2011) and *Coastal Monitoring Project (2004-2006)*. The National Woodland Survey has identified that an area of ancient long-established woodland occurs at Courtown Dunes/Glen. Ancient long-established woodland refers to those woods that have had a continuous history of cover since before the period when planting and afforestation became common practice (mid-1600s). These woodlands are important in terms of their biological and cultural value and may even form links with prehistoric wildwoods.

A review of national species datasets, including BSBI, NBDC, Flora of County Wexford and Online Atlas of Vascular Plants, identified historic records (2000 – 2009) for Greater Broomrape (*Orobancha rapum-genistae* Thuill.) within the Potential Onshore Infrastructure Zone. This species is Near Threatened in Ireland. This species is a perennial root parasite of leguminous shrubs, especially *Ulex europaeus* and *Cytisus scoparius*. Other red list species noted within the Potential Onshore Infrastructure Zone are *Dactylorhiza fuchsia*, *Blackstonia perfoliate*, and *Senecio sylvaticus*. All of which are of least concern.

The above listed habitats and flora is not exhaustive. Further desk-based assessments, consultations and field survey will be carried out to build upon existing knowledge of the Receiving Environment.

Mammals

Available mammal datasets include the Atlas of Mammals in Ireland 2010-2015 and Mammals of Ireland 2016-2025, Badger Setts of Ireland, and Hedgehogs of Ireland. Records within the Potential Onshore Infrastructure Zone include:

- Eurasian Badger (*Meles meles*);
- Eurasian Pygmy Shrew (*Sorex minutus*);
- Eurasian Red Squirrel (*Sciurus vulgaris*);
- European Otter (*Lutra lutra*);
- European Rabbit (*Oryctolagus cuniculus*);
- Irish Hare (*Lepus timidus* subsp. *hibernicus*);
- Irish Stoat (*Mustela erminea* subsp. *hibernica*);
- West European Hedgehog (*Erinaceus europaeus*);
- Wood Mouse (*Apodemus sylvaticus*).

The NPWS and the Department of Agriculture has carried out extensive studies on Badger in the East of Ireland focussing on the spread of Tuberculosis (TB) by Badger and on the impacts of road developments on Badger.

These studies have shown that there are strong Badger territories within the Potential Onshore Infrastructure Zone.

Bats

A study by Lundy et al. (2011) examined the relative importance of landscape and habitat associations for bats across Ireland the output of which is a national 'habitat suitability' index map for bats (ranging from 0 to 100, with 0 being least favourable and 100 most favourable for bats). The map presented in Lundy et al. shows that the habitats within the Potential Onshore Infrastructure Zone have a high to moderate suitability for bats. The National Bat Database of Ireland, as held and maintained by Bat Conservation Ireland, has recorded the following bat species within the Potential Onshore Infrastructure Zone:

- Brown Long-eared Bat (*Plecotus auritus*);
- Daubenton's Bat (*Myotis daubentonii*);
- Lesser Noctule (*Nyctalus leisleri*);
- Natterer's Bat (*Myotis nattereri*);
- Nathusius's Pipistrelle (*Pipistrellus nathusii*);
- Pipistrelle (*Pipistrellus pipistrellus sensu lato*);
- Soprano Pipistrelle (*Pipistrellus pygmaeus*).

Most notable are the records for Nathusius Pipistrelle, which was first recorded in Ireland in 1996 as a migrant winter visitor, with records of resident individuals increasing. It is currently unknown whether the population in Ireland undergoes seasonal migration, however the migratory movement of this species across seas has been documented in Europe. Potential migratory impacts within the offshore environment for this species, and other bats, is discussed in the Offshore Chapter 7.

Birds

A preliminary desktop assessment to inform this EIAR Scoping Report included a review of the Rare Birds of Ireland Database, the Birds of Ireland Database, Bird Sensitivity Mapping, and review of iWeBs data. The more notable species records within the Potential Onshore Infrastructure Zone include Red Kite (*Milvus milvus*) which is Amber Listed in Ireland and was formally extinct from Ireland. This species was reintroduced in Co. Wicklow in 2007 and is successfully breeding and broadening its range within Ireland. Lesser Whitethroat (*Sylvia curruca*), which is a rare summer visitor to Ireland, has also been recorded and understood to be establishing itself as a resident breeder in an undisclosed location along the East coast (Fehily Timoney Ornithologist personal comment). Present also in the Potential Onshore Infrastructure Zone is Lesser Spotted Woodpecker (*Dendrocopos minor*) an uncommon visitor to Ireland.

The more notable areas for birds are Cahore Point and the associated Cahore Marshes, and the Arklow Ponds, Arklow Harbour and Avoca River/Arklow.

Other Species

Other records for species of conservation interest within the Potential Onshore Infrastructure Zone include those of the Irish Wildlife Trust's Newt Survey 2010-2014 which indicates several records of smooth newt (*Lissotriton vulgaris*). Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*) has been recorded in a number of locations within the Potential Onshore Infrastructure Zone, and Dog Whelk (*Nucella lapillus*) has been recorded at Glasscarrig Point in 1994 (Threatened Species: OSPAR Convention).

7.5.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.5.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR. Additionally, ecological field surveys will be carried out to substantiate the desk based assessment.

7.5.5 Proposed EIAR Assessment Methodology

The Onshore Biodiversity Topic-specific Study Area will vary relative to the ecological receptor under consideration. The zone of influence for The Project (i.e. the area over which ecological features may be affected by biophysical changes caused by the proposed development) will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018, updated April 2022) and also the likelihood of their presence within the spatial (and temporal) scale of the biophysical change. Different zones of influence will therefore be set for different ecological receptors. As such, the study area will be driven by a zone of influence assessment. This zone of influence will be established using the standard Source-Pathway-Receptor (S-P-R) assessment.

The S-P-R assessment will be an iterative assessment which will evolve as the design of The Project and the understanding of the receiving environment becomes clearer throughout the EIAR process. Initially, the potential zone of influence of The Project will be determined on the basis of broad development corridors/areas (the Potential Onshore Infrastructure Zone) and will be informed by desktop assessment. This desktop assessment will involve a review of biological records for the area. Consultation with key stakeholders will also inform the scope of the assessment. Additionally, regard will be had to species-specific best practice survey guidelines, advice notes, and scientific studies when defining the Topic-specific Study Area for ecological receptors. Table 7-16 defines the proposed Onshore Biodiversity Topic-specific Study Area for field surveys. Note these areas may be expanded or reduced in response to findings of initial walkover surveys.

The evaluation of ecological receptors contained within this EIAR Scoping Report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009). Regard will also be had to CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine'.

Table 7-16 Proposed Field Survey Study Areas (Onshore Biodiversity)

Ecological Receptor	Study Area Buffer Beyond Development Footprint	Guideline reference for Zol	Field Survey Methods
Habitats	Habitat survey area: 250m for all development with excavations or intrusions greater than 1 metre depth. All suitable habitat for protected invertebrates and herpetofauna within 250m will also be assessed.	Land Use Planning System SEPA Guidance Note 31 (Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems)	Habitat classification will be in accordance with Fossitt (2000) A Guide to Habitats in Ireland. The Heritage Council, Kilkenny. Habitat mapping will be in accordance with Smith et al., 2011 'Best practice guidance for habitat survey mapping' (heritagecouncil.ie). The Herpetofauna Workers' Manual (Gent and Gibson 1998, revised 2003) and Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (TII 2009).
Mammals	Otter: 200m Badger: 150m Pine Marten: 250m Red Squirrel: 50m	Nature Scot Standing advice for planning consultations and TII guidelines on Environmental Impact of Road Schemes	Otter survey will be undertaken in accordance with methodology outlined in National Roads Authority 'Guidelines for the Treatment of otters prior to the Construction of National Road Schemes' (NRA, 2006) and 'Monitoring the Otter Conserving Natura 2000 Rivers' Monitoring Series No. 10 Paul Chanin. Badger survey will follow 'Surveying for Badgers Good Practice Guidelines' (2018) and 'Surveying Badgers'. Mammal Society (1989). Other incidental mammal signs will be documented.
Bats	Consideration of potential effects on commuting / foraging for roosts within 2km.	Bat Mitigation Guidelines Ireland (2022)	Preliminary roost assessment will comprise daytime visual assessment survey in accordance with Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (Collins, 2016). The daytime ground level visual assessment will be carried out in line with Bat Tree Habitat Key (Andrews,

Ecological Receptor	Study Area Buffer Beyond Development Footprint	Guideline reference for ZOI	Field Survey Methods
			H et al., 2013). These assessments will inform the need for further survey relative to The Project which may include emergence / re-entry survey and/or activity surveys.
Birds	<p>For Special Conservation Interests of Special Protection Areas (SPAs) core foraging ranges will be used as based on SNH guidance (2016) and Power et al (2021).</p> <p>For all other species, disturbance due to human presence and noise is generally taken as up to 1km from source.</p>	<p>Scottish Natural Heritage (June 2016) Assessing Connectivity with Special Protection Areas (SPAs). Guidance. Version 3.</p> <p>Ruddock, M. and Whitfield, D.P. (2007). A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage. Natural Research, Banchory, UK.</p> <p>Smit, C .J. and Visser, G .J.M. 1993. Effects of disturbance on shorebirds a summary of existing knowledge from the Dutch Wadden Sea and Delta area. Wader Study Group Bull. 68: 6-19</p>	<p>Kingfisher survey will follow Cummins et al (2010).</p> <p>Nearshore bird survey will be a bespoke method comprising hourly surveys over a 6-hour tidal cycle broken down as follows: First 30 mins scan/record, next 15 mins passage snapshot sea watch count, and last 15 mins rest and prepare for next survey hour.</p> <p>Wetland survey will adopt the 'look-see' method in accordance with both the I-WeBS (wetlands) and WFBS (farmland) methods aimed at picking up waders and wildfowl such as Snipe, Lapwing, Golden Plover and Heron.</p> <p>Vantage point survey methodology will be adopted from 'Recommended bird survey methods to inform impact assessment of onshore wind farms' (SNH, 2017). The surveys will aim to quantify the level of flight activity and distribution over the survey area. Vantage points are fixed locations, which are strategically positioned to provide a maximum view shed of the survey area from a minimum number of locations.</p> <p>Raptor survey (including for Hen harrier, Red Kite and Peregrine) will be in accordance with the Raptors Field Guide (Hardey et</p>

Ecological Receptor	Study Area Buffer Beyond Development Footprint	Guideline reference for Zol	Field Survey Methods
			<p>al, 2013) and O'Donoghue, 2019 and O'Donoghue, 2020.</p> <p>Woodcock survey will follow Duriez, O. et al (2005) comprising spot-lamp counting.</p> <p>The Countryside Bird Survey methodology (BirdWatch Ireland, 2012) will be adopted to assess general bird distribution and gather data on bird usage. Point counts will also be conducted. All birds seen or heard during this period will be recorded.</p>
Aquatic	<p>To be assessed on a case-by-case basis.</p> <p>The potential effects of anthropogenic sound on fish can range from direct mortality to no obvious behavioural responses and are dependent on the class of sound i.e. either continuous or impulsive.</p>	<p>Popper, A, Hawkins, D., (2019) An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. J Fish Biol. 2019; 94:692-713.</p> <p>Popper, A. N., Hawkins, A. D., Fay, R. R., Mann, D. A., Bartol, S., Carlson, T. J., Tavalga, W. A. (2014). ASA S3 s-1C1. 4 TR-2014 sound exposure guidelines for fishes and sea turtles: A technical report prepared by ANSI-accredited standards committee S3 s-1C1 and registered with ANSI. New York, NY: Springer</p>	<p>River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O'Grady, 2006) will be followed to broadly characterise the river sites (i.e. channel profiles, substrata etc.).</p> <p>Fisheries habitat for salmonids will be assessed using the Life Cycle Unit method (Kennedy, 1984; O'Connor and Kennedy, 2002) to map survey sites as nursery, spawning and holding water, by assigning quality scores to each type of habitat.</p> <p>Lamprey habitat evaluation for each survey site will be undertaken using the Lamprey Habitat Quality Index (LHQI) scoring system, as devised by Macklin et al. (2018).</p> <p>Biological water quality will be undertaken using Q-sampling. Macro-invertebrate samples will be converted to Q-ratings as per Toner et al. (2005).</p>

7.5.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect effects on Onshore Biodiversity due to The Project will be examined in the EIA and potential significant effects will be identified. Where the potential for significant cumulative effect is identified in the EIA, such effects and interaction of effects will be included and addressed in the impacts sections of the Onshore Biodiversity chapter of the EIA

A transboundary screening exercise will be undertaken at an early stage of the EIA process (post EIA Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to the potential impacts on Onshore Biodiversity from onshore infrastructure.

7.5.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, a description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Onshore Biodiversity receptors.

7.5.5.3 Proposed Consultees

Table 7-17 summarises the proposed consultees for Onshore Biodiversity that will be consulted as part of this EIA Scoping Exercise and over the duration of the EIA process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIA process, up to the point of submission. The key consultees for onshore biodiversity are National Parks and Wildlife Service, Inland Fisheries Ireland and BirdWatch Ireland, local authority heritage officers / environment section. Consultation will be undertaken with these organisations throughout the lifespan of The Project in order to seek agreement on the approach to data collection, impact assessment, monitoring and potential mitigation measures.

Table 7-17 Proposed Consultees (Onshore Biodiversity)

Proposed Consultee	Objective of Consultation
National Parks and Wildlife Services (NPWS)	To discuss and agree data available to date and to discuss any additional data collection requirements to inform the EIA process.
BirdWatch Ireland (Wicklow Branch)	
Inland Fisheries Ireland	
Bat Conservation Ireland	
Butterfly Conservation Ireland	
An Taisce	

Proposed Consultee	Objective of Consultation
Wicklow County Council (Heritage/Biodiversity Officer)	
Wexford County Council (Heritage/Biodiversity Officer)	
Wexford Naturalists' Field Club	
Irish Raptor Study Group	
Irish Wildlife Trust	
Botanical Society of Britain and Ireland	
NPWS, Inland Fisheries Ireland and BirdWatch Ireland	To discuss and agree the approach to impact assessment and potential embedded and additional mitigation measures and any future monitoring requirements.

7.5.6 Potential Impacts to be Assessed Within the EIAR

The potential impacts on Onshore Biodiversity are shown in Table 7-18. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

The ecological evaluation of the onshore biodiversity within the Topic-specific study area will be assessed according to NRA (2009). Once the value of the identified ecological receptors (features and resources) is determined, the potential impacts and resulting effects of The Project on the identified key ecological receptors will be assessed.

Impact assessment will be carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009; CIEEM, Updated April 2022).

The potential effects will be assessed under a number of parameters such as magnitude, extent, timing, frequency, duration and reversibility. The effect significance criteria detailed in the EPA guidelines (EPA, 2022) will be used where applicable.

The design of The Project will be a constraint led approach where ecological sensitivities are identified in advance and mitigation by avoidance adopted where possible.

The potential effects associated with The Project for onshore biodiversity are likely to mostly relate to the construction phase, with potential effects also possibly relating to the operational phase of the substation and O&M facility. Potential effects are presented in Table 7-18 below.

Table 7-18 Potential impacts (Onshore Biodiversity)

Potential Impacts	Project Phase where Impact may Potentially Occur			Scoped In / Out
	Construction	Operational	Decommissioni	
Direct permanent loss of habitat Potential for loss of habitat within the footprint of The Project. Fragmentation of wildlife corridors or stepping stones as a result of habitat loss. Direct displacement of birds from important feeding, nesting and roosting areas due to direct habitat loss. Direct damage to resting or breeding places of protected species due to permanent habitat removal. Possibility of alteration of hydrology / hydromorphology of water dependant habitats which could result in permanent damage to such habitat. Onshore habitat loss may be reversable at decommissioning stage of The Project.	Yes	Yes	Yes	In
Direct temporary to short-term impact of habitat loss / disturbance due to construction Increased vehicular and personnel movement during construction resulting in disturbance from resting, feeding or breeding areas. Potential effects on water and habitat quality due to pollution run-off during construction. Barrier to wildlife corridors or stepping stones during construction. Introduction of alien invasive species during construction.	Yes	No	No	In
Indirect effects due to potential impacts on prey species due to construction Potential impacts include those resulting from noise (e.g., during piling) or the generation of suspended sediments (e.g., during watercourse crossings), or visual disturbance, that may alter the distribution, physiology or behaviour of prey species (in particular for birds: raptors and seabirds, and otter / pine marten), and thereby have an indirect potential effect. These mechanisms could potentially result in less prey being available in the areas adjacent to active construction works to foraging / hunting animals.	Yes	No	No	In
Operational disturbance and displacement Vehicle and vessel movements at the O&M base and at the substation may result in brief disturbance effects. However a level of acclimatisation would be expected.	No	Yes	No	In
Collision Risk / Barrier Effect (Onshore Infrastrucure)	No	No	No	Out

Potential Impacts	Project Phase where Impact may Potentially Occur			Scoped In / Out
	Construction	Operational	Decommissioning	
Barrier effect and collision risk from the onshore infrastructure on migrating birds / bats would not be expected given the scale of the infrastructure i.e. height of buildings would be on par with existing industrial / agricultural buildings in the area and are not of a height that would be inhibitory to the movement of birds or bats.				
Decommissioning effects During decommissioning, the potential impacts are anticipated to be similar to those described above for the construction phase but on a smaller scale. There may also be an incremental reduction of effect as the permanent structures are removed from the site.	No	No	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

7.5.7 EIAR Scoping Questions

The following list of questions are designed to assist you in providing feedback to the EIAR team as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Onshore Biodiversity chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Onshore Biodiversity Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Onshore Biodiversity chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Onshore Biodiversity chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects you believe could be significant and you wish to see assessed in the Onshore Biodiversity chapter of the EIAR for Shelmalere Offshore Wind Farm?

7.5.8 References

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7.6 CHAPTER 6: ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

7.6.1 Introduction

This chapter of the EIAR Scoping Report outlines the potential effects of Shelmalere Offshore Wind Farm on Archaeology, Architectural and Cultural Heritage receptors and sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. This chapter of the EIAR Scoping Report includes the following:

- A list of policy and guidance documents relevant to Archaeology, Architectural and Cultural Heritage;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Archaeology, Architectural and Cultural Heritage Topic specific Study Area.;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance in Ireland and Rubicon Heritage Services Ltd., a Heritage and Archaeological consultancy with extensive experience in preparing Archaeology, Architectural and Cultural Heritage assessments for EIARs for projects of the scale and extent of the proposed onshore infrastructure required for Shelmalere Offshore Wind Farm in Ireland.

The definition of a Topic-specific Study Area for the Archaeology, Architectural and Cultural Heritage chapter of the EIAR is based on the expert judgement of Rubicon Heritage Services Ltd and precedents from previous projects in Ireland of the nature and scale of the proposed onshore infrastructure associated with Shelmalere Offshore Wind Farm. The Archaeology, Architectural and Cultural Heritage Topic specific Study Area is the same as the Potential Onshore Infrastructure Zone shown in Figure 1.1. However the Archaeology, Architectural and Cultural Heritage Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process. For example, the study area for onshore buried grid connection cables will encompass an overall minimum corridor width of 500m, i.e. a minimum of 250m from the centre line of a cable route alignment.

This section of the EIAR Scoping Report deals with terrestrial archaeology, architectural and cultural heritage. Effects on the marine environment with respect to archaeology and cultural heritage are considered in Chapter 11: Offshore Archaeology and Cultural Heritage.

7.6.2 Relevant Policy and Guidance

The Archaeology, Architectural and Cultural Heritage assessment as part of the EIAR shall comply with guidance relevant to the design and acquisition of data, standards in terms of data quality and coverage of both the baseline and assessment in the EIAR for Archaeology, Architectural and Cultural Heritage, as presented in Section 4.3.1. of this EIAR Scoping Report.

In particular, key relevant policy and guidance that will inform the Archaeology, Architectural and Cultural Heritage assessment of the EIAR includes the policies of the Department of Housing, Local Government and Heritage (DHLGH), Wicklow County Council, Wexford County Council, Waterford City and County Council and the National Monuments Acts 1930-2004.

These acts are the principal statutes governing the care of monuments in the Irish Republic. They provide for the protection of national monuments through the use of preservation orders.

Key relevant policy and guidance that will inform the EIAR are set out in Table 7-19 below:

Table 7-19 Relevant Policy and Guidance Documents (Archaeology, Architectural and Cultural Heritage)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The National Monuments Acts 1930 to 2004 (as amended)	1930 to 2004 (as amended)	Ireland
Legislation for the protection of archaeological heritage in Ireland is based on the National Monuments Acts 1930 and amendments of 1954, 1987, 1994 and 2004.	1954, 1987, 1994 and 2004.	Ireland
Heritage Act, 1995;	1995	Ireland
Guidance		
EirGrid (2015) 'Cultural Heritage Guidelines for Electricity Transmission Projects. A stand approach to archaeological, architectural and cultural heritage impact assessment of high voltage transmission projects;'	2015	Ireland
Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) (1999) 'Frameworks and Principles for the Protection of the Archaeological Heritage';	1999	Ireland
Department of the Environment, Heritage and Local Government (2004) 'Architectural Heritage Guidelines';	2004	Ireland
National Roads Authority (2005) 'Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes';	2005	Ireland
National Roads Authority (2005) 'Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes'.	2005	Ireland

Monuments are protected under the National Monuments Acts in a number of ways:

- National Monuments in the ownership or guardianship of the Minister or a local authority;
- National Monuments, which are subject to a preservation order;
- Historic monuments or archaeological areas recorded in the Register of Historic Monuments;
- Monuments recorded in the Record of Monuments and Places (RMP).

Furthermore, under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies over a five-year period covering a range of issues including archaeology and built heritage and, setting out their policies and objectives with regard to the protection and enhancement of both. The National Monuments Act recognises that proper planning and sustainable development includes the protection of the archaeological heritage.

7.6.3 Receiving Environment

7.6.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

The Archaeological, Architectural and Cultural Heritage features identified in this EIAR Scoping Report within the Potential Onshore Infrastructure Zone area as shown in Figure 1-1 is based on a desktop study of a number of documentary sources. The main sources consulted in completing this section of the EIAR Scoping Report are listed here:

- Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Wicklow and County Wexford;
- National Inventory of Architectural Heritage;
- Excavation Bulletins Database;
- Topographical file maps of the national museum of Ireland;
- Wexford County Development Plan (2021-2027);
- Waterford City and County Development Plan (2022 – 2028);
- Wicklow County Development Plan (2016 -2022).

Desktop studies will be supplemented by field surveys and the addition of further sources including:

- Aerial Photographs
- Cartographic Sources
- Various published sources for local history
- Ordnance Survey Name books and Letters

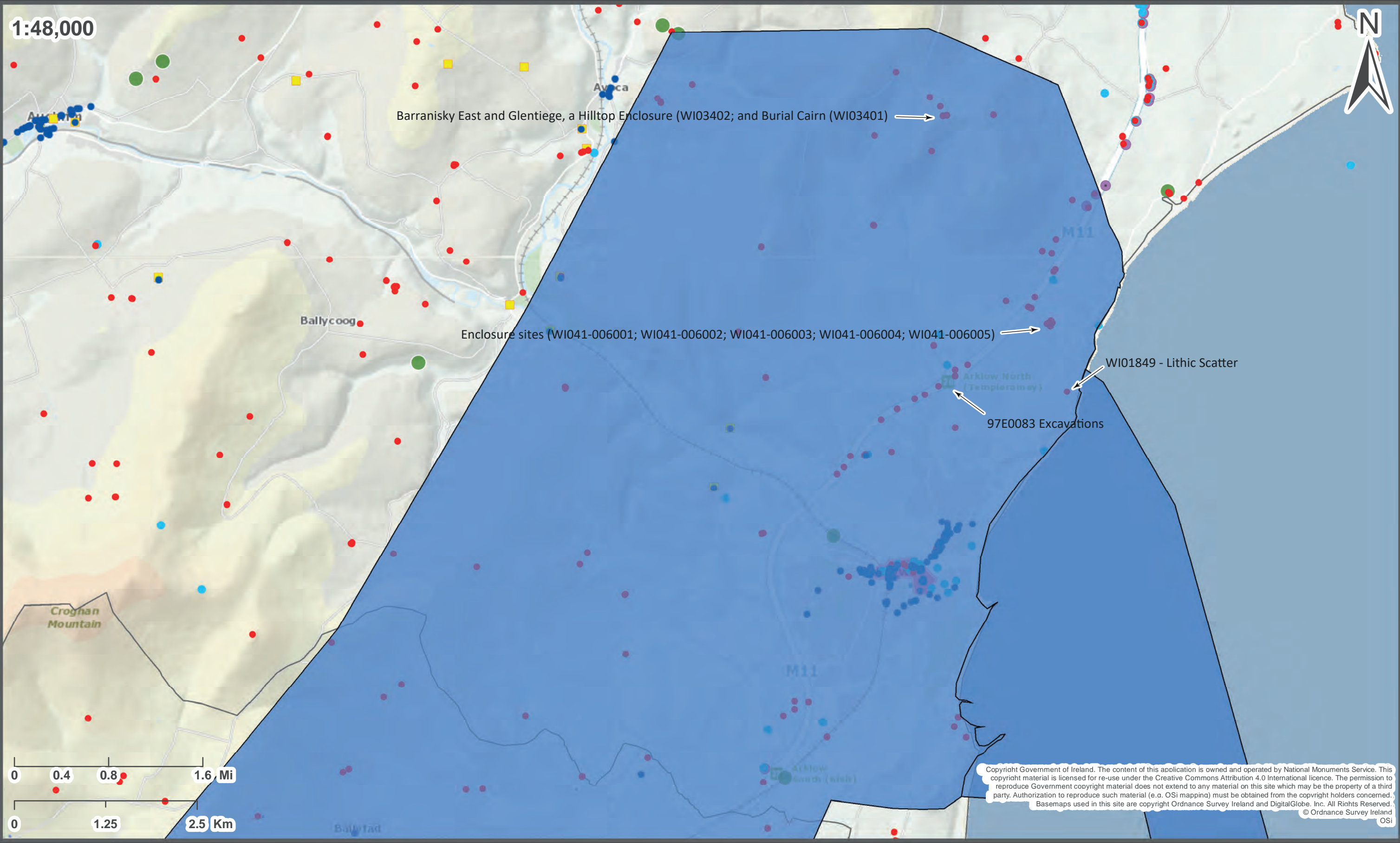
7.6.3.2 Overview of the Receiving Environment

A Potential Onshore Infrastructure Zone of c.1028 Km² (Figure 1-1) has been identified from the townland of Seabank, 3.1 km north of the town of Arklow in Co. Wicklow to the Great Island Power Station located on the Wexford-Waterford border. This part of Ireland comprises a rich and diverse archaeological, architectural and cultural landscape, with settlement dating from the Prehistoric to the early modern period.



From northeast to southwest, the principal known Archaeological, Architectural, and Cultural Heritage receptors located within the Potential Onshore Infrastructure Zone are outlined below and present in Figure 7-4 to Figure 7-13.

Of note is the presence of a known Prehistoric lithic scatter (WI01849) situated c.200 m from the shore. Just west of the town of Arklow, a dugout canoe of likely Neolithic date was recovered from the Avoca River in 1966 (IA/46/1966). Previous infrastructural development and the resulting archaeological testing programmes associated with the M11 motorway resulted in dense clusters of archaeological excavations around the towns of Arklow in Co. Wicklow. The results of these excavations identified evidence of Bronze Age activity in this area in the form of multiple burnt mound sites (Excavation No. 97E0083), particularly to the northeast of the town. In the townlands of Barranisky East and Glentiege, a Hilltop Enclosure (WI03402; and Burial Cairn (WI03401) are further evidence for prehistoric settlement in the uplands. In the townland of Johnstown south, a particularly dense cluster of ringforts/enclosure sites is noted and suggests significant Early-to-High Medieval activity at this location.



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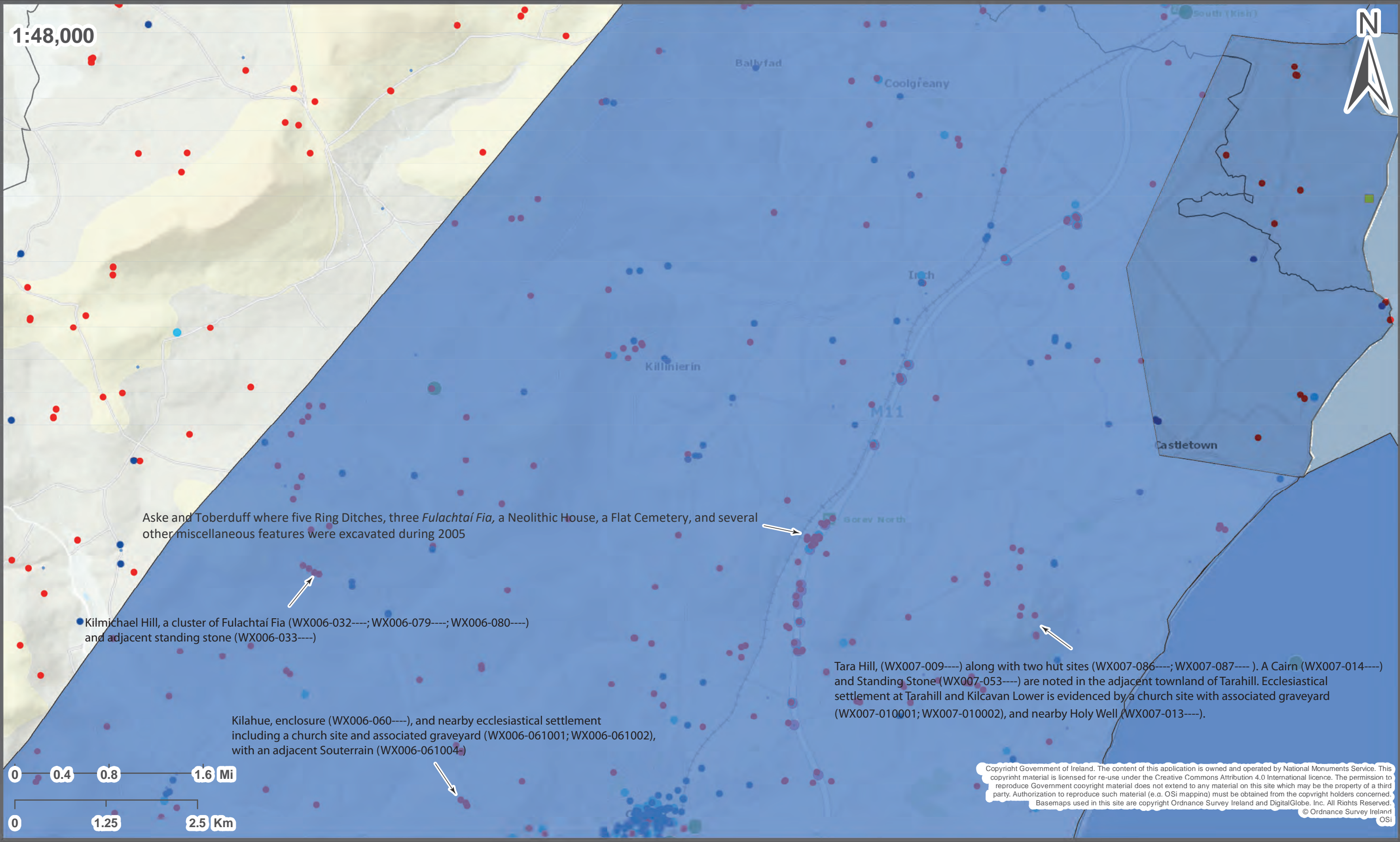
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Figure 7.4 - Study area view

Previous infrastructural development associated with the construction of the M11 motorway and N30 Enniscorthy bypass resulted in dense linear clusters of archaeological excavations. Areas of note included the townlands of Aske and Toberduff where five Ring Ditches, three *Fulachtaí Fia*, a Neolithic House, a Flat Cemetery, and several other miscellaneous features were excavated during 2005. Approximately 2 km to the east of this at Tara Hill, there is evidence for multi period settlement from at least the Bronze Age with a megalithic tomb noted in the townland of Kilcavan Lower (WX007-009----) along with two hut sites (WX007-086----; WX007-087---). A Cairn (WX007-014----) and Standing Stone (WX007-053----) are noted in the adjacent townland of Tarahill. Ecclesiastical settlement at Tarahill and Kilcavan Lower is evidenced by a church site with associated graveyard (WX007-010001; WX007-010002), and nearby Holy Well (WX007-013----).

To the northwest of Gorey in the townland of Kilmichael Hill, a cluster of *Fulachtaí Fia* (WX006-032----; WX006-079----; WX006-080----) and adjacent standing stone (WX006-033----) indicates likely Bronze Age activity at this location. To the west of the town of Gorey in the townland of Kilahue, another settlement cluster of likely early medieval origin is indicated by the presence of an enclosure (WX006-060----), and nearby ecclesiastical settlement including a church site and associated graveyard (WX006-061001; WX006-061002), with an adjacent Souterrain (WX006-061004-).



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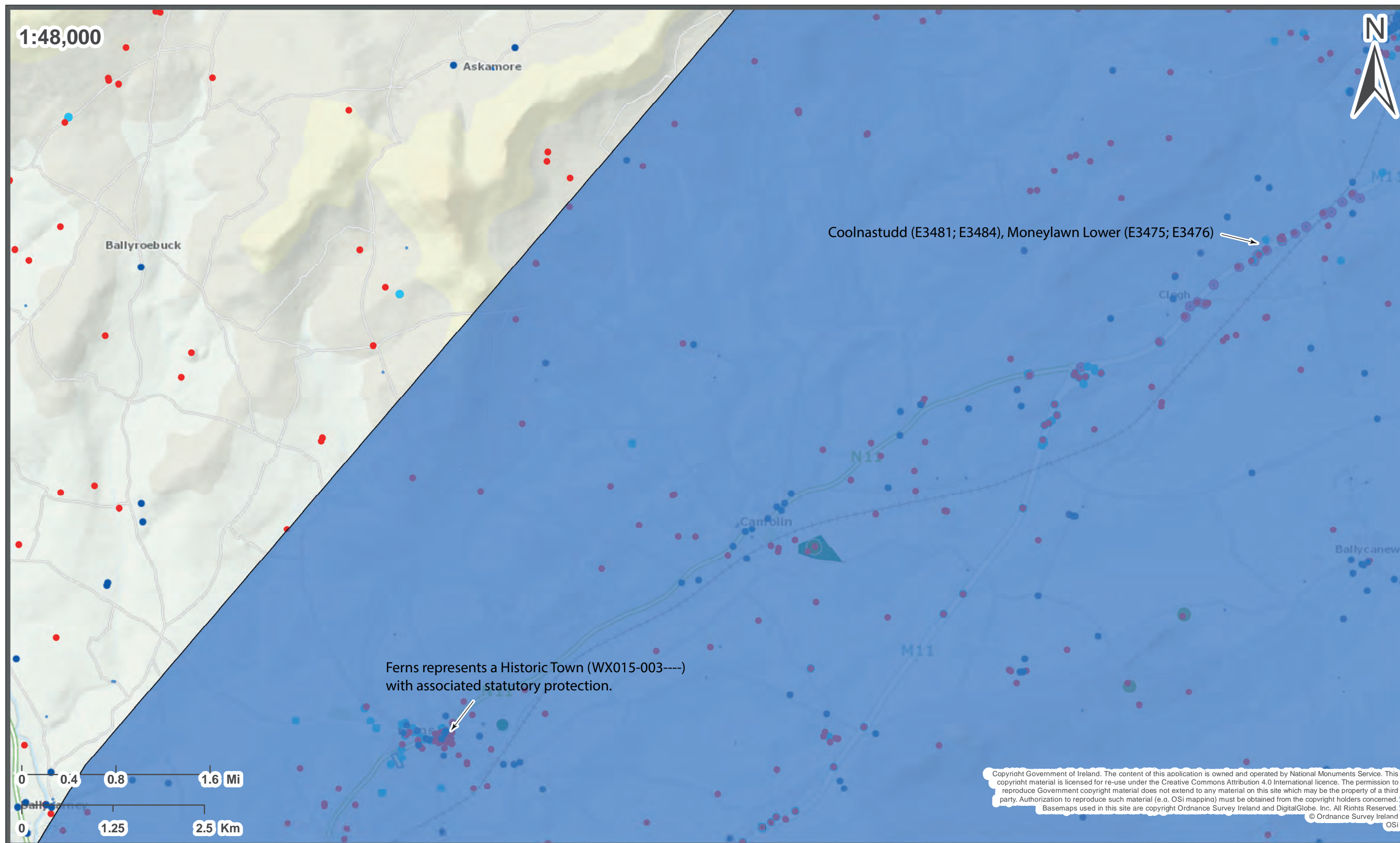
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Figure 7.5 - Study area view 2

Previous infrastructural development and the resulting archaeological testing programmes associated with the M11 motorway resulted in dense clusters of archaeological excavations south of the town of Gorey and west of the town of Ferns. To the south of Gorey, further evidence for Bronze Age activity in the form of burnt mounds (*Fulachtaí Fia*) and other pyrolythic deposits was excavated in the townlands of Coolnastudd (E3481; E3484), Moneylawn Lower (E3475; E3476). A Ring Ditch along with a cremation pit was also excavated in the townland of Coolnaveagh (E3486). Again in the townland of Moneylawn Lower, an Early Medieval House was excavated (E3478) during the same development.

The town of Ferns represents an important secular and ecclesiastical settlement centre from the Early Medieval period onward, and the density of archaeological sites in this area reflects this. The ecclesiastical landscape is represented in the townland of Ferns Upper by the presence of Churches (WX015-003002-; WX015-003005-), a Cathedral (WX015-003003-), an Augustinian Friary (WX015-003004-) along with an associated graveyard (WX015-003019-), at least five High Crosses, a Cross-inscribed Slab (WX015-003014-) and possible ecclesiastical enclosure (WX015-003032-). Secular settlement associated with the Anglo-Normans is also well represented; of note is the presence of a Ringwork Castle (WX015-003007-), later masonry castle (WX015-003001-) and a horizontal water mill (WX015-003039-). It is important to note that the landscape of Ferns represents a Historic Town (WX015-003----) with associated statutory protection.



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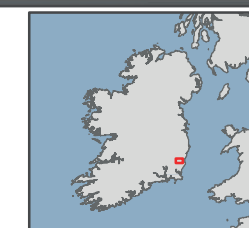
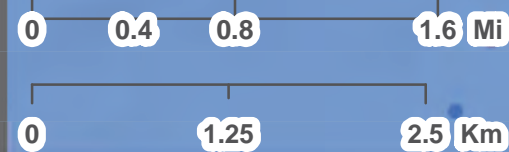
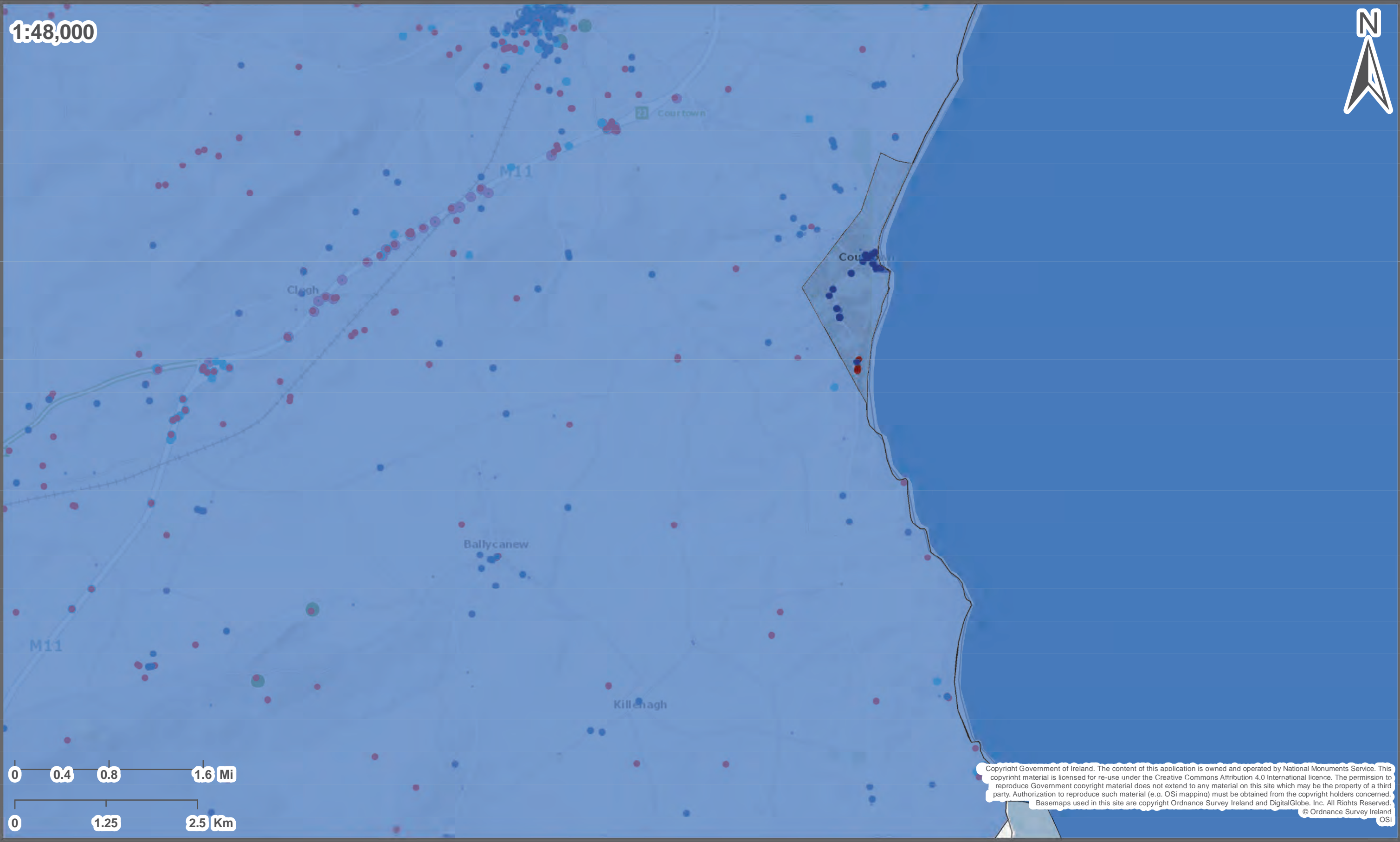


Figure 7.6 - Study area view 3



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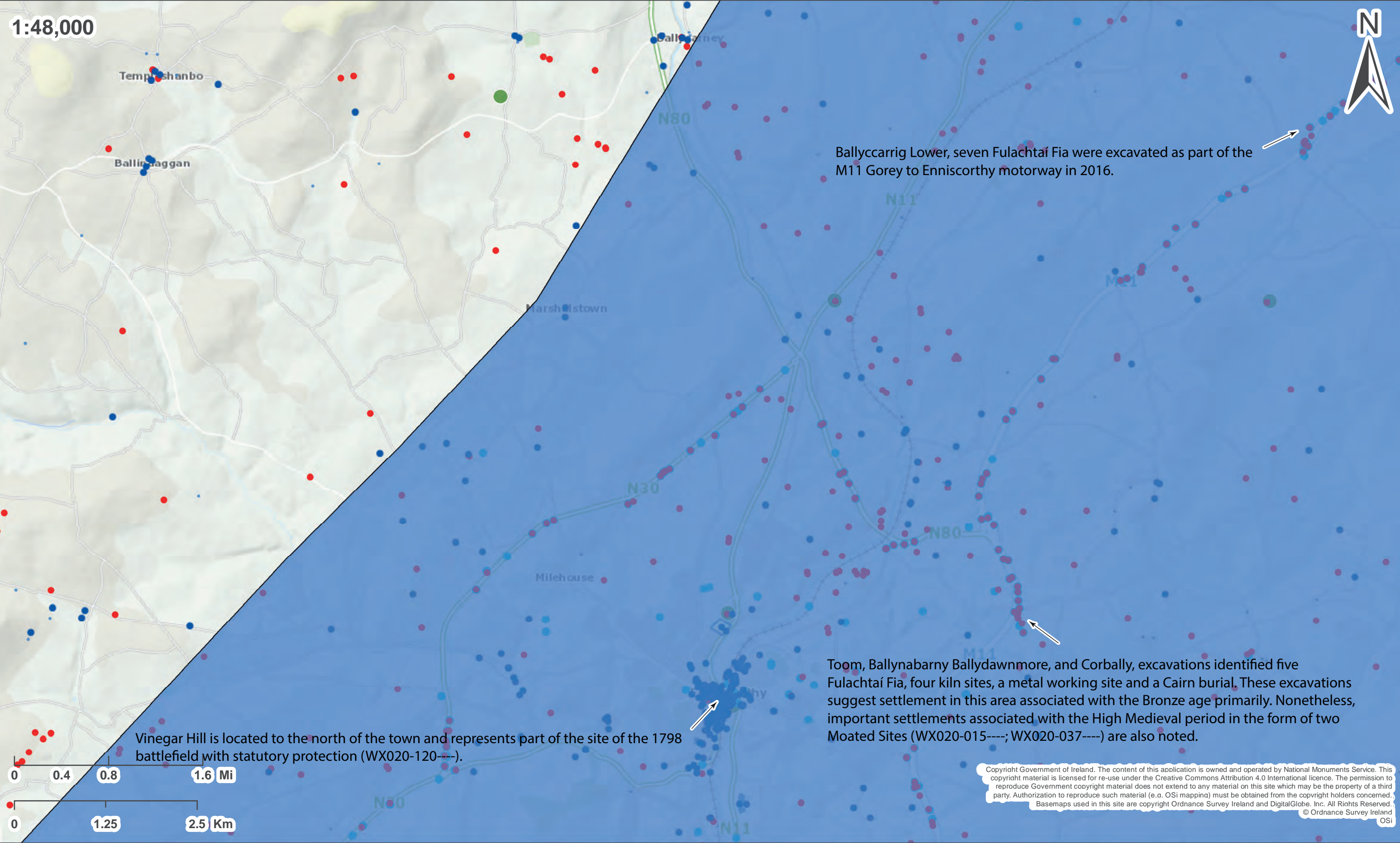
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Figure 7.7 - Study area view 4

Previous infrastructural development associated with the construction of the M11 motorway and N30 Enniscorthy bypass resulted in dense linear clusters of archaeological excavations. Southeast of the town of Ferns in the townland of Ballycarrig Lower, seven *Fulachtaí Fia* were excavated as part of the M11 Gorey to Enniscorthy motorway in 2016. Two further *Fulachtaí Fia* were excavated to the north of this in the townland of Mountgeorge as part of the same project. Northeast of Enniscorthy in the townlands of Toom, Ballynabarny Ballydawnmore, and Corbally, excavations identified five further *Fulachtaí Fia*, four kiln sites, a metal working site and a Cairn burial. These excavations suggest settlement in this area associated with the Bronze age primarily. Nonetheless, important settlements associated with the High Medieval period in the form of two Moated Sites (WX020-015----; WX020-037----) are also noted.

Similar to Ferns, the town of Enniscorthy was an important settlement centre from at least the Early Medieval period, and its status as an Historic Town with statutory protection (WX020-031----) reflects this. Archaeological monuments of note within the town include the caput of the manor of Duffry (a tower house WX020-031003), the Franciscan Friary (WX020-031002) and numerous church sites. Vinegar Hill is located to the north of the town and represents part of the site of the 1798 battlefield with statutory protection (WX020-120----). The limits of this area do not appear to be defined, and it appears to encompass the majority of the town of Enniscorthy.



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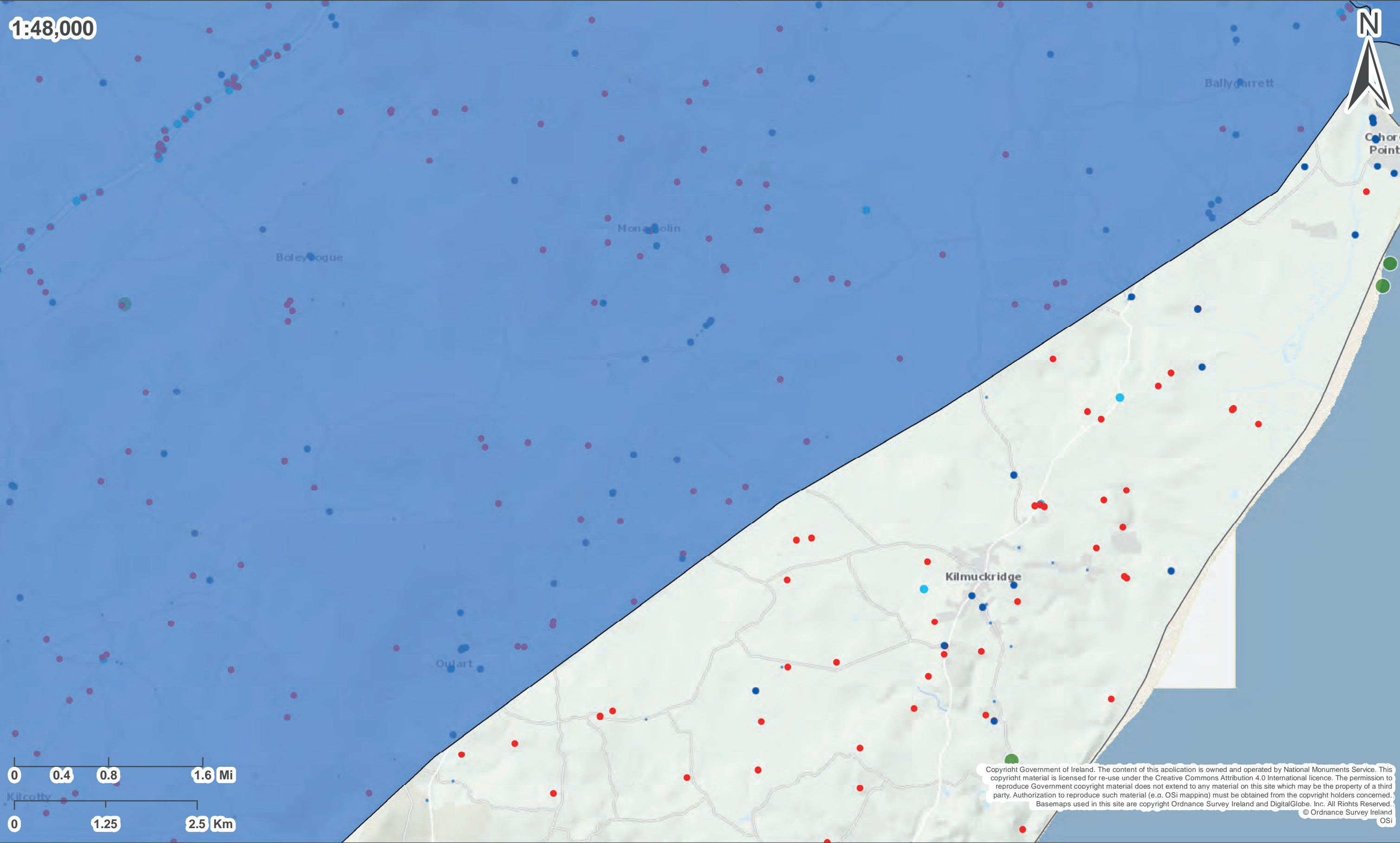
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Figure 7.8 - Study area view 5 © The Heritage Council



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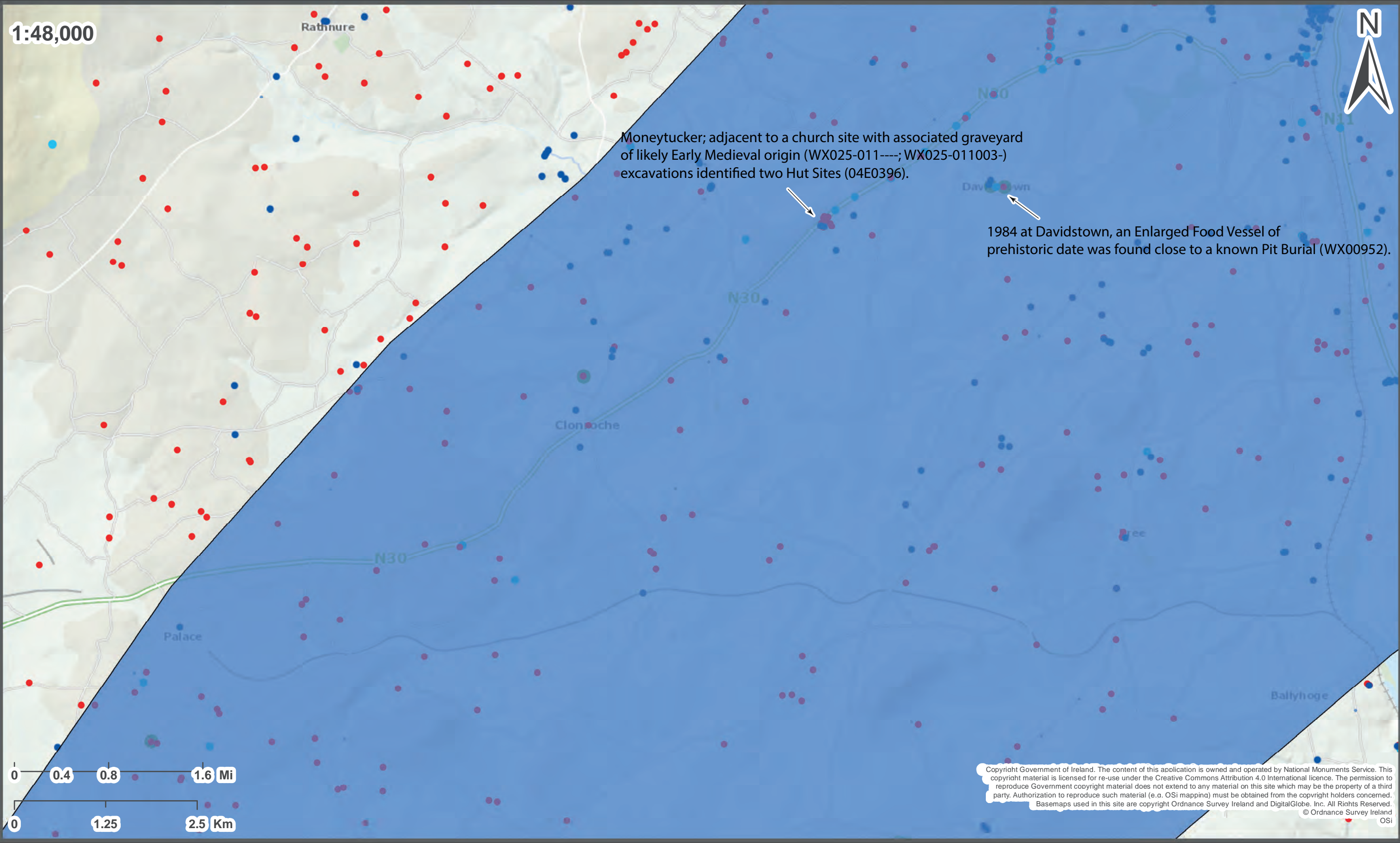
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Figure 7.9 - Study area view 6



Previous infrastructural development associated with the construction of the N30 Enniscorthy bypass resulted in dense linear clusters of archaeological excavations in the townland of Moneytucker. Here, adjacent to a church site with associated graveyard of likely Early Medieval origin (WX025-011----; WX025-011003-) excavations identified two Hut Sites (04E0396). To the east of this in 1984 at Davidstown, an Enlarged Food Vessel of prehistoric date was found close to a known Pit Burial (WX00952).

Southeast of Enniscorthy in the townland of Monroe excavations in 2016 associated with the M11 motorway identified six *Fulachtaí Fia* and a charcoal production pit (E4110), indicative of Bronze Age activity. As part of the same development and just to the north of this is the townland of Knockrathkyle, a Ring Ditch, flat Cemetery and Prehistoric House were excavated.



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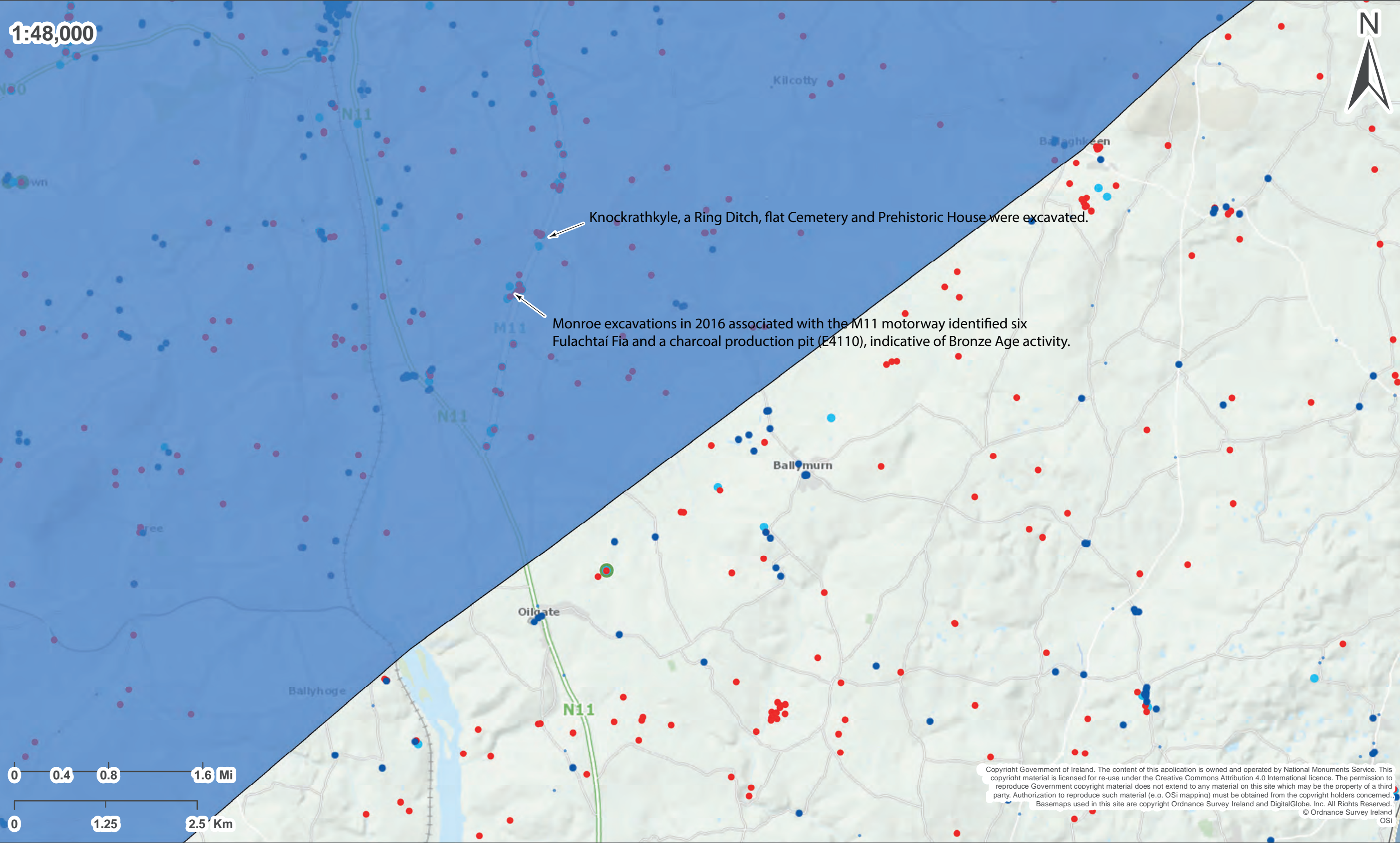
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Figure 7.10 Study Area View

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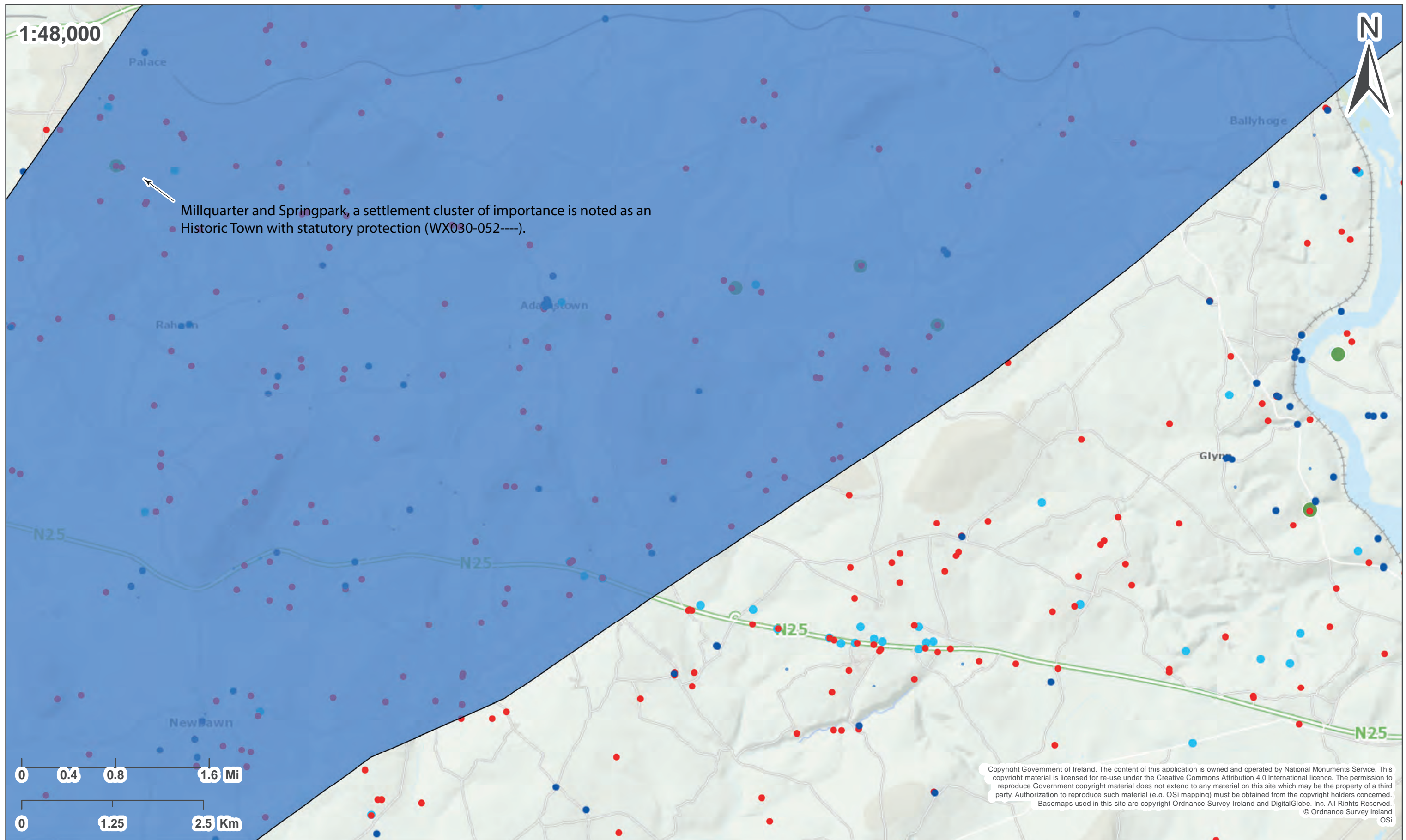
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North of the town of Ballynabola in the townlands of Millquarter and Springpark, a settlement cluster of importance is noted as a Historic Town with statutory protection (WX030-052----). Old Ross was one of the principal manors of Strongbow's descendants in Co. Wexford. In the partition of the Leinster estate in 1247 it passed to Maud, the wife of Hugh Bigod, earl of Norfolk, and thereafter to various English families. Accounts surviving from the 1280s and 1290s reveal that it was a considerable settlement with perhaps 60 households. A description in 1305 mentions two old halls, a chapel, kitchen, grange, and gardens. The location is not known precisely, but on the pattern of English rural settlements it probably lay between the motte and bailey (WX030-052001-) and the church site (WX030-053001-).

There was also a stone castle (WX030-052002-) from at least the 16th century. Robert Leigh describes the settlement as an old castle out of repair and 50 cabins in the 1680s (Hore, H.F. 1858-9, 453-4). (Hore 1900-11, vol. 1, 9-39; Bradley and King 1990, 134-6)³².

32 Bradley, J. and King, H. 1990 Urban archaeological survey - county Wexford. Unpublished report commissioned by the Office of Public Works, Dublin.

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Hore, P.H. 1900-1911 (Reprint 1979) *History of the town and county of Wexford*, 6 vols. Dublin. Published by arrangement with W.A. Hennessy Esq.



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- Excavations.ie
- National Museum Point

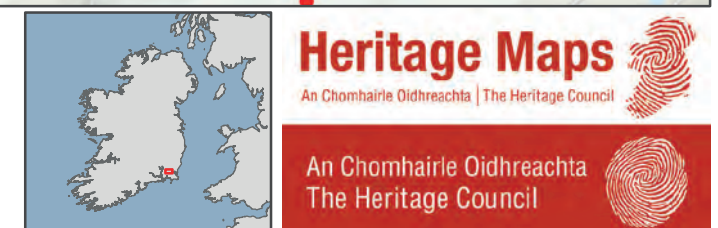


Figure 7.12 - Study area view 9

In the townland of Great Island there is a significant early ecclesiastical settlement comprising two enclosures (WX039-018001-; WX039-018007-) with associated ecclesiastical remains including the church site of Kilmokea (WX039-018002-). It has been identified as Inis Teimle, described in the sources as being between Uí Chennselaig and the Déisse, between the modern counties of Wexford and Waterford (Ní Dhonnchadha 2002). The church was founded in the early 8th century by Suadbar. Saints Findbarr and Barrfhinn (both names contain words for ‘fair’ and ‘top’) are also associated with it. They were sons of Aed with a pedigree back to the Deisse, from which the name Kilmokea – Cill mac (n)Aeda (the church of the sons of Aed) – derives. It was raided by the Vikings in 822 and 825, and again in 951, but the church may have been deserted by the time the Anglo-Norman occupation began in the 1170s. However, it did become the centre for the medieval parish and the name became attached to the parish. According to a Visitation by Thomas Ram, the Protestant bishop of Ferns, in 1615 the church and chancel of Insula Harvei were in repair (Hore 1900-11, vol. 6, 269). There is no holy well and there is no record of any form of veneration. The site is situated in a fold on the NE-facing slope of what was once the Great Island (dims c. 2.5km N-S; c. 800m E-W at S to 1.8km E-W at N) in the N-S River Barrow/Nore but the channel (Wth c. 500-600m) around the NE and E sides of the island is long silted up and reclaimed³³.

33 Flynn, J. and Grennan, T. 2016 ‘What does the Kilmokea enclosure enclose?’ in I. Doyle and B. Browne (eds) *Medieval Wexford: Essays in memory of Billy Colfer*, 62-72. Dublin, Four Courts Press.

Freitag, B. 2004 *Sheela-na-gigs: unravelling an enigma*. London. Routledge.

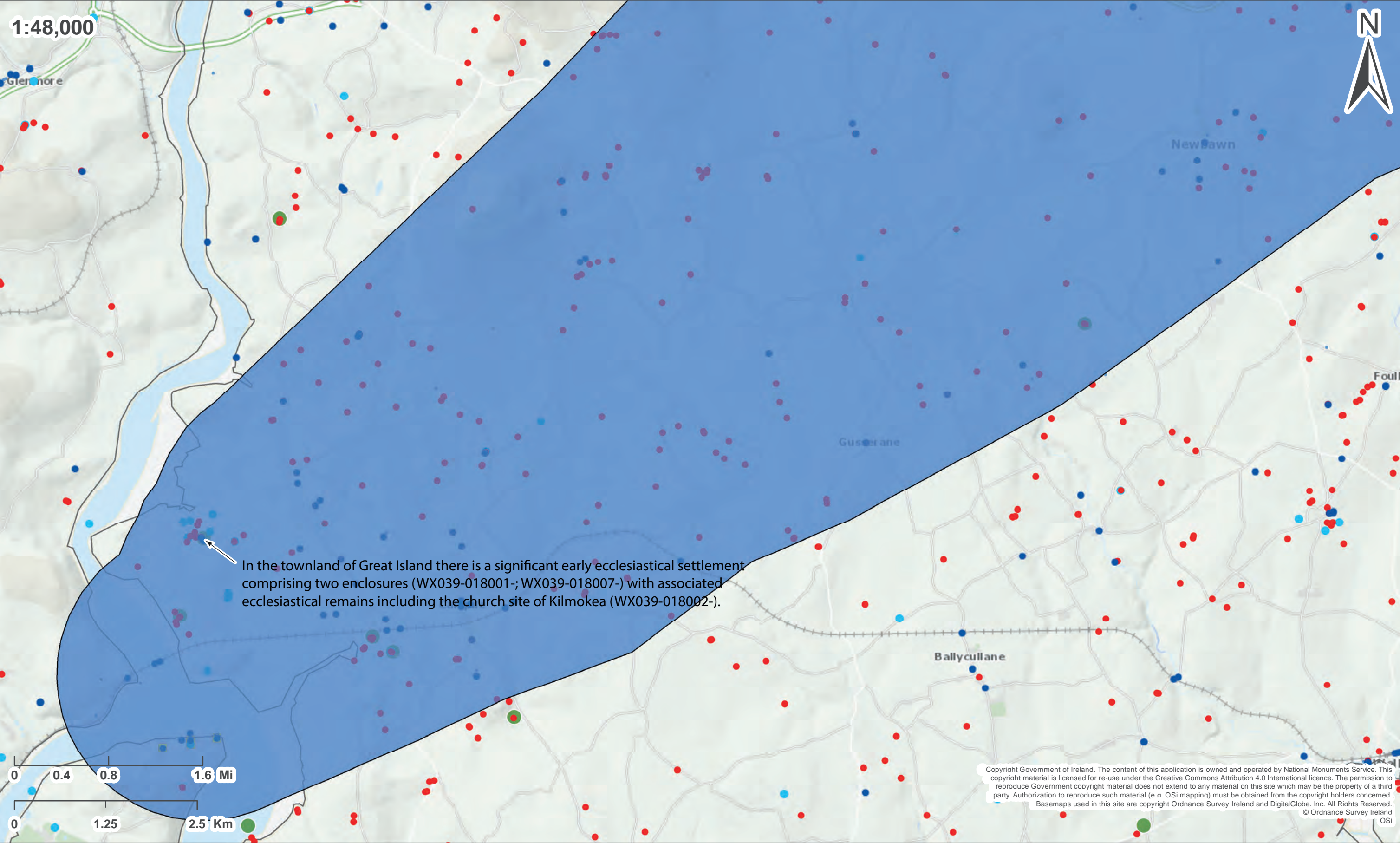
Harbison, P. 1992 *The high crosses of Ireland: an iconographical and photographic survey*, 3 vols. Dublin. Royal Irish Academy. Bonn. Dr. Rudolf Habelt GMBH.

Ní Dhonnchada, M. 2002 Inis Teimle, between Uí Chennselaig and the Déisse. *Peritia* 16, 451-8.

Stafford, E. 2004. Kilmokea House, Kilmokea. Ecclesiastical site. in I. Bennett (ed.), *Excavations 2002: summary accounts of archaeological excavations in Ireland*, 518, No. 1916. Bray, Wordwell

Stafford, E. 2013 Great Island, Kilmokea No archaeological significance. in I. Bennett (ed.), *Excavations 2010: summary accounts of archaeological excavations in Ireland*, 248, No. 775. Dublin, Wordwell

Westropp, T.J. 1918 Five large earthworks in the barony of Shelbourne, Co. Wexford, *Journal of the Royal Society of Antiquaries of Ireland*, vol. 48, 1-18



S004IE_ShelmalereOWF_20220518 - S004IE_ShelmalereOWF_IndicativeInfrastructureZones_20220518

- NIAH Heritage Sites
- Public Entity
- County
- Excavations.ie
- National Museum Point

Heritage Maps

An Chomhairle Oidhreachta | The Heritage Council

An Chomhairle Oidhreachta

The Heritage Council

Figure 7.13 - Study area view 10

7.6.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.6.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

7.6.5 Proposed EIAR Assessment Methodology

The Archaeology, Architectural and Cultural Heritage assessment as part of the EIAR will consider direct and indirect potential effects for onshore Archaeology, Architectural and Cultural Heritage receptors from all onshore infrastructure proposed as part of Shelmalere Offshore Wind Farm as described in Section 3.

In relation to underground grid connection cabling construction works, detailed searches will be undertaken to identify features of archaeological and cultural heritage significance within 250m of the cable alignment. This may be adjusted depending on the local environment.

For elements such as the Cable Landfall TJBs, Onshore Project Substation and O&M facility, detailed searches will take place for features of archaeological and cultural heritage significance within a zone of influence of up to 250m from the infrastructure. Again, this may be adjusted depending on the local environment.

As appropriate the baseline survey and impact assessment will be informed by the guidelines listed in Section 7.6.2 and any feedback received from consultees as part of this EIAR Scoping Exercise and consultation. Further baseline information to establish the receiving environment will be obtained from the sources also outlined in Section 7.6.4.

7.6.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect effects will be examined and any such potential effects will be identified. Where the potential for significant cumulative effect is identified, such effects and interaction of effects will be included in the scope and addressed in the impact assessment.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to onshore Archaeology, Architectural and Cultural Heritage.

7.6.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, A description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Archaeology, Architectural and Cultural Heritage receptors.

7.6.5.3 Proposed Consultees

Table 7-20 summarises the proposed consultees for Archaeology, Architectural and Cultural Heritage that will be consulted as part of this EIAR Scoping Exercise and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 7-20 Proposed Consultees (Archaeology, Architectural and Cultural Heritage)

<i>Proposed Consultee</i>	<i>Objective of Consultation</i>
<i>National Monuments Service</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>
<i>Wicklow County Council</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>
<i>Arklow Municipal District</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>
<i>Wexford County Council</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>
<i>Enniscorthy Municipal District</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>
<i>Gorey-Kilmuckridge Municipal District</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>
<i>Waterford City and County Council</i>	<i>To discuss and agree approach to impact assessment and potential mitigation measures where required</i>

7.6.6 Potential Impacts to be Assessed within the EIAR

The potential impacts on Archaeology, Architecture and Cultural Heritage are shown in Table 7-21. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table:

Table 7-21 Potential Impacts to be Assessed within the EIAR (Archaeology, Architectural and Cultural Heritage)

Potential Impacts	Project Phase where Impact may Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Disturbance and damage to archaeological remains. The potential impact of construction activities associated with the Cable Landfall /, onshore underground grid connection cabling routes and onshore substation(s) with associated parking, drainage and miscellaneous infrastructure, onshore construction compound(s) including works areas, temporary storage areas, temporary parking areas, welfare facilities, lighting, security features, onshore laydown area(s), onshore access tracks/roads, road improvement works, landscaping works, potential electrical infrastructure upgrades at point of connection, battery storage facility near point of connection and biodiversity enhancement measures, will involve groundworks which are likely to physically disturb, and damage buried archaeological remains if these are present.	Yes	No	Yes	In
Temporary potential impacts on designated historic assets within close proximity through the noise and dust generated by construction, or vibration from heavy machinery, as well as visual change whilst construction is in progress.	Yes	No	Yes	In
Permanent Visual Change. The potential impact of the offshore windfarm array and the onshore substation will be considered permanent through the indirect effect of a change to heritage significance through development within the setting of the designated historic asset.	No	Yes	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

7.6.7 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Archaeology, Architectural and Cultural Heritage topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Archaeology, Architectural and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Archaeology, Architectural and Cultural Heritage Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Archaeology, Architectural and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Archaeology, Architectural and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are there any other potential effects you believe could be significant and you wish to see assessed in the Archaeology, Architectural and Cultural Heritage chapter of the EIAR for Shelmalere Offshore Wind Farm?

7.7 CHAPTER 7: TRAFFIC AND TRANSPORTATION

This chapter of the EIAR will address the potential effects of Shelmalere Offshore Wind Farm on Traffic and Transportation receptors and sets out the methodology and approach to be taken to assessing these potential effects within the EIAR. This chapter of the EIAR Scoping Report includes the following:

7.7.1 Introduction

- A list of policy and guidance documents relevant to Traffic and Transportation;
- A preliminary review of the receiving environment relevant to this EIAR topic within the Traffic and Transportation Topic specific Study Area.;
- The methodology proposed to be used within the EIAR to assess potential effects on this receptor group;
- A list of topic-specific stakeholders that it is proposed to consult over the duration of the EIAR process;
- Key data sets that it is proposed to use to inform the EIAR for this topic;
- Potential surveys proposed to inform the EIAR for this topic;
- A summary of potential effects on this receptor group that will be fully assessed within the EIAR.

This chapter of the EIAR Scoping Report has been completed by FT, an Environment and Engineering consultancy with extensive experience in preparing EIARs for energy projects of strategic infrastructural importance and scale in Ireland.

The definition of a Topic-specific Study Area for the Traffic and Transportation chapter of the EIAR is based on the expert judgement of FT and precedents from previous projects in Ireland of this nature and scale. The Traffic and Transportation Topic specific Study Area is the same as the Potential Onshore Infrastructure Zone shown in Figure 1-1. However the Traffic and Transportation Topic specific Study Area will be refined based on the positioning of onshore infrastructure elements described in Section 3 of this EIAR Scoping Report, the locations of which shall be defined as the design develops throughout the EIAR process.

The section of the EIAR Scoping Report deals with potential effects on terrestrial traffic and transportation only. Potential effects in the marine environment associated with marine traffic are detailed in Chapter 10: Shipping and Navigation.

7.7.2 Relevant Policy and Guidance

The Traffic and Transportation assessment in the EIAR shall comply with guidance relevant to the design and acquisition of data, standards in terms of data quality and coverage of both the baseline and assessment in the EIAR for Traffic and Transportation, as presented in Section 4.3.1. of this EIAR Scoping Report.

The assessment of the receiving environment and potential effects in the Traffic and Transportation assessment as part of the EIAR shall be made with specific reference to relevant policies and guidance.

In preparation of the assessment reference will be made to the following standards and guidance documentation at a minimum:

- Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines, 2014;
- TII Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, 2019;
- TII Project Appraisal Guidelines for National Roads: Estimating AADT on National Roads, October 2016;
- TII Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions) DN-GEO-03060 April 2017;
- County Development Plans.

In addition, key relevant policy and guidance that will inform the EIAR are set out in Table 7-22 below:

Table 7-22 Relevant Policy and Guidance Documents (Traffic and Transportation)

Policy / Guidance	Reference	Geographic Coverage
Guidance		
Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines, 2014;	PE-PDV-02045, 2014	Ireland
TII Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, 2019;	PE-PAG-02017, 2019	Ireland
TII Project Appraisal Guidelines for National Roads: Estimating AADT on National Roads, October 2016;	PE-PAG-02039, 2016	Ireland

7.7.3 Receiving Environment

7.7.3.1 Data Sources used for EIAR Scoping and to be used for EIAR

Baseline information to establish the receiving environment for the Traffic and Transportation chapter of the EIAR will be obtained from a combination of desktop studies, consultation and field surveys. Other sources of information to inform the Onshore Noise and Vibration assessment as part of the EIAR shall include outline designs, specifications and construction methodologies associated with The Project provided by the project design team.

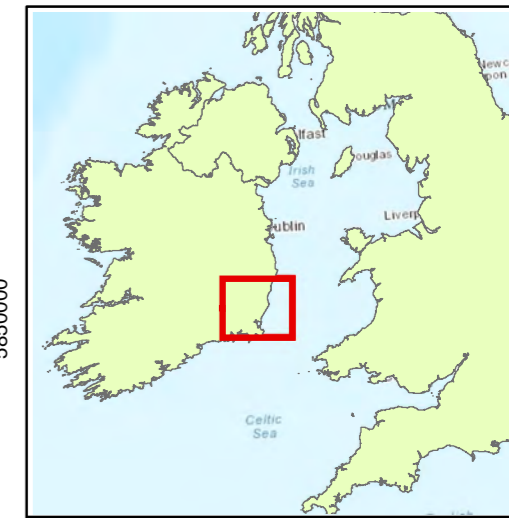
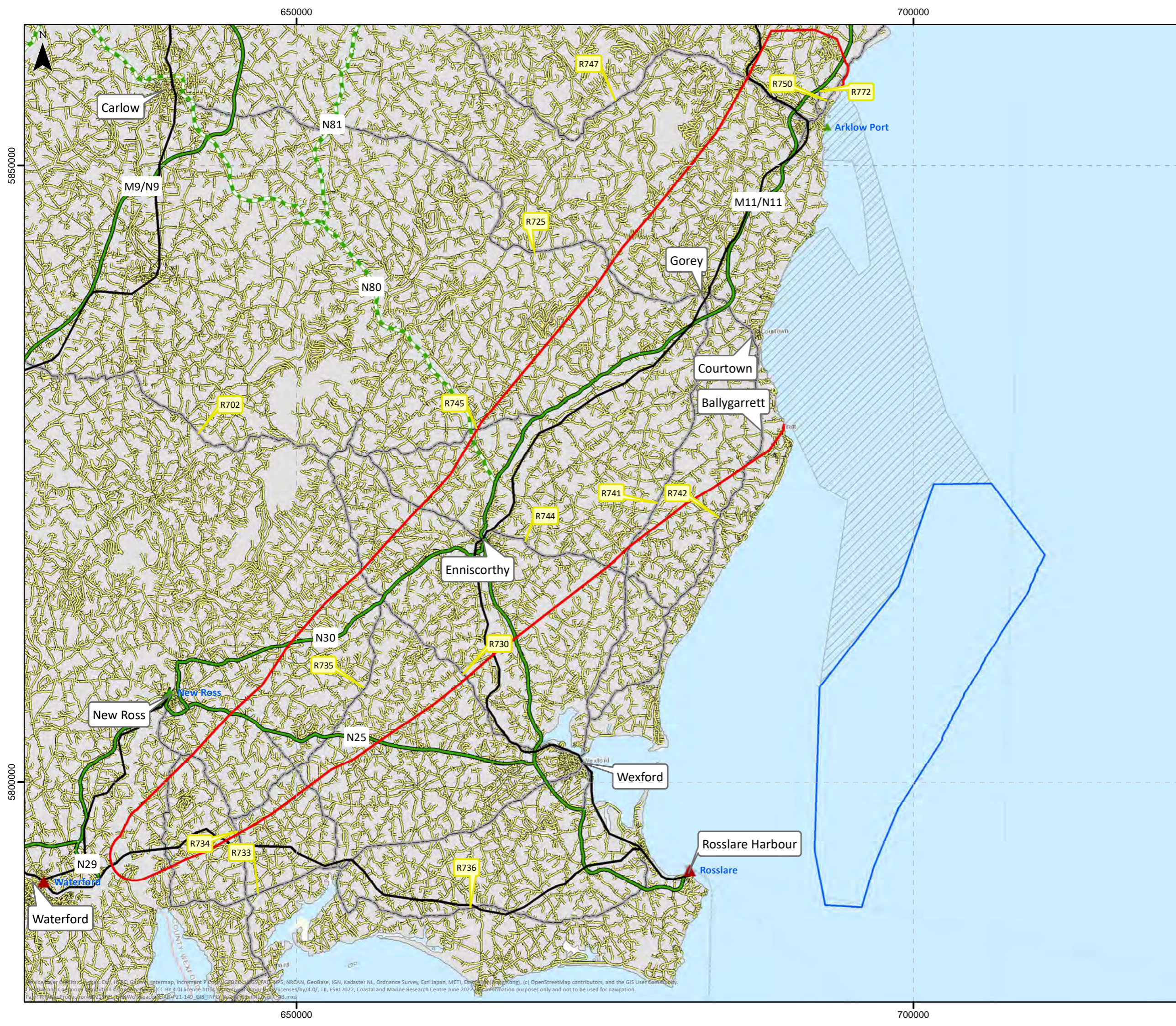
7.7.3.2 Overview of the Receiving Environment

The Potential Onshore Infrastructure Zone encompasses an extensive network of national, regional and local roads as shown in Figure 7-14.. Three existing 220/110 kV electrical substations are located within the onshore infrastructure zone at Arklow, Lodgewood and Great Island. The onshore underground grid connection cabling is expected to run to one of these locations or a potentially new 220 kV station by being routed through or crossing under private lands and existing public roads including potentially, the M11 motorway, N11, N80, N30 and N25 national roads, as well as regional and local roads within the Potential Onshore Infrastructure Zone which include the R702, R725, R734, R736, R745, R747, R750, R730, R733, R735, R741, R742, R744, and R772.



Onshore infrastructure will also potentially cross the Dublin to Rosslare Main Rail Line, which runs between Arklow and Wexford Town and traverses the Potential Onshore Infrastructure Zone. The urban areas of Enniscorthy, Arklow and Gorey are all located within the Potential Onshore Infrastructure Zone while the road networks serving nearby settlements such as Bunclody, Wexford Town, Courtown and New Ross may also potentially experience traffic and transportation impacts during the construction phase depending on the final location of the proposed onshore infrastructure.

The Traffic and Transportation Topic specific Study Area includes the transport network which may potentially experience effects as a result of the construction, operation and decommissioning of Shelmalere Offshore Wind Farm. This may include road links and junctions located outside the Potential Onshore Infrastructure Zone, depending on the location of infrastructure. For example, much of the R745 and N80 between Bunclody, Killealy and Lodgewood are located outside of the Potential Onshore Infrastructure Zone, however, construction works near Lodgewood and the Potential Infrastructure Zone boundary as part of Shelmalere Offshore Wind Farm could result in direct or indirect effects on these roads in the form of increased HGV traffic volumes during the construction stage.



Legend



- Potential Onshore Infrastructure Zone
- Potential Export Cable Corridor Infrastructure Zone
- Potential Turbine Array Infrastructure Zone


Road and Rail Network:

- National Primary
- National Secondary
- Regional Road of Interest
- Regional and Local Roads
- Railway

Ports of Ireland:

- Regional Port
- Tier 2 National Port

Title: Road and Rail Network			
Project: Shelmalere OWF			
Client:  			
Projection: IREN95 UTM Zone 29N			
Scale: 0 2 4 8 Kilometers			
Figure Number	Drawn By CE	Checked By TB	Date 15/06/2022


MarineSpace
Making Sense of the Marine Environment

7.7.4 Potential Additional Data and Proposed Surveys

The data sources listed in Section 7.7.3 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

7.7.5 Proposed EIAR Assessment Methodology

The details of Shelmalere Offshore Wind Farm are considered in relation to the construction, operation and decommissioning phases of Shelmalere Offshore Wind Farm and all relevant factors that could potentially cause traffic and transportation impacts will be examined.

Traffic generated by each phase of Shelmalere Offshore Wind Farm will be estimated in order to identify potential disruptions to existing road users within the Topic-specific study area. Based on project construction methodologies and programmes, an estimate of the number of vehicles generated as a result of each element of Shelmalere Offshore Wind Farm will be calculated. These estimates are used to assess the potential effect on the road network in numerical terms. Disruption as a result of road or lane closures as a result of as part of the cable installation works along public roads will also be assessed. Mitigation, for example temporary traffic diversions, will be considered where required.

The potential effects on the existing road network will then be considered and described in terms of quality, duration and significance. Mitigation measures will be proposed, where required, followed by identification of residual effects.

The assessment will also include (but is not limited to) the following activities:

- Review of existing data / information including historical local traffic data and other relevant and recent studies or assessments of traffic and transportation issues in the study area;
- Consider future, known road network developments;
- Identify key issues and risks for evaluation in the assessment;
- Advise the design team on project design including onshore cable routing;
- Engage with key stakeholders and gather feedback to inform the assessment;
- Undertake surveys to obtain data on current baseline traffic levels within the study area;
- Undertake an Abnormal Load Assessments if required;
- Identify potential haul routes for Heavy Goods Vehicles (HGV's) associated with construction and decommissioning phases of Shelmalere Offshore Wind Farm for assessment;

- Assess and contribute to the selection of safe access points for project infrastructure for both construction and operational phases of Shelmalere Offshore Wind Farm;
- Consider traffic movements associated with construction and operational staff including parking requirements;
- Prepare an outline Traffic Management Plan (if required) as part of mitigation proposals.

7.7.5.1 Cumulative and Transboundary Effects

The potential for significant cumulative and indirect effects will be examined and any such potential effects will be identified. Where the potential for significant cumulative effect is identified, such effects and interaction of effects will be included in the scope and addressed in the impact assessment.

A transboundary screening exercise will be undertaken at an early stage of the EIAR process (post EIAR Scoping) to determine if any potential transboundary effects are likely. It is not expected that transboundary effects will be identified with respect to onshore Traffic and Transportation.

7.7.5.2 Major Accidents and Natural Disasters

In line with Annex IV of the EIA Directive, A description of the expected significant adverse effects of Shelmalere Offshore Wind Farm on the environment deriving from the vulnerability of The Project to risks of major accidents and/or disasters which are relevant to The Project will be assessed with respect to the Potential effects on Traffic and Transportation receptors.

7.7.5.3 Key Consultees

Table 7-23 summarises the proposed consultees for Traffic and Transportation that will be consulted as part of this EIAR Scoping Process and over the duration of the EIAR process. Specific points that are proposed to be consulted on are also included in the Table. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission.

Table 7-23 Proposed Consultees (Traffic and Transportation)

Proposed Consultee	Objective of Consultation
<i>Transport Infrastructure Ireland (TII)</i>	<p><i>To discuss and agree approach to traffic and transportation assessment and to inform the scope of the Traffic and Transportation assessment of the EIAR.</i></p> <p><i>To consult on approaches to potential infrastructure crossing methods for motorways and national roads.</i></p> <p><i>To discuss potential mitigation measures to be incorporated into the design or traffic management plan.</i></p>
<i>Local Authority Engineering Department</i>	<p><i>To discuss and agree approach to traffic and transportation assessment and to inform the scope of the Traffic and Transportation assessment of the EIAR.</i></p> <p><i>To consult on approaches to potential infrastructure crossing methods for local roads.</i></p> <p><i>To discuss potential mitigation measures to be incorporated into the design or Traffic Management Plan.</i></p>
<i>Irish Rail</i>	<p><i>To consult on approaches to potential infrastructure crossing methods for Irish Rail assets (if required).</i></p>
<i>Relevant Port Authorities</i>	<p><i>To discuss and agree approach to traffic and transportation assessment and to inform the scope of the Traffic and Transportation assessment of the EIAR.</i></p>

7.7.6 Potential Impacts to be Assessed within the EIAR

The potential impact on Traffic and Transportation are shown in Table 7-24. The project phase during which these potential impacts may arise is signified by a Yes/No in the respective column in the table.

Table 7-24 Potential Impacts to be Assessed within the EIAR (Traffic and Transportation)

Potential Effect	Project Phase where Impact will Potentially Occur			Scoped In/Out of the EIAR
	Construction	Operation	Decommissioning	
Delay and disruption to road users	Yes	No	Yes	In
Road safety issues should the works not be carried out in line with good traffic management practices	Yes	No	Yes	In
Inappropriate parking of construction related vehicles	Yes	No	Yes	In
Soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads	Yes	No	Yes	In
Damage to existing road surfaces and public infrastructure	Yes	No	Yes	In
Cumulative Effects	Yes	Yes	Yes	In
Transboundary Effects	No	No	No	Out

7.7.7 EIAR Scoping Questions

The following questions are designed to assist the respondent in providing feedback to the EIAR Team on the Traffic and Transportation topic as part of this EIAR Scoping Exercise:

- Are you satisfied with the scope proposed for the Traffic and Transportation chapter of the EIAR for Shelmalere Offshore Wind Farm?
- Are you satisfied the proposed Traffic and Transportation Topic-specific Study Area is suitable for the purpose of the EIAR for Shelmalere Offshore Wind Farm?
- What other data sources or surveys, if any, should The EIAR Team have regard to in the preparation of the Traffic and Transportation chapter of the EIAR for Shelmalere Offshore Wind Farm?



-
- What additional guidance and policy should The EIAR Team have regard to in the preparation of the Traffic and Transportation chapter of the EIAR for Shelmalere Offshore Wind Farm?
 - Are there any other potential effects you believe could be significant and you wish to see assessed in the Traffic and Transportation chapter of the EIAR for Shelmalere Offshore Wind Farm?

8 CUMULATIVE EFFECT, INDIRECT EFFECT AND INTERACTION OF EFFECTS

8.1 CUMULATIVE EFFECTS

The potential cumulative effect of Shelmalere Offshore Wind Farm will be assessed in line with Annex IV of the EIA Directive 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 Shelmalere Offshore Wind Farm in combination with other plans, projects and activities has four principal aims:

1. To establish the range and nature of receiving projects and plans within the cumulative effect study area of Shelmalere Offshore Wind Farm.
2. To summarise the relevant projects and plans which have a potential to create cumulative effects.
3. To establish anticipated cumulative effect findings from expert opinions within each relevant field. This will be addressed in each chapter of the EIAR.
4. 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 extent of the cumulative assessment is considered on a case-by-case basis, in line with the Guidelines for the Assessment of Indirect and Cumulative Impacts 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 Shelmalere Offshore Wind Farm.

The material for the cumulative assessment will be gathered through a search of relevant County Councils' Online Planning Registers, the An Bord Pleanála website and the EIA Portal. Relevant EIA documents, planning application details and planning drawings will be reviewed, which serve to identify the locations of existing and approved projects and projects pending a decision from the competent authority, their activities and their environmental impacts. Plans will also be considered such as County Development Plans and National Spatial Plans for any potential future project that could interact with The Project site. For example, other offshore wind farms which have been considered 'Phase One Projects' will likely be considered in the cumulative impact assessment.

The progress of Phase Two offshore wind project and potential future offshore development sites will be monitored and when relevant information becomes available it will be considered in the EIAR for potential cumulative effects. A Staged / Tiered approach will be taken as outlined in PINS Advice Note 17. This approach will identify other projects, where the level of information likely to be available decreases from Tier 1 to Tier 3.

- Tier 1: Projects would consist of developments under construction, permitted and submitted for planning.
- Tier 2: Projects or developments identified in relevant plans including County Development Plans, Local Area Plans.

Tier 3: Projects or developments identified in other framework plans and programmes for future development consent.

8.2 INTERRELATED EFFECTS

In addition to assessing potential cumulative effects, the EIAR will also consider and present potential inter-related effects. A potential inter-related effect is defined as an additional effect that may arise on a particular receptor via the interaction of multiple individual effects, either spatially, temporally or both. It is proposed that as part of the assessment of potential inter-related effects within the EIAR, such effects will be classified into two categories:

- **Project-lifetime effects:** Assessment of the scope for effects that occur throughout more than one project phase (i.e. construction, operation and decommissioning) to interact to potentially create an effect of greater significance than if assessed just within individual project phases. For example, increases to suspended sediment concentrations from activities across all three of the project phases stated above may combine to create an additive effect of greater significance than these impacts considered alone in each discrete project phase;
- **Receptor-led effects:** Assessment of the scope for all effects to interact (spatially and temporally) to create an effect on a receptor of greater significance than when the effects are considered in isolation. For example, effects due to increased noise and poorer air quality during the construction phase together could have an effect of greater significance on a residential receptor than each impact considered in isolation. The receptor-led effects assessment also considers whether a project lifetime inter-related effect is predicted for that impact.

The following methodology is proposed to be used and presented within the EIAR with respect to inter-related effects:

- A review of all residual effects for individual EIAR topic areas will be undertaken;
- A review of the assessment carried out for each EIA topic area will be undertaken, to identify "receptor groups" requiring assessment of potential inter-related effects;

- Potential inter-related effects on these receptor groups will be identified via the review of the assessment carried out across a range of topics;
- Lists for all potential receptor-led effects will be developed;
- A qualitative assessment on how individual effects may combine to create inter-related effects will be undertaken and presented within the individual EIAR topic chapters.

Each chapter of the EIAR will address cumulative and inter-related effects and a summary chapter will be provided at the end of the EIAR to summarise the projects considered and any likely cumulative and/or inter-related effects.

8.3 CONCLUSION

Each topic-specific chapter of the EIAR will include a section to address Cumulative and Inter-Project potential effects and a summary chapter will also be provided at the end of the EIAR to summarise any likely cumulative effects and inter-related effects across all topics.

9 TRANSBOUNDARY EFFECTS

9.1 APPROACH TO TRANSBOUNDARY EFFECTS

Requirements for assessing environmental effects of an activity that may have the potential to have transboundary effects at an early stage in the process are set out in The United Nations Economic Commission for Europe (UNECE) Convention on EIA in a Transboundary Context (UNECE, 1991), commonly referred to as the Espoo Convention, and also Directive 2011/92/EU as amended by Directive 2014/52/EU (the EIA Directive). With potential transboundary effects from Shelmalere Offshore Wind Farm most likely to arise on the UK, and thus require engagement on this issue with UK stakeholders, the Espoo Convention will be the key piece of legislation, due to the UK no longer being a member of the EU.

In order to determine if Shelmalere Offshore Wind Farm has the potential to result in likely significant adverse transboundary effects, a transboundary screening exercise will be undertaken at an early stage of the EIA process (post EIA Scoping).

This transboundary screening exercise will focus on the following potential transboundary effects:

- Potential effects that may occur in/on the environment of another European Economic Area Member States (EEA States) (i.e. their territory or territorial waters);
- Potential effects that may occur to interests of another State (for instance commercial fishing by non-Irish vessels which occurs within the Irish EEZ).

The potential for transboundary effects will vary across EIA topics and will be informed by the spatial extent of Topic-specific Study Areas.

Where significant transboundary effects are identified, and if the Competent Authority deems it appropriate, it will notify EEA States, including non-EU Member State such as the UK, and consult with them at the time of the consent application or during the pre-application stage (PINS, 2015; EPA, 2022). Potential Transboundary effects will also be considered as part of the Appropriate Assessment (AA), particularly for mobile species, i.e. marine mammals, birds, migratory fish, where their foraging/migratory ranges overlap with Natura 2000 sites within another EEA State (or National Sites which form part of the National Site Network in the UK) for which these species are qualifying features.

In addition to the potential consultation by the Competent Authority detailed above, if the transboundary screening exercise does identify potentially significant effects, Shelmalere Offshore Wind Farm Ltd. may potentially undertake its own targeted consultation with affected transboundary stakeholders to discuss and hopefully resolve specific issues to the satisfaction of relevant Irish consenting authorities.



9.1.1 References

UK Planning Inspectorate (PINS), 2015. Advice Note Twelve: Transboundary Impacts. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/>

Environmental Protection Agency (EPA), 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Convention on Environmental Impact Assessment in a Transboundary Context, United Nations Economic Commission for Europe, 1991 (as amended), 2017.

10 APPROPRIATE ASSESSMENT

10.1 INTRODUCTION

The following section considers the approach to the assessment of likely significant effects on designated nature habitats and species in accordance with requirements of the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC). An Appropriate Assessment (AA) is required for any project which may result in significant effects on a European site, either alone, or in combination with other plans or projects, in view of the site's conservation objectives. This section outlines the approach for identification of European sites and their designated features for consideration and lists pressure pathways associated with Shelmalere Offshore Wind Farm such that the likelihood of significant effects on the conservation objectives of European sites might be determined. It should be noted that list of sites identified within this EIA Scoping Report is not definitive, and that an AA Screening Report will be produced in which a full review of potential European sites that may be affected by Shelmalere Offshore Wind Farm, will be presented (see Section 10.2.4 below).

A Natura Impact Statement (NIS) will also be submitted alongside the EIA to accompany the consent application, where it is considered that likely significant effects will arise as a result of Shelmalere Offshore Wind Farm.

The NIS will follow all relevant policy and guidance, as detailed in Section 10.3. It is understood that the following guidance document from 2010 will be updated and published whilst the NIS (and EIA) process is being undertaken for Shelmalere Offshore Wind Farm. Therefore, the updated guidance will be reviewed and fully considered as part of this assessment (Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (NPWS, DEHLG (2009, updated 2010).

10.2 APPROACH TO NATURA IMPACT STATEMENT

10.2.1 Habitats Directive and Irish Regulations

The Habitats Directive was transposed into Irish legislation by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94/1997) (and subsequent amendments, 1998 and 2005). The European Communities (Birds and Natural Habitats) Regulations were subsequently introduced (in 2011 (S.I. No. 477/2011) (and subsequent amendments in 2013, 2015 and 2021); hereafter referred to as the Birds and Natural Habitats Regulations) to account for transposition issues raised in European Court of Justice (ECJ) judgements against Ireland in 2008. The Birds and Natural Habitats Regulations provide the legislative framework for the protection of designated habitats and species in Ireland. The aim of the Habitats Directive, and Birds and Natural Habitats Regulations, is to conserve natural habitats and wild species across Europe by establishing a network of sites known as Natura 2000 sites.

Sites of Community Importance, afforded protection under the 2011 Birds and Natural Habitats Regulations, are designated in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). As a matter of policy, the procedures described below are also applied to candidate SACs and proposed SPAs.

Under Article 6(3) of the Habitats Directive, for any proposed plan or project, which is not directly connected or necessary to the management of a European site, the Competent Authority (the designated public authority that determines the application) should make an initial consideration to establish whether the plan or project is likely to have a significant effect on the European site.

Prior to deciding to authorise a project which is not directly connected with or necessary to the management of the site as a European Site, the Birds and Natural Habitats Regulations require the Competent Authority to carry out screening for AA. The aim of this screening is *“to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on [a] European site.”*

In accordance with the Birds and Natural Habitats Regulations, *“at any time following an application for consent for a plan or project, a public authority may give notice in writing to the applicant, directing him or her to:*

- a) furnish a Natura Impact Statement and the applicant shall furnish the statement within the period specified in the notice, and*
- b) furnish any additional information that the public authority considers necessary for the purposes of this Regulation.”*

Article 6(3) has been interpreted as meaning that any project is to be subject to an AA if it cannot be proven, beyond reasonable scientific doubt, that there is no likely significant effect on the integrity of that site (a precautionary approach), either alone, or in combination with other plans or projects.

“Any plan or project not directly connected with or necessary to the management of the 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” - Article 6(3).

Should an AA conclude that there will be an adverse effect on the integrity of a site, a project cannot proceed unless the requirements from Article 6(4) derogations are met.

These are the test of alternative solutions and then Imperative Reasons of Overriding Public Interest (IROPI). If, after these tests are applied and it is concluded that The Project does meet the requirements of Article 6(4), environmental compensation measures are required to be delivered to “*ensure the overall coherence of the Natura 2000 network is protected.*”

10.2.2 The Role and Requirements of the Competent Authority

Although the Birds and Natural Habitats Regulations do not specify the methodology for carrying out an AA, they do specify the obligations of the Competent Authority, and the Applicant. The role of the Competent Authority is to determine if there are likely significant effects and carry out the AA, if required, before a decision is made.

Where the Competent Authority determines that adverse effects remain, the Competent Authority must undertake further assessments on alternatives (during which time the Applicant may be asked to provide additional information) and prepare a justification statement for IROPI as relevant.

Therefore, the NIS is prepared by the Applicant to provide information to allow the Competent Authority to give full consideration to all elements contributing to the European sites’ integrity and allowing identification of potential impacts from The Project and adequacy of any mitigation proposed. Further details are provided below.

10.2.3 The NIS Approach

The approach to the NIS for Shelmalere Offshore Wind Farm will follow the guidance set out below. This guidance sets out a 4-stage process, which commences with Screening. Only if Screening identifies that a proposed plan or project may result in a significant effect on a European site, does Stage 2 commence - AA:

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. (European Commission, 2021);
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin (2009, updated 2010);
- Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission (2019).

European Commission notice (2021) outlines the stages of the Article 6(3) and (4) procedure as follows:

- **Stage one: Screening.** The first part of the procedure consists of a pre-assessment ('Screening') to ascertain whether the plan or project is directly connected with, or necessary to, the management of a Natura 2000 site, and, if this is not the case, then whether it is likely to have a significant effect on the site (either alone or in combination with other plans or projects) in view of the site's conservation objectives. Stage one is governed by the first part of the first sentence of Article 6(3). This Screening stage will consider sites within the Irish Natura 2000 network and also similar sites within adjacent countries, in particular Wales, England, Scotland and Northern Ireland. The need to consider non-Irish sites in this screening process is in recognition of the fact that some qualifying features of European (and for UK, National) designated sites have wide-ranging foraging distances and may potentially be affected by the construction, operation and decommissioning Shelmalere Offshore Wind Farm;
- **Stage two: the Appropriate Assessment (AA).** If likely significant effects cannot be excluded, the next stage of the procedure involves assessing the impact of the plan or project (either alone or in combination with other plans or projects) against the site's conservation objectives and ascertaining whether it will affect the integrity of the Natura 2000 site, taking into account any mitigation measures. It will be for the Competent Authorities to decide whether or not to approve the plan or project in light of the findings of the AA. Stage two is governed by the second part of the first sentence and the second sentence of Article 6(3);
- **Stage three: Assessment of Alternative Solutions.** Stage 3 is an Assessment of Alternative Solutions; the process which examines alternative ways of achieving the objectives of the project or plan, which avoid adverse impacts on the integrity of the Natura 2000 site;
- **Stage four: derogation from Article 6(3) under certain conditions.** The third stage of the procedure governed by Article 6(4). It only comes into play if, despite a negative assessment, the developer considers that the plan or project should still be carried out for Imperative Reasons of Overriding Public Interest. This is only possible if there are no alternative solutions, the Imperative Reasons of Overriding Public Interest are duly justified, and if suitable compensatory measures are adopted to ensure that the overall coherence of Natura 2000 is protected.

Specific to Stage 2 the AA stage, the Commission notice requires that the following steps are taken in the assessment:

1. Collect information on the project and on the Natura 2000 site concerned;
2. Assess the implications of the plan or project in view the site's conservation objectives, individually or in combination with other plans or projects;
3. Ascertain whether the plan or project can have adverse effects on the integrity of the site;
4. Consider mitigation measures (including their monitoring).

Furthermore, the European Commission Notice (2019): prescribes the content of the AA and notes the following:

- It must be ensured that the AA addresses all elements contributing to the site's integrity as specified in the site's conservation objectives and Standard Data Form, and is based on the best available scientific knowledge in the field;
- The information required should be up-to-date;
- The AA should also include a comprehensive identification of all the potential effects of the plan or project likely to be significant on the site, taking into account cumulative and other effects likely to arise as a result of the combined action of the plan or project under assessment with other plans or projects;
- It should apply the best available techniques and methods to assess the extent of the effects of the plan or project on the integrity of the site(s).

Assuming that the Stage one AA Screening exercise results in at least one site needing further assessment, a multi-volume NIS will be produced for Shelmalere Offshore Wind Farm which will cover all onshore and offshore elements. It is expected that the NIS will be broken into chapters as follows:

- Introduction – Overview, review of relevant legislation, policy and guidance, structure of report, methodology and consultation;
- Screening for Appropriate Assessment –Management of European Sites, overview of proposed development (onshore and offshore), characteristics of European Sites, summary of potential significant effects, screening outcome;
- NIS Onshore - description of proposed onshore development, description of receiving environment, impact prediction, potential adverse effects on site integrity, mitigation, outcomes. Will also include an assessment of potential in-combination effects;
- NIS Offshore description of proposed offshore development, description of receiving environment, impact prediction, potential adverse effects on site integrity, mitigation, outcomes. Will also include an assessment of potential in-combination effects.

The report will be prepared having regard to the relevant policy and guidance detailed below.

10.3 RELEVANT LEGISLATION, POLICY AND GUIDANCE

Relevant policies and guidance documents relevant to the AA process are detailed below. Where certain guidance documents have been produced in relation to UK projects, i.e. not strictly applicable to Irish projects, these will be reviewed as part of the EIAR process and due consideration given to how this guidance is applied to Shelmalere Offshore Wind Farm.

Table 10-1 Relevant Policy and Guidance Documents (NIS)

Policy / Guidance	Reference	Geographic Coverage
Policy		
The Offshore Renewable Energy Development Plan (OREDPA)	DCCAE, 2014	Ireland
Marine Planning Policy Statement	DHLGH, 2019	Ireland
National Marine Planning Framework (NMPF)	DHLGH, 2021a	Ireland
Guidance		
Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Commission Notice (2021) Brussels, 28.9.2021 C(2021) 6913 final	European Commission, 2021	Europe
Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission (2019). Brussels, 21.11.2018 C (2018) 7621 final.	European Commission, 2019	Europe
Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.	NPWS, DEHLG (2009, updated 2010)	Ireland
Guidance on Marine Baseline Ecological Assessments and Monitoring Activities for Offshore Renewable Energy Projects. Part 1 and 2	DCCAE, 2018	Ireland
Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine	CIEEM, 2019	UK and Ireland
Cumulative Impact Assessment Guidelines - Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms	RenewableUK, 2013	UK

10.4 RECEIVING ENVIRONMENT

10.4.1 Study Area

Differing spatial extents of study area are proposed to be used to inform EIAR Scoping and the main EIAR, depending on the type and nature of the designated sites presented in this Chapter. The study areas differ depending on whether each individual site contains mobile designated features (e.g. birds; marine mammals; fish) that may forage or migrate outside of the site at which they are designated. See Table 10.2 for further information.

All SPAs and SACs within the defined study area have been identified and scoped in at the time of writing. Following the formal AA screening process, which will be undertaken alongside the EIAR process, the designated sites and associated effects that will require further assessment will be identified and carried forward to the NIS stage.

NIS will be prepared separately to the EIAR and will investigate with more certainty the potential effects of Shelmalere Offshore Wind Farm on European sites. Shelmalere Offshore Wind Farm does not fall directly within any European marine nature conservation designations. However, various other parts of the coast, in the vicinity of the Potential Turbine Array and Export Cable Corridor Infrastructure Zones, are designated as SACs or SPAs. The Potential Onshore Infrastructure Zone is also in proximity to (<1 km) or overlaps several sites of European importance including the Cahore Polders and Dunes SAC (000700), Slaney River Valley SAC (000781) and Cahore Marshes SPA (004143).

10.4.2 Baseline Data

10.4.2.1 Data Sources used for EIAR (AA) Scoping and EIAR (AA)

The following key sources of information have been used to identify designated sites in and around the proposed Project:

- NPWS Protected Sites Map-viewer (NPWS, 2022);
- Natura 2000 standard data forms published by NPWS;
- National Biodiversity Data Centre;
- Joint Nature Conservation Committee (JNCC) UK Protected Area database (<https://jncc.gov.uk/our-work/uk-protected-areas>).

10.4.2.2 Designated Sites

The following section provides details of designated sites that have the potential to be impacted by Shelmalere Offshore Wind Farm. The sites are presented in line with the categories of designated sites set out in Table 10-2:

Table 10-2 Designated Sites Study Area Definition and Rationale

Designated Site Type	Study Area	Rationale
Terrestrial Designated Sites.	Any European site within the Potential Onshore Infrastructure Zone plus any sites within the zone of influence of The Project (i.e. the area over which ecological features may be affected by biophysical changes caused by the development).	Ensures that all European sites with a Source-Pathway-Receptor connectivity to The Project are identified and the sensitivity of the receptors to an environmental change are determined and also the likelihood of their presence within the spatial (and temporal) scale of the biophysical change. Ensuring that the typical foraging ranges and habitat preferences of species is assessed.

Designated Site Type	Study Area	Rationale
Marine / Coastal designated sites that overlap with or within a distance from Shelmalere Offshore Wind Farm within which potential effects may arise.	Potential Turbine Array and Export Cable Corridor Infrastructure Zones plus 24.5 km buffer.	Ensures that all marine designated sites that may be affected, including those that may not directly overlap with any actual offshore project infrastructure, are considered within the NIS. The 24.5 km buffer is based on the greatest extent of tidal ellipses in this area and enables assessment of potential far-field impacts on designated sites via sediment plumes/deposition or changes in hydrodynamic regime.
Marine / Coastal designated sites that contain mobile interest / qualifying features (migratory fish; birds; marine mammals).	Accepted foraging ranges or regional sea study areas.	<p>Ensures that NIS takes full account of:</p> <ul style="list-style-type: none"> (a) typical foraging ranges for classified seabird populations for designated sites (SPAs), or designated marine mammal populations of SACs, SCIs or Ramsar sites – this aspect will be undertaken in line with best practice for AA Screening; (b) movement of migratory birds through the offshore array area; and (c) the movement of migratory fish that may pass through the site to SAC/SCI rivers and those migrating to marine SACs/SCIs. <p>Inclusion of classified SPA seabird populations is based on foraging ranges determined as mean maximum foraging range +1 standard deviation (where applicable) as reported by Woodward <i>et al.</i> (2019). Species-specific regional populations will be assessed where appropriate, these will use the Seabird Monitoring Programme (SMP) colony count database, alongside Cummins <i>et al.</i> (2019) and any other relevant available information.</p> <p>For marine mammals, it is proposed that all sites within the relevant marine mammal management unit will be taken forward for assessment.</p> <p>For migratory fish, it is proposed that assessment of will be on a regional sea scale, including all SACs situated within, or discharging into the Celtic or Irish seas.</p>

10.4.2.3 Identification of Additional Marine Protected Areas

A key aspect of the AA process for Shelmalere Offshore Wind Farm will be keeping up-to-date with ongoing discussions within Ireland, between Government and a range of relevant stakeholders (including Environmental Non-Governmental Organisation; Developers; Commercial Fishing Groups), in relation to the identification of new Marine Protected Areas (MPAs).

A report published in 2020 (Marine Advisory Group, 2020) outlined a number of key issues and concerns related to Ireland's present marine conservation strategy and set out how it needed to catch up to meet legal obligations and sustainable management of marine resources (Marine Protected Area Advisory Group 2020).

A public survey on this same topic also found that 92% of respondents wanted more MPAs in Ireland, indicating that national marine planning was also behind public opinion (French and McDonough 2020). In response to this, Irish Government have stated a commitment to expanding Ireland's MPA network from the current level of 2.1% Ireland's Maritime Area, to 30% by 2030.

More recently, Wind Energy Ireland (WEI) have produced a Draft Position Paper on this topic and regular updates are also provided by the Irish Government. The most recent update being from 31st March 2022 – see below (from <https://www.gov.ie/en/publication/e00ec-marine-protected-areas/>)

'the Department is now in the process of developing stand-alone legislation to enable the identification, designation and management of MPAs in accordance with Ireland's national and international commitments. This work is expected to continue for a good part of 2022. Check this webpage regularly to find out the latest news on the ongoing MPA process.'

As part of the overall AA/NIS process for Shelmalere Offshore Wind Farm, and specifically the AA Screening stage, all efforts will be made to ensure that the most up-to-date information on proposed/new MPAs is gathered and used to inform the assessment.

10.4.2.4 Marine and Coastal Designated Sites within Close Proximity to Potential Turbine Array and /Export Cable Corridor Infrastructure Zones

Table 10.3 lists the designated sites that overlap or are within 24.5 km of the Potential Turbine Array and Export Cable Corridor Infrastructure Zones and those within the likely zone of influence of the Potential Onshore Infrastructure Zone. Where a designated site is >24.5 km, this distance is shown in *italics*. As there are a large number of marine and coastal designated sites which contain mobile interest/qualifying features (marine mammals, birds, fish) that are located within the relevant foraging ranges or regional sea study areas (as identified in Table 10.2).

Table 10-3 Marine / Coastal Designated Sites that Overlap with or are in Close Proximity (≤ 24.5 km) to the Potential Turbine Array/Export Cable Corridor Infrastructure Zones

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
Special Areas of Conservation (SAC)				
IE0002953	Blackwater Bank SAC	0.00	0.00	Sandbanks which are slightly covered by sea water all the time [H1110]
IE0002269	Carnsore Point SAC	3.54	16.00	Mudflats and sandflats not covered by seawater at low tide [H1140] Reefs [H1170]
IE0002161	Long Bank SAC	5.04	6.60	Sandbanks which are slightly covered by sea water all the time [H1110]
IE0000710	Raven Point Nature Reserve SAC	11.80	12.60	Mudflats and sandflats not covered by seawater at low tide [H1140] Annual vegetation of drift lines [H1210] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [H1330] Embryonic shifting dunes [H2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [H2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [H2130] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [H2170] Humid dune slacks [H2190]
IE0000700	Cahore Polders and Dunes SAC	11.98	0.80	Annual vegetation of drift lines [H1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [H2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [H2130] Humid dune slacks [H2190]

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
IE0001741	Kilmuckridge-Tinnaberna Sandhills SAC	12.38	12.38	Embryonic shifting dunes [H2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [H2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [H2130]
IE0000781	Slaney River Valley SAC	12.20	13.30	Estuaries [H1130] Mudflats and sandflats not covered by seawater at low tide [H1140] Atlantic salt meadows <i>Glauco-Puccinellietalia maritima</i> [H1330] Mediterranean salt meadows <i>Juncetalia maritimi</i> [H1410] Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [H3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [H91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i> , <i>Salicion albae</i>) [H91E0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [S1029] Sea Lamprey <i>Petromyzon marinus</i> [S1095] Brook Lamprey <i>Lampetra planeri</i> [S1096] River Lamprey <i>Lampetra fluviatilis</i> [S1099] Twaite Shad <i>Alosa fallax fallax</i> [S1103] Atlantic salmon <i>Salmo salar</i> [S1106] Otter <i>Lutra lutra</i> [S1355] Harbour seal <i>Phoca vitulina</i> [S1365]
IE000704	Lady's Island Lake SAC	14.2	23.70	Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220]

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
IE0000709	Tacumshin Lake SAC	18.00	27.40	Coastal lagoons [1150] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]
IE0000707	Saltee Islands SAC	22.95	33.75	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Submerged or partially submerged sea caves [8330] Grey seal <i>Halichoerus grypus</i> Grey Seal [1364]
IE0001742	Kilpatrick Sandhills SAC	23.24	0.99	Annual vegetation of drift lines [H1210] Embryonic shifting dunes [H2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [H2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [H2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [H2150]
IE0000729	Buckrone-y-Brittass Dunes and Fen SAC	34.39	1.65	Annual vegetation of drift lines [H1210] Perennial vegetation of stony banks [H1220] Mediterranean salt meadows <i>Juncetalia maritimi</i> [H1410] Embryonic shifting dunes [H2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [H2120]

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
				Fixed coastal dunes with herbaceous vegetation (grey dunes) [H2130] Atlantic decalcified fixed dunes (Calluno-Ulicetea) [H2150] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [H2170] Humid dune slacks [H2190] Alkaline fens [H7230]
IE0001766	Magherabeg Dunes SAC	42.60	10.94	Annual vegetation of drift lines [H1210] Embryonic shifting dunes [H2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [H2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [H2130] Petrifying springs with tufa formation (Cratoneurion) [H7220]
IE0002274	Wicklow Reef SAC	47.80	17.75	Reef [1170]
IE0002249	The Murrough Wetlands SAC	51.00	19.00	Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows <i>Glauco-Puccinellietalia maritimae</i> [1330] Mediterranean salt meadows <i>Juncetalia maritimi</i> [1410] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]
Special Protection Areas (SPAs)				
IE0004019	The Raven SPA	8.50	8.50	Red-throated diver <i>Gavia stellata</i> [A001] Cormorant <i>Phalacrocorax carbo</i> [A017] Common scoter <i>Melanitta nigra</i> [A065] Grey plover <i>Pluvialis squatarola</i> [A141] Sanderling <i>Calidris alba</i> [A144]

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
				Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> [A395] Wetland and waterbirds [A999]
IE0004009	Lady's Island Lake SPA	12.16	23.63	Gadwall <i>Anas strepera</i> [A051] Black-headed gull <i>Chroicocephalus ridibundus</i> [A179] Sandwich tern <i>Sterna sandvicensis</i> [A191] Roseate tern <i>Sterna dougallii</i> [A192] Common tern <i>Sterna hirundo</i> [A193] Arctic tern <i>Sterna paradisaea</i> [A194] Wetland and waterbirds [A999]
IE0004143	Cahore Marshes SPA	12.30	1.53	Wigeon <i>Anas penelope</i> [A050] Golden plover <i>Pluvialis apricaria</i> [A140] Lapwing <i>Vanellus vanellus</i> [A142] Greenland white-fronted goose <i>Anser albifrons flavirostris</i> [A395] Whooper swan <i>Cygnus cygnus</i> [A038] Bewick's swan <i>Cygnus columbianus bewickii</i> [A037] Shelduck <i>Tadorna tadorna</i> [A048] Eurasian teal <i>Anas crecca</i> [A052] Mallard <i>Anas platyrhynchos</i> [A053] Northern shoveler <i>Anas clypeata</i> [A056] Eurasian curlew <i>Numenius arquata</i> [A160] Black-headed gull <i>Larus ridibundus</i> [A179]
IE0004076	Wexford Harbour and Slobbs SPA	12.75	13.40	Little grebe <i>Tachybaptus ruficollis</i> [A004] Great crested grebe <i>Podiceps cristatus</i> [A005] Cormorant <i>Phalacrocorax carbo</i> [A017] Grey heron <i>Ardea cinerea</i> [A028] Bewick's swan <i>Cygnus columbianus bewickii</i> [A037] Whooper swan <i>Cygnus cygnus</i> [A038]

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
				<p>Light-bellied Brent goose <i>Branta bernicla hrota</i> [A046] Shelduck <i>Tadorna tadorna</i> [A048] Wigeon <i>Anas penelope</i> [A050] Teal <i>Anas crecca</i> [A052] Mallard <i>Anas platyrhynchos</i> [A053] Pintail <i>Anas acuta</i> [A054] Scaup <i>Aythya marila</i> [A062] Goldeneye <i>Bucephala clangula</i> [A067] Red-breasted merganser <i>Mergus serrator</i> [A069] Hen harrier <i>Circus cyaneus</i> [A082] Coot <i>Fulica atra</i> [A125] Oystercatcher <i>Haematopus ostralegus</i> [A130] Golden plover <i>Pluvialis apricaria</i> [A140] Grey plover <i>Pluvialis squatarola</i> [A141] Lapwing <i>Vanellus vanellus</i> [A142] Knot <i>Calidris canutus</i> [A143] Sanderling <i>Calidris alba</i> [A144] Dunlin <i>Calidris alpina</i> [A149] Black-tailed godwit <i>Limosa limosa</i> [A156] Bar-tailed godwit <i>Limosa lapponica</i> [A157] Curlew <i>Numenius arquata</i> [A160] Redshank <i>Tringa totanus</i> [A162] Black-headed gull <i>Chroicocephalus ridibundus</i> [A179] Lesser black-backed gull <i>Larus fuscus</i> [A183] Little tern <i>Sterna albifrons</i> [A195] Greenland white-fronted goose <i>Anser albifrons flavirostris</i> [A395] Wetland and waterbirds [A999]</p>

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
IE0004076	Wexford Harbour and Slob SPA	13.52	15.28	<p>Little grebe <i>Tachybaptus ruficollis</i> [A004] Great crested grebe <i>Podiceps cristatus</i> [A005] Cormorant <i>Phalacrocorax carbo</i> [A017] Grey heron <i>Ardea cinerea</i> [A028] Bewick's swan <i>Cygnus columbianus bewickii</i> [A037] Whooper swan <i>Cygnus cygnus</i> [A038] Light-bellied Brent goose <i>Branta bernicla hrota</i> [A046] Shelduck <i>Tadorna tadorna</i> [A048] Wigeon <i>Anas penelope</i> [A050] Teal <i>Anas crecca</i> [A052] Mallard <i>Anas platyrhynchos</i> [A053] Pintail <i>Anas acuta</i> [A054] Scaup <i>Aythya marila</i> [A062] Goldeneye <i>Bucephala clangula</i> [A067] Red-breasted merganser <i>Mergus serrator</i> [A069] Hen harrier <i>Circus cyaneus</i> [A082] Coot <i>Fulica atra</i> [A125] Oystercatcher <i>Haematopus ostralegus</i> [A130] Golden plover <i>Pluvialis apricaria</i> [A140] Grey plover <i>Pluvialis squatarola</i> [A141] Lapwing <i>Vanellus vanellus</i> [A142] Knot <i>Calidris canutus</i> [A143] Sanderling <i>Calidris alba</i> [A144] Dunlin <i>Calidris alpina</i> [A149] Black-tailed godwit <i>Limosa limosa</i> [A156] Bar-tailed godwit <i>Limosa lapponica</i> [A157] Curlew <i>Numenius arquata</i> [A160] Redshank <i>Tringa totanus</i> [A162]</p>

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
				Black-headed gull <i>Chroicocephalus ridibundus</i> [A179] Lesser black-backed gull <i>Larus fuscus</i> [A183] Little tern <i>Sterna albifrons</i> [A195] Greenland white-fronted goose <i>Anser albifrons flavirostris</i> [A395] Wetland and waterbirds [A999]
IE0004009	Lady's Island Lake SPA	14.12	23.63	Gadwall <i>Anas strepera</i> [A051] Black-headed gull <i>Chroicocephalus ridibundus</i> [A179] Sandwich tern <i>Sterna sandvicensis</i> [A191] Roseate tern <i>Sterna dougallii</i> [A192] Common tern <i>Sterna hirundo</i> [A193] Arctic tern <i>Sterna paradisaea</i> [A194] Wetland and waterbirds [A999]
IE0004092	Tacumshin Lake SPA	18.00	27.40	Little Grebe <i>Tachybaptus ruficollis</i> [A004] Bewick's Swan <i>Cygnus columbianus bewickii</i> [A037] Whooper Swan <i>Cygnus cygnus</i> [A038] Wigeon <i>Anas penelope</i> [A050] Gadwall <i>Anas strepera</i> [A051] Teal <i>Anas crecca</i> [A052] Pintail <i>Anas acuta</i> [A054] Shoveler <i>Anas clypeata</i> [A056] Tufted Duck <i>Aythya fuligula</i> [A061] Coot <i>Fulica atra</i> [A125] Golden Plover <i>Pluvialis apricaria</i> [A140] Grey Plover <i>Pluvialis squatarola</i> [A141]

Site Code	Site Name	Distance from Potential Turbine Array Infrastructure Zone	Distance from Potential Export Cable Corridor Infrastructure Zone	Designated Features
				Lapwing <i>Vanellus vanellus</i> [A142] Black-tailed Godwit <i>Limosa limosa</i> [A156] Wetland and Waterbirds [A999]
IE0004127	Wicklow Head SPA	47.30	16.80	Kittiwake <i>Rissa tridactyla</i> [A188]
IE0004186	The Murrough SPA	50.20	18.30	Red-throated Diver <i>Gavia stellata</i> [A001] Greylag Goose <i>Anser anser</i> [A043] Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046] Wigeon <i>Anas penelope</i> [A050] Teal <i>Anas crecca</i> [A052] Black-headed Gull <i>Chroicocephalus ridibundus</i> [A179] Herring Gull <i>Larus argentatus</i> [A184] Little Tern <i>Sterna albifrons</i> [A195] Wetland and Waterbirds [A999]

10.4.2.5 Marine and Coastal Designated Sites that Contain Mobile and Qualifying Features

As there are a large number of marine and coastal designated sites which contain mobile interest/qualifying features (marine mammals, birds, fish) that are located within the relevant foraging ranges or regional sea study areas (as identified in Table 10.2). These are listed in Appendix A.

10.5 POTENTIAL ADDITIONAL DATA AND PROPOSED SURVEYS

The data sources listed in Section 10.4.2 are those identified to date which have been used to inform this EIAR Scoping Report and which will potentially be used to inform the assessment to be included in the future EIAR. Whilst all efforts have been made to identify key existing data sources at this stage of the EIAR process (EIAR Scoping), additional data sources will potentially be identified through consultation on this EIAR Scoping Report and over the duration of the future EIAR process. Any such additional data sources will be used alongside those identified to date, to inform the EIAR.

A series of project-specific surveys are proposed to gather data that will (a) enable the site to be fully characterised for EIAR purposes and (b) inform the assessments of effects on key receptors. This information will allow effects to be fully assessed during the EIAR process and will assist in identifying which effects will need to be considered during the AA process. The following surveys are of specific relevance to designated sites/features that will be assessed via an AA.

Table 10-4 Summary of site investigation activities that will inform the AA process

Survey Method	Details	Relevant EIAR (AA) Topics
Digital Aerial Surveys (DAS)	Monthly DAS across the Potential Turbine Array Infrastructure Zone plus a 4 km buffer. This 24-month survey programme commenced in April 2021 and is currently programmed to continue up to and including March 2023.	Offshore Ornithology (SPA) Marine Mammals (SAC)
Geophysical, Benthic and Geotechnical Survey	Survey coverage of the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone with a range of sensors to collect site-specific data: Multibeam (MBES) – to generate detailed topographical information of the seabed and mapping of near seafloor sediment types. High resolution side-scan sonar (SSS) – to identify key seabed sediment types and bedforms, as well as to identify any features of note, including but not limited to wrecks, debris or other man-made objects.	Marine Processes (SAC) Benthic, Epibenthic and Intertidal Ecology (SAC) Fish and Shellfish Ecology (SAC)

Survey Method	Details	Relevant EIAR (AA) Topics
	<p>Sub-bottom profiling (SBP) – to allow for assessment of variations in thickness and sediment cover of the seabed sediments and shallow geology to a depth of 5 m or greater, for inter array cable and export cable design cable design purposes and development of the ground model.</p> <p>Magnetometer – to enable the identification of potential metal/ferrous objects, potentially including UXO. Any UXO identified via this survey will be considered within the Underwater Noise and Vibration Assessment and related Marine Mammal and Reptile and Fish and Shellfish Ecology assessments.</p>	
Grab Sampling	Sub-tidal seabed locations across the Potential Turbine Array Infrastructure Zone and Potential Export Cable Corridor Infrastructure Zone will be sampled, with multiple samples taken at each location. Subsequent analysis will include detailed particle size distributions.	
Drop Down Video	Site-specific geophysical data will be reviewed to identify potential sub-tidal habitats of conservation importance, i.e. Annex I habitats. DDV will be deployed to identify, classify and delineate the spatial extent of any such features	
Intertidal	Unmanned Aerial Vehicle (UAV) (drone) survey of the intertidal region of Cable Landfall to collect hi-resolution aerial imagery. This will be used to map key intertidal habitat features. A Phase I walkover of the potential Cable Landfall within the Potential Export Cable Corridor Infrastructure Zone with identification and mapping of key habitats and biotopes present will then be undertaken, informed by the UAV imagery. Any features of conservation interest are to be identified such as Annex I habitat and INNS.	Benthic and Intertidal Ecology (SAC)
Freshwater Aquatic	River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O'Grady, 2006) for all watercourse crossing location within the Slaney River Valley SAC or catchment.	Aquatic ecology (SAC)
Terrestrial Habitat Survey	Habitat survey and mapping in accordance with the Heritage Council (2011) 'Best practice guidance habitat survey and mapping' and assessment of conservation value in accordance with Fossitt (2000) 'A Guide to Habitats in Ireland' and the European Union (2013) 'Interpretation Manual of European Union Habitats – EUR28'.	Annex I habitats (SAC)

10.6 ASSESSMENT METHODOLOGY

10.6.1 Identification of Key Sensitivities and Potential Impacts

For each type of designated site an assessment of potential impacts arising from changes in the environment and the effects as a consequence will be identified. As detailed in the introductory section, a separate NIS will be submitted with the planning application which will list all EU designated sites that will be subject to AA (identified via the Stage one Screening process). Table 10-6 details the key sensitivities and potential impacts that have been identified and provides the preliminary rationale for scoping these into or out of the NIS. A full AA screening will be undertaken, which will further inform and define the scope the NIS, if required.

10.6.2 Survey Requirements

It is not expected that any additional surveys will be required specifically to inform the NIS. The NIS will include all information required for assessment by the Competent Authority.

10.6.3 Proposed Approach to EIA

The EIA approach for species and habitats of nature conservation significance are addressed in Offshore Volume: Chapter 4 (Benthic, Epibenthic and Intertidal Ecology); Chapter 5 (Marine Mammals); Chapter 6 (Offshore Ornithology); Chapter 8 (Fish and Shellfish Ecology); and Onshore Volume: Chapter 5 (Onshore Biodiversity). Data from these chapters and relevant sources, including local regulators, will be used to assess the effects of Shelmalere Offshore Wind Farm on designated and protected sites. A key aspect of this process will be ensuring that conclusions and findings specific to the EIA are properly reviewed and, where appropriate, modified (in terms of format and presentation; not in terms of actual findings) in order to make them relevant to the AA process.

The Applicant will liaise with statutory authorities throughout the AA process, to ensure project survey designs are robust and sufficient to assess potential impacts to designated sites, species and habitats.

10.6.3.1 In-Combination and Transboundary Effects

The AA process differs from the EIA process with respect to potential cumulative effects. In the context of AA, the term “in-combination” is used when describing the potential for other plans or projects to interact to create such in-combination effects on designated sites. As part of the AA, a key first stage will be to develop and agree (via consultation) an initial list of plans, projects and activities to be considered alongside Shelmalere Offshore Wind Farm. It is expected that this will include, but not be limited to other offshore wind farm projects (Phase 1 and 2), subsea cable projects, maintenance and capital dredging schemes and coastal defence works.

As additional projects will likely emerge over the development phase for Shelmalere Offshore Wind Farm, this initial list will be reviewed and updated at regular intervals to ensure the eventual cumulative assessment fully considers other Projects.

Once the other plans, projects and activities to be assessed within the AA in-combination assessment have been agreed, as many details from these other plans, projects and activities, relevant to the assessment of potential effects on designated sites will be collated and reviewed. This will include as many details that can be collated with respect to proposed timing of construction phases on other projects in the region to determine if scope exists for impacts such as increased SSC plumes from Shelmalere Offshore Wind Farm and other plans, projects and activities to interact spatially and temporally; and or in-combination effects of piling noise; or collision risk on the same qualifying population, but from multiple OWF projects.

With respect to potential transboundary effects, an initial view on where potential transboundary effects may arise has been presented in each Offshore Chapter. A further, more detailed screening exercise will be undertaken as part of the future EIAR process to determine the potential for such effects to arise. Consultation will be undertaken with potentially affected parties to discuss and assess such potential effects.

10.7 PROPOSED CONSULTEES

Details of proposed consultees/stakeholders, and details of objectives are detailed in Table 10-5. It is proposed that this consultation will take the form of a series of topic-specific technical consultation meetings over the EIAR process, up to the point of submission of Development Permission application.

Table 10-5 Summary of Proposed Consultees for NIS

Proposed Consultee	Objective of Consultation
An Bord Pleanála	<ol style="list-style-type: none"> 1. To outline the key principles of the proposed AA/NIS process to be adopted for Shelmalere Offshore Wind Farm. 2. To discuss potential data collection to inform the AA/NIS. 3. To discuss outputs of the Stage One AA Screening. 4. To discuss and agree the sites to be taken forward into the NIS/AA.

10.8 POTENTIAL IMPACTS

Table 10-6 outlines the potential impacts on designated sites which may arise as a result of the proposed Shelmalere Offshore Wind Farm. The project phase during which these potential effects may arise is signified by a Yes/No in the respective column in the table.

The approach to how these potential effects will be assessed within the AA is set out above.

Table 10-6 Key Sensitivities and Potential Impacts to Designated Sites within the Marine and Coastal Study Area

Potential Impact (Pathway)	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Special Areas of Conservation (SACs)				
Potential damage and loss of habitats and features (direct). Installation and removal of infrastructure has the potential to cause collision hazards, noise disturbance (including piling and UXO clearance) and loss of habitat leading to reduced prey availability.	Yes	No	Yes	In
Potential damage and loss of habitats and features (indirect). Potential disturbance of historic contaminated sediments and/or risk of pollution incidences impacting habitats and species near Cable Landfall.	Yes	Yes	Yes	In
Potential damage and loss of habitats and features (indirect). The presence of the subsea infrastructure can result in potential effects on benthic communities (e.g. habitat loss/alteration, or smothering) arising from scour effects, changes in sediment transport and wave and tidal current regimes.	No	Yes	No	In
Reduction and/or increase in foraging success (indirect). Elevated turbidity levels associated with sediment disturbance could impact foraging success in visual foragers / Colonisation of OWF foundations by marine fauna may create feeding habitat for seals.	Yes	Yes	Yes	In
Emissions of electromagnetic fields (EMFs) (direct).	No	Yes	No	In

Potential Impact (Pathway)	Project Phase where Impact may Potentially Occur			Scoped In / out of the EIAR
	Construction	Operation	Decommissioning	
Special Protection Areas (SPAs)				
Potential damage and loss of habitats and features (direct). Surface and subsea infrastructure has the potential to cause collision hazards, noise and visual disturbance, and loss of habitat leading to reduced prey availability.	Yes	Yes	Yes	In
Potential damage and loss of habitats and features (indirect). Potential disturbance of historic contaminated sediments and/or risk of pollution incidences impacting habitats and species near Cable Landfall.	Yes	Yes	Yes	In
Potential damage and loss of habitats and features (indirect). The presence of the subsea infrastructure can result in potential effects on benthic communities (e.g. habitat loss/alteration, or smothering) arising from scour effects, changes in sediment transport and wave and tidal current regimes. This can result in indirect effects on classified bird populations through a reduction in prey resources.	No	Yes	No	In
Reduction in foraging success (indirect). Elevated turbidity levels associated with sediment disturbance could impact foraging success in visual foragers.	Yes	Yes	Yes	In

10.9 REFERENCES

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Appendix A

LIST OF CONSULTEES FOR THIS EIAR SCOPING REPORT

Local Authorities

Wicklow County Council

- Environment department
- Heritage department
- Planning department
- IT department
- Roads/Engineering department
- Water services department

Wexford County Council

- Environment department
- Heritage department
- Planning department
- IT department
- Roads/Engineering department

Waterford City and County Council

- Environment department
- Heritage department
- Planning department
- IT department
- Roads department/Engineering/Flood risk

Kilkenny County Council

Regional Authorities

Eastern & Midland Regional Assembly

Southern Regional Assembly

Port Authorities

Drogheda Port

Dublin Port Company

Dun Laoghaire Port Company

New Ross Port

Port of Waterford

Rosslare Europort

Wicklow Harbor / Arklow Port

Port of Cork

Courtown Harbour

Wexford Harbour

Cork Dockyard/ Doyle Shipping Group

Bantry Bay Port

Shannon Foynes Port Company

Government Departments

Minister for Housing, Planning and Local Government

Minister for Culture, Heritage and the Gaeltacht

Minister for Agriculture, Food and the Marine

Minister for Communications, Climate Action and Environment

Minister for Transport, Tourism and Sport
Minister for Defence
Foreshore Unit

Telecommunications

Broadcasting Authority of Ireland
Commission for Communications Regulation
Eircom Ltd
Enet Telecommunications Networks Limited
Imagine Networks Services Ltd
Meteor Mobile Communications Limited (Eir)
Nova Networks Ltd
Ripple Communications Ltd
RTE Transmission Network Ltd
RTÉ/Saorview
Telecommunications Section, An Garda Siochána
Three Ireland (Hutchison) Limited
Viatel Ireland Ltd
Virgin Media Ireland Ltd (PP)
Vodafone Ireland Ltd

Other Interest Bodies

Aeronautical Search and Rescue
An Bord Pleanála
An Garda Siochána - Waterford
An Garda Siochána - Wexford
An Garda Siochána - Arklow
An Taisce
Angling Council of Ireland
Arklow Municipal District
Ballycotton Fishermen's Association
Bat Conservation Ireland
Biodiversity Ireland
Birdwatch Ireland
Bord Gais Energy
Bord Iascaigh Mhara
Botanical Society of Britain and Ireland
Brittany Ferries
Butterfly Conservation Ireland
Casement (Baldonnell) Aerodrome
Chambers of Commerce Waterford
Chambers of Commerce Wexford
Chambers of Commerce Wicklow
CHC Helicopters
Coastal Communities
Coastwatch
Cobh and Harbour Chamber
Commission for Regulation of Utilities
Commissioners of Irish Lights
Coordination Centre (MRCC) of the Irish Coast Guard

Cork Nature Network
Development Applications Unit
Dublin Airport
Earth Mining Division, Department of Environment, Climate and Communications
Eir
EirGrid
Electricity Supply Board
Energy Ireland
Enniscorthy Municipal District
Enterprise Ireland
Environmental Pillar (Irish Environmental Network – IEN)
Environmental Protection Agency
Environmental Sciences Association of Ireland
ESB Networks
Fáilte Ireland
Fisheries Local Action Group South
Fisheries Local Action Group Southeast
Forestry Service
Friends of the Earth
Friends of the Irish Environment
Gas Networks Ireland
Geographical Society of Ireland
Geological Society of Ireland
Geological Survey Ireland
Gorey-Kilmuckridge Municipal District
Health and Safety Authority
Health Service Executive
IBEC (Irish Marine Federation)
Industrial Development Agency
Inland Fisheries Ireland
Irish Air Corps
Irish Angling Development Alliance
Irish Aviation Authority
Irish Basking Shark Group
Irish Chamber of Shipping
Irish Cruising Association
Irish Environmental Network
Irish Federation of Sea Anglers
Irish Ferries
Irish Fish Processors and Exporters Association
Irish Fish Producers organisation
Irish Islands Marine Resources Organisation
Irish Maritime Development Office
Irish Maritime Operations Centre of the Irish Coast Guard – Marine Rescue
Irish Peatland Conservation Council
Irish Rail
Irish Raptor Study Group
Irish Sailing Association
Irish Seal Sanctuary
Irish South and East Fish Producers Organisation

Irish South and West Fish Producers Organisation
Irish Water
Irish Whale and Dolphin Group
Irish Wildlife Trust
Killybegs Fishermans Organisation
MaREI
Marine Survey Office
Maritime Safety Directorate
Met Éireann
National Biodiversity Data Centre
National Inshore Fishermans Organisation/ National Inshore Fishermen's Association
National Maritime College of Ireland
National Monuments Service
National Parks and Wildlife Service
National Transport Authority
NATS (UK)
Newcastle Aerodrome
Ocean Research and Conservation Association
Office of Public Works
RNLI
Rosslare Municipal District Council
Sea Fisheries Protection Authority
South East Razor Association
South East Regional Fisheries Forum/ National Inshore Fisheries Forum
Stena Line
Sustainable Energy Authority of Ireland
Sustainable Water Network (SWAN) Ireland
Teagasc
The Commission for Energy Regulation
The Economic and Social Research Institute
The Heritage Council
Inland Fisheries Ireland / Regional Fisheries Office
The Irish Mussel Seed Company
The Irish Naval Services
The Irish Tourist Industry Confederation
The Irish Underwater Council
The Marine Institute
The National Transport Authority
The Railway Procurement Agency
Transport Infrastructure Ireland
Underwater Archaeology Unit
VOICE Ireland (Voice of Concern for Irish Environment)
Waterford Airport
Wexford Naturalists' Field Club