

Assessment of Impacts of the Maritime Usage (AIMU) Report

Maritime Usage Licence Application MUL230034

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Page 3 of 154



TABLE OF CONTENTS

TABL	_E OF CONTENTS4
LIST	OF TABLES7
LIST	OF FIGURES
ABB	REVIATIONS9
DEFI	NITIONS
1 IN	ITRODUCTION16
1.1	Aim of this Report
1.2	Methodology18
1.3	Structure of the Report
2 D	ESCRIPTION OF THE PROPOSED ACTIVITIES20
2.1	Licence Area
2.2	Proposed Activities
2.3	Survey Schedule
2.4	Survey Methodologies
3 N	EED AND ALTERNATIVES43
4 C	ONSIDERATION OF DIRECTIVES44
4.1	EIA Directive Requirements
4.1.1	Approach to EIA Screening44
4.1.2	Screening for Mandatory EIA46
4.1.3	Screening of Significance of Impacts on Environment46
4.1.4	Conclusion of the EIA Screening47
4.2	Water Framework Directive47
4.3	Marine Strategy Framework Directive (MSFD)48
5 P	LANNING AND DEVELOPMENT50
5.1	The National Marine Planning Framework (2021)50
6 A	SSESSMENT OF IMPACTS53
6.1	Overview
	Page 4 of 154



6.2	Land and Soils	67
6.3	Water	67
6.3.1	Background	67
6.3.2	Assessment of Potential Impacts to Water	69
6.4	Biodiversity	70
6.4.1	Marine Benthos	70
6.4.2	Marine Benthic Habitats in Licence Area	73
6.4.2.1	Assessment of Potential Impacts to Benthic Habitats and the Benthos	75
6.4.3	Marine Mammals	76
6.4.3.1	Assessment of Potential Impacts to Marine Mammals	78
6.4.4	Birds 79	
6.4.4.1	Assessment of Potential Impacts to Birds	79
6.4.5	Fish 83	
6.4.5.1	Commercially Important Fish Species – spawning and nursery grounds	83
6.4.5.2	Migratory Fish Species	85
6.4.5.3	Assessment of Potential Impacts to Fish	85
6.5	Commercial Fisheries and Aquaculture Activities	86
6.5.1	Fishing Activity	86
6.5.1.1	Assessment of Potential Impacts to Fishing Activities	90
6.5.2	Aquaculture and Shellfish Ecology	90
6.5.2.1	Assessment of Potential Impacts to Aquaculture and Shellfish	91
6.6	Air Quality	92
6.7	Noise & Vibration	92
6.7.1.1	Assessment of Potential Impacts of Noise and Vibration	93
6.8	Landscape and Seascape	95
6.8.1.1	Assessment of Potential Impacts to Landscape and Visual	95
6.9	Marine Traffic & Transport	96
6.9.1.1	Assessment of Potential Impacts to Marine Traffic and Transport	101
6.10	Archaeology and Cultural Heritage	102
6.10.1.	1 Assessment of Potential Impacts to Archaeology and Cultural Heritage	104
6.11	Population and Human Health	

Page **5** of **154**

6.11.1	Tourism and Recreation	107
6.12	Major Accidents and Disasters	
6.13	Climate	
6.14	Waste	
6.15	Material Assets	
6.16	Health, Safety, Environment and Quality (HSEQ) Management	
6.16.1	Waste Management and Pollution Control	
6.17	Interactions	
6.17.1	In-combination effects on European sites	
7 M	TIGATION MEASURES	
7.1	Condition Compliance	
8 C	ONCLUSION	135
9 RI	EFERENCES	136
APPE	NDICES	
APPE	NDIX A LICENCE AREA COORDINATES	



LIST OF TABLES

Table A: Summary of Proposed Activities and Indicative Programme.	22
Table B: Sediment determinants from sediment chemistry analysis.	40
Table C: Water Framework Directive supporting quality elements (Annex 5)	48
Table D: Marine Strategy Framework Directive good environmental status (GES) descriptors	49
Table E: Table outlining consistency of this licence application with relevant National Marine Planning Framework (NMPF) Offshore Renewable Energy (ORE) policies.	51
Table F: Potential impact and assessment of the Proposed Activities on the following topics covered in section 6.2 to section 6.17.	54
Table G: Relevant sections and sub-sections in other reports submitted in support of the Licer Application.	nce 65
Table H: Sensitivity to disturbance for key seabird species	79
Table I: Project, plans, and activities with spatial and temporal overlap with the current AIMU application	110
Table J: Summary of the proposed mitigation measures for the Proposed Activities	125
Table L: Coordinates of Licence Area	144

Page 7 of 154



LIST OF FIGURES

Figure 1-1: Proposed Licence Area; boundary outlined in red.	17
Figure 2-1: Licence Area and proposed export cable corridor. Indicative locations of the geotechnical, metocean and marine mammal acoustic (PAM) surveys	27
Figure 2-2: Indicative benthic sampling stations	28
Figure 2-3 Example Floating LiDAR System	30
Figure 2-4 Example ADCP Seabed Frame	31
Figure 2-5 Example of a Waverider and MetOcean buoy.	33
Figure 2-6 EdgeTech 4205 Side Scan Sonar	34
Figure 2-7 Manta GT25® Core Penetration Testing.	36
Figure 6-1: Water Framework Directive coastal and transitional water bodies ecological status the monitoring period 2016-2021 (Environmental Protection Agency).	for 68
Figure 6-2: Presence of <i>Sabellaria</i> sp. from the 2021 benthic survey conducted by AQUAFACT. Seventy-one stations were sampled across the survey area.	72
Figure 6-3: Seabed sediment type according to INFOMAR's seabed substrate (INFOMAR)	74
Figure 6-4: Key fish species spawning and nursery areas in the Irish Sea (Ireland's Marine Atla	s). 84
Figure 6-5: Key areas of Irish static gear fishing activity: whelk pots and crab and lobster creek (Ireland's Marine Atlas)	s 87
Figure 6-6: Key areas of dredge gear fishing activity. Left: international and Irish dredge fishing activity by effort. Right: Location of dredge fishing activity by species	g 88
Figure 6-7: International and Irish trawl activity by effort. Top left: otter trawls; Top right: beam trawls; Bottom left: Pelagic trawls; Bottom right: seine fishing activity	89
Figure 6-8: Traffic separation schemes.	97
Figure 6-9: Vessel density in summer 2022	99
Figure 6-10: Vessel density in winter 2023.	100
Figure 6-11: Archaeological and Cultural Heritage sites in the vicinity of the Proposed Activities	s 103

Page 8 of 154



ABBREVIATIONS

Abbreviation	Term
ADCP	Acoustic Doppler Current Profiler
AEZs	Archaeological Exclusive Zones
AIMU	Assessment of Impacts of Maritime Usage
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
API	American Petroleum Institute
BOD	Biochemical Oxygen Demand
COSHH	Control of Substances Hazardous to Health
СРТ	Cone Penetration Test
CWP	Codling Wind Park
CWPL	Codling Wind Park Limited
DAFM	Department of Agriculture, Food, and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
DCCAE	Department of Communications, Climate Action and Environment
DDVs	Drop down videos
DHLGH	Department of Housing, Local Government and Heritage
DRM	Dispute Resolution Mechanism
EC	European Commission
ECC	Export cable corridor
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
EUNIS	European Nature Information System
FLO	Fisheries Liaison Officer
FLS	Floating LiDAR System
GNSS	Global Navigation Satellite System

Page 9 of 154



GESGood Environmental StatusIMOInternational Maritime OrganizationINNSInvasive Non-Native SpeciesISOInternational Organization for StandardizationJNCCJoint Nature Conservation CommitteekmkilometreLiDARLight Detection and RangingMAPMaritime Area Planning Act 2021MARAMaritime Area Regulatory AuthorityMARDThe International Convention for the Prevention of Pollution from ShipsMBESMultibeam echosounderMHWSMean High Water SpringmmmillimetreMSFDMaritime Strategy Framework DirectiveMSPMaritime Usage Licence ApplicationNULAMaritime Usage Licence ApplicationNISNational Marine Planning FrameworkNMFFNational Marine Planning FrameworkNMPFNational Marine StatesemtNMSNational Marine Planning FrameworkNMSPNational Marine Planning FrameworkNMSPNational Marine Planning FrameworkNMFFNational Marine Planning FrameworkNMSPNational Monuments DatabaseNPWSNational Parks and Wildlife ServiceNRANavigation Risk AssessmentOFLOOffshore Fisheries Lialson OfficerOMBOperation and Maintenance BaseOWFOffshore Wind FarmPAMPassive Acoustic MonitoringPODsEcholoccation nelk detectorsPSCSProject Supervisor Construction Stage	Abbreviation	Term
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PAM Passive Acoustic Monitoring PODs Echolocation click detectors PSCS Project Supervisor Construction Stage	OWF	Offshore Wind Farm
PODs Echolocation click detectors PSCS Project Supervisor Construction Stage	PAM	Passive Acoustic Monitoring
PSCS Project Supervisor Construction Stage	PODs	Echolocation click detectors
	PSCS	Project Supervisor Construction Stage

Page 10 of 154

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Abbreviation	Term
PSDP	Project Supervisor Design Process
PTS	Permanent Threshold Shift
ROV	Remotely Operated Vehicle
SAC	Special Areas of Conservation
SBP	Sub bottom Profiling
sCPT	Seismic Cone Penetration Test
SFPA	Sea Fisheries Protection Agency
SISAA	Supporting Information for Screening for Appropriate Assessment
SPA	Special Protected Area
SSC	Suspended Sediment Concentration
SSS	Side Scan Sonar
TSS	Traffic Separation Schemes
TTS	Temporary Threshold Shift
UAIA	Underwater Archaeological Impact Assessment
UAU	Underwater Archaeology Unit
UHRS	Ultra-High resolution seismic
UK	United Kingdom
USBL	Ultra Short Base Line (Underwater positioning system)
UXO	Unexploded Ordnance
VC	Vibrocore
WFD	Water Framework Directive
WTG	Wind Turbine Generator

Page 11 of 154



DEFINITIONS

Definition	Term
Acoustic Doppler Current Profiler (ADCP)	An Acoustic Doppler Current Profiler is a hydroacoustic current meter similar to a sonar, used to measure water current velocities over a depth range using the Doppler effect of sound waves scattered back from particles within the water column.
Appropriate Assessment (AA)	An Appropriate Assessment (AA) is an assessment of the potential adverse effects of a plan or project (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas. These Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are protected by both National and European Law.
Aquaculture Sites	Aquaculture sites include shellfish, finfish and seaweed production areas as monitored for licensing purposes.
Array Area	Area where site investigations will take place to determine the suitability of that area as an offshore wind farm.
Benthic Ecology	Benthic ecology is the study of organisms that make up bottom communities (sediments, seagrass communities and rock outcrops) in lakes, streams, estuaries and oceans, to determine environmental health and conduct environmental appraisals.
Boreholes	A borehole is a narrow shaft bored in the ground, either vertically or horizontally.
Cone Penetration Test (CPT)	The cone penetration or cone penetrometer test (CPT) is a method used to determine the geotechnical engineering properties of soils and delineating soil stratigraphy.
Exclusive Economic Zone	Marine area from the territorial seas boundary seaward to a distance of 200 miles or otherwise as agreed under international statute.
Dredge Fishing	A fishing dredge, also known as a scallop dredge or oyster dredge, is type of fishing gear which is towed along the bottom of the sea by a fishing boat in order to collect a targeted bottom-dwelling species.
Ecology	Ecology is a branch of biology concerning the spatial and temporal patterns of the distribution and abundance of organisms, including the causes and consequences.
Estuaries	Estuaries are coastal inlets with a significant freshwater influence. They are diverse, dynamic habitats that help maintain the health of coastal ecosystems. They are a significant resource for bird and mammal species for feeding, breeding, and resting, and depending on their geomorphology and hydrology support a mosaic of other habitats, including Annex I habitats such as mudflats.
Fish Nursery Grounds	Nursery grounds are habitats that enhance the growth and survival of juvenile fish.
Fish Spawning Grounds	Spawning grounds are areas where fish congregate to lay and fertilise their eggs.

Page 12 of 154



Definition	Term
Geophysical Surveys	Geophysical surveys are ground-based physical sensing techniques that produce a detail image or map of an area. Ground-based surveys may include: Seismic surveys - vibrations are recorded with geophones to provide information about the properties of rocks.
Geotechnical investigation and evaluation	Geotechnical investigation and evaluation include methods to acquire and evaluate subsurface information, including drilling and sampling, laboratory testing, cone penetration testing, and pressure meter testing.
Grab Samples	A grab sample is a sample of sediment taken from the seabed.
Habitats Directive	Adopted in 1992, the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging developments.
Lidar	LiDAR is a method for measuring distances by illuminating the target with laser light and measuring the reflection with a sensor. Differences in laser return times and wavelengths can then be used to make digital 3-D representations of the target. It has terrestrial, airborne, and mobile applications.
Magnetometer	A magnetometer is a device that measures magnetism—the direction, strength, or relative change of a magnetic field at a particular location.
Maritime Area Planning Act	Legislation reforming consenting within Ireland's marine area, including introducing both an offshore specific consenting regime and extending the powers of the State to enable the State to operate a consenting regime across its entire (Exclusive Economic Zone) EEZ and agreed continental shelf.
Maritime Usage Licence Area	Within this report: The areas within the outer limit of the State's continental shelf and high water mark for which a Maritime Usage Licence Application is submitted to MARA for a licence under the Maritime Area Planning Act 2021.
MARPOL	MARPOL is the main international convention aimed at the prevention of pollution from ships caused by operational or accidental causes. It was adopted at the International Maritime Organization (IMO) in 1973. The Protocol of 1978 was adopted in response to a number of tanker accidents in 1976–1977.
Metocean	Metocean conditions refer to the combined wind, wave, and climate conditions as found on a certain location. They are most often presented as statistics, including seasonal variations, scatter tables, wind roses and probability of exceedance.
Minister	In this report, Minister means the Minister for Housing, Local Government and Heritage.
Mudflats	Tidal mudflat habitat is comprised of the intertidal section of the coastline where muds dominate.



Definition	Term
Multibeam Echosounder	An echosounder uses sound waves to measure water depth. A transducer mounted under a vessel emits a pulse which travels through the water to the seafloor and bounces back to a receiver. The time it takes for the signal to return is measured, and because the speed of sound through water) is known, the water depth under the boat is measured. This is the basic principle of hydrography and seafloor mapping. A multibeam echosounder (MBES) measures multiple echoes at a time.
Natura Impact Statement	A Natura Impact Statement (NIS) is the statement 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).
Offshore Wind Farm Area	Area where site investigations will take place to determine the suitability of that area for the installation of Wind Turbine Generators and inter-array cabling.
Pollution Event	A 'pollution incident' includes a leak, spill or escape of a substance, or circumstances in which this is likely to occur.
Pot Fishing	Pots and traps are used in commercial fishing to catch crustaceans such as lobster, crab, and shrimp.
Receiving Environment	The receiving environment is the environment upon which a proposed activity might have effects.
Reefs	Reefs are marine features with hard substrate available for collation by plants and animals. In Irish waters they range from the intertidal to depths of 4,500m and more than 400 km from the coast.
Side Scan Sonar	Side-scan uses a sonar device that emits conical or fan-shaped pulses down toward the seafloor across a wide-angle perpendicular to the path of the sensor through the water, which may be towed from a surface vessel or submarine or mounted on the ship's hull.
Special Areas of Conservation	These are prime wildlife conservation areas considered to be important on a European as well as national level. The EU Habitats Directive lists certain habitats and species that must be protected within SACs.
Special Protection Areas	Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of: Listed rare and vulnerable species; regularly occurring migratory species and wetlands, especially those of international importance.
Sub Bottom Profiler	A sub bottom profiler is a type of sonar system that produces a 2-dimensional stratigraphic cross section by using acoustic energy to image sub-surface features in an aquatic environment.
Vibrocore	Vibrocoring is a sediment sampling methodology for retrieving continuous, undisturbed cores. Vibrocorers can work in a variety of water depths and can retrieve core samples at different lengths depending on sediment lithology and project objectives.
Wave Buoy	Wave buoys are used to measure the movement of the water surface as a wave train. The wave train is analysed to determine wave characteristics such as the significant wave height and period, and wave direction.

Page 14 of 154



Definition	Term
World Geodetic System	The World Geodetic System (WGS) is a standard for use in cartography, geodesy, and satellite navigation including GPS. WGS84 is a geocentric reference ellipsoid and a geodetic datum, in that it defines the centre of mass of the earth as its origin, and the direction of the earth's axis as the minor axis of the reference ellipsoid. WGS84 (EPSG:4326) is used to map the project area.

Page 15 of 154



1 INTRODUCTION

Codling Wind Park (CWP) is a proposed offshore wind farm (OWF) in the Irish Sea, set in an area called Codling Bank, between approximately 13-22 kilometres (km) off the County Wicklow coast, between Greystones and Wicklow Town.

Codling Wind Park Ltd. (CWPL) has prepared this Assessments of Impacts of Maritime Usage (AIMU) report in support of an application for a Maritime Usage Licence under the Maritime Area Planning (MAP) Act (2021) to undertake Site Investigation Activities to inform the detailed design stage of the proposed CWP OWF off the coast of Co. Wicklow, the potential operation and maintenance base (OMB) at Wicklow Harbour, export cable corridor (ECC) and possible reclamation area for the potential onshore substation along the northern shore of the Poolbeg Peninsula.

The purpose of the AIMU report is to allow the Marine Area Regulatory Authority (MARA) to determine all the potential impacts, both positive and negative, of the proposed maritime usage.

The Licence Application Area (outlined in red) comprises an area of circa 477 km² (Figure 1-1). This will hereafter be referred to as the Licence Area.

CWPL intends to undertake survey mobilisations at the proposed Licence Area to inform the location and detailed design of the proposed CWP OWF, export cable route, potential operations and maintenance base, potential land reclamation area at the potential onshore substation location, and additional buffer zones. The Site Investigation Activities, hereafter referred to as the 'Proposed Activities' will include marine geophysical, hydrographic, geotechnical, benthic, subtidal and intertidal ecological, environmental, metocean, and archaeological surveys and water quality monitoring. The Licence Area accounts for all locations where site investigations are proposed as part of this Maritime Usage Licence Application (MULA).

This Application is also accompanied by a Supporting Information for Screening for an Appropriate Assessment report (CWP-CWP-CON-02-01-09-ASM-0001) and an Annex IV Risk Assessment (CWP-CWP-CON-02-01-09-ASM-0002. A Natura Impact Statement (NIS) report will be submitted following MARA's screening exercise.

In preparing this application, pre-application consultation was undertaken with a wide range of stakeholders. (Refer to application form). Pre-application consultation meetings were also carried out with the following public bodies: the Maritime Area Regulatory Authority (MARA), the Marine Survey Office, the Marine Institute, the National Monument Service, Inland Fisheries Ireland, and the Commissioners of Irish Lights.

An Environmental Impact Assessment (EIA) screening is contained herein, provided in **section 4.1** below.





1.1 Aim of this Report

This AIMU report is part of the MULA to the MARA and aims to provide information documenting the current state of the environment in the vicinity of the Proposed Activities (see **section 2** Description of the Proposed Activities) and on the potential effects from these activities on the receiving environment.

This report should be read in conjunction with the other reports which have been prepared to support the MULA, namely the Supporting Information for Screening for Appropriate Assessment (SISAA) report and a Risk Assessment for Annex IV species.

This report also aims to assist MARA in determining whether any of the Proposed Activities fall within a class of project listed in Part 2 of Schedule 5 of the Planning Regulations 2001, as amended.

1.2 Methodology

This report summarises (**section 2**) and details the Proposed Activities. The report considers the EIA Directive, Water Framework Directive (WFD), and Marine Strategy Framework Directive (MSFD) (**section 4**). The AIMU highlights, where appropriate, where the survey design and proposed mitigation measures will be implemented to prevent or minimise impacts on the environment. Planning and development considerations and a statement of consistency with the National Marine Planning Framework (NMPF) are included in **section 4** and **section 5**, respectively. The current state of the environment in the vicinity of the Proposed Activities is described to help identify the effects, if any, on the environment (**section 6**).

This report has been produced to consider the potential effects of the Proposed Activities on environmental aspects such as population and human health, biodiversity, water, air, climate, socio-economic activities (commercial fisheries, aquaculture, marine traffic, tourism and recreation, material assets, and other proposed developments), archaeology and cultural heritage, landscape and seascape, and major accidents and disasters.

This report has been prepared in accordance with the following guidance:

- 1. Guidelines on the information to be contained in Environmental Impact Assessment Reports, from the Environmental Protection Agency (EPA) (May 2022).
- 2. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, from the Department of Housing, Planning, Community and Local Government (August 2018).
- 3. OPR Practice Note PN02 Environmental Impact Assessment Screening, from the Office of the Planning Regulator (June 2021).
- 4. Environmental Impact Assessment of Projects, Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU), from the European Commission (2017).
- 5. Applicant Technical Guidance Note for Obtaining a Licence to Carry Out Specified Maritime Usages in the Maritime Area under the Maritime Area Planning Act 2021, from MARA (2023).
- 6. Applicant Process Guidance Note for Obtaining a Licence to Carry Out Specified Maritime Usages in the Maritime Area under the Maritime Area Planning Act 2021, from MARA (2023).
- 7. Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters. Prepared by National Parks Wildlife Service, Department of Arts, Heritage, and the Gaeltacht (DAHG) (2014).

This report has been prepared and reviewed by a construction (BSc. (Hons) Marine Science, MSc. Biology). a Senior Consultant Ecologist at AQUAFACT, with experience in the marine sector and has undertaken various multi-disciplinary projects across a wide range of reports. Preparation of this AIMU has also been carried out back and BSc. (Hons) Marine Science, MSc. (Hons) Marine Biology). is a Graduate Consultant Ecologist at AQUAFACT, with experience in a variety of projects within the marine sector including Sanitary Surveys and EIA report preparation.

Page 18 of 154



The preparation of this report was overseen by **Constant of Sector** is the Divisional Director of AQUAFACT and has 25 years of experience in the field of marine science. e s a Chartered Scientist (CSci) and Fellow of the Royal Society of Biology (FRSB) and the Royal Geographical Society (FRGS) and holds a PhD in biological oceanography from the National University of Ireland, Galway. Prior to joining AQUAFACT, was manager of the Ecology Unit in the Irish Environmental Protection Agency. He has previously wor e as a Research Fellow in the Marine Institute and as a seconded expert to the European Commission.

1.3 Structure of the Report

This report is structured into the following chapters, which describe or comprise the following elements:

- Chapter 1 (this chapter): Introduction to the report.
- Chapter 2: Describes the Proposed Activities.
- Chapter 3: Needs and alternatives.
- Chapter 4: Consideration of EIA Directive, WFD and MSFD.
- Chapter 5: Planning and development, where Irish ORE and supporting policies are considered in the context of the Proposed Activities.
- Chapter 6: Assessment of potential impacts.
- Chapter 7: Summarises the proposed mitigation measures.
- Chapter 8: Presents the conclusions from this report.

Page 19 of 154



2 DESCRIPTION OF THE PROPOSED ACTIVITIES

This document has been produced to support a MULA, which seeks consent to conduct the Proposed Activities to inform the development and detailed design of the CWP OWF off the coast of Co. Wicklow, alongside the potential OMB at Wicklow Harbour, the ECC and the potential onshore substation location along the northern shore of the Poolbeg Peninsula. This is not an application for a wind farm development.

2.1 Licence Area

The proposed Licence Area lies off the east coast of Ireland spanning from the Poolbeg Peninsula, situated on the east side of Dublin City to Wicklow Town and is within Ireland's NMPF area and Irish Exclusive Economic Zone (EEZ), both of which extend 320 km (200 miles) from the Irish coast. The Licence Area covers a total area of 477 km² and is comprised of the proposed OWF area, potential OMB at Wicklow Harbour, proposed reclamation area at the potential onshore substation area for the onshore substation, and the proposed ECC (**Figure 2-1**); the coordinates of the Licence Area are provided in **Table K** (Appendix A).

2.2 Proposed Activities

The objectives of the proposed CWP OWF surveys are to determine the environmental conditions and the seafloor and subsurface geological characteristics within the Licence Area, to inform the detailed design phase at CWP OWF. Site-specific data is needed to provide additional geotechnical, geophysical, environmental, and metocean information. Once gathered, these data will be used to inform detailed design decisions about foundation type, sizing, installation methodology, cable routing, methodology for laying and burying cables, cable landfall site selection, and to verify the validity of previously acquired data in light of the changing marine environment. The proposed programme of Proposed Activities to be undertaken within the Licence Area is summarised in **Table A** below and discussed in more detail in **section 2.3**.

As part of the Proposed Activities, two forms of site investigation survey are proposed: remote sensing activities (*e.g.*, geophysical survey) which typically do not contact the seabed, and direct sampling activities (*e.g.*, geotechnical survey) which will directly interact with the seabed. All Proposed Activities will be undertaken within the Licence Area shown in **Figure 1-1**, as defined by the co-ordinates in **Table K** (Appendix A).

The geophysical survey data to be collected as part of the Proposed Activities will subsequently be analysed, the results of which will be used to inform the precise locations where the direct sampling and tests will take place (within the Licence Area). For this reason, it has been necessary to consider, and present, indicative sampling locations within this document. This approach also allows for any site specific considerations (such as physical obstructions) to be avoided or taken into account at the time of carrying out the sampling/test.

The Proposed Activities will include:

- Metocean and Floating LiDAR surveys.
- Geophysical surveys and unexploded ordnance (UXO) surveys.
- Geotechnical surveys.
- Fish & shellfish surveys.
- Benthic & intertidal surveys.
- Marine mammal passive acoustic monitoring (PAM) surveys.
- Archaeological surveys.

A description of the typical equipment and survey parameters is included in **section 2.4** below. The information contained within **section 2.4** is indicative and may be subject to change depending on the final design and Page **20** of **154**

Document Title: Assessment of Impacts of the Maritime Usage (AIMU) Report Revision No: R03



outcome of any consultation and agreements reached with statutory bodies or consultees. Timings for the Proposed Activities are also indicative and dependent on various factors including but not limited to weather and other environmental restrictions. Notwithstanding this, the details provided in this document are considered sufficient to inform a robust assessment of the Proposed Activities. A precautionary approach has been taken to ensure that the maximum impact is assessed where uncertainty exists over the precise timing or details of the Proposed Activities.

All efforts will be made to follow survey recommendations outlined in the Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects Part 1 and 2 (Department of Communications, Climate Action, and the Environment (DCCAE), April 2018).

Page 21 of 154



Proposed Activity	Proposed sample numbers/locations	Indicative timings
Metocean surveys	 Floating LiDAR system (FLS) Up to two devices to be deployed at any one time for up to 36 months deployment. Wave buoys or MetOcean Buoys Up to two wave or MetOcean buoys located within the array area or along the export cable route. Predicted to use a clump weight anchors or drag anchors. Mooring can be single point or two-point mooring for systems. Buoys up to approximately 3 metres (m) diameter. Acoustic Doppler Current Profilers (ADCPs) Up to two ADCPs placed on the seabed located within the proposed array area or along the proposed ECC. 	Fixed 12 to 36 month period including the need for site access for data collection and servicing as required.
Geotechnical surveys	Indicatively 271 proposed survey locations have been identified across the Licence Area (including the proposed array area, proposed ECC, potential OMB and potential onshore substation location) which may require the use of boreholes, co-located Cone Penetration Tests (CPTs), and vibrocores (VCs), and may require multiple mobilisations. Trial pits will be used at the intertidal landfall area. The test locations are yet to be determined and will be informed by prior surveys, detailed engineering, and project design. Indicative locations for geotechnical tests within the Licence Area are provided in Figure 2-1 .	Two to eight months per mobilisation.
	Proposed Array Area A conservative approach has been adopted which considers a maximum of 203 geotechnical survey locations consisting of up to 125 boreholes and up to 78 co- located CPTs and VCs. These are maximum figures (see Figure 2-1). Likely the number of geotechnical survey locations will be significantly lower (<i>i.e., c.</i> 60 or 75 boreholes in total to correspond with wind turbine generator (WTG) layouts with 78 co-located CPTs/VCs). Borehole indicative depths: 50 m.	

Table A: Summary of Proposed Activities and Indicative Programme.



Proposed Activity	Proposed sample numbers/locations	Indicative timings
	The maximum casing diameter of a borehole is typically 508 millimetres (mm). The diameter of the sample recovered is approximately 105 mm. Therefore, the maximum seabed penetration footprint from the boreholes, within the proposed array area is circa 25 m ² . CPT and VC indicative depths: 6 m. CPT penetration cone is approximately 50 mm in diameter housed within a seabed frame with a footprint of between 8-10m ² . With a maximum of 78 locations, the maximum seabed penetration footprint over the proposed array area is less than 2 m ² for the CPTs. VC typically has an outer diameter of 100-120 mm, with an expected sample recovery of 96 mm. With a maximum of 78 locations, the maximum footprint over the proposed array area is less than 2 m ² for the CPTs.	
	Proposed Export Cable Corridor and Intertidal Landfall Area	
	A conservative approach has been adopted which considers a maximum of 48 geotechnical survey locations in the proposed ECC. Indicative depths: 6 m with few extending to 12 m close to the proposed intertidal landfall area. Diameter of casings and recovered samples for boreholes, VCs, and CPTs within the proposed ECC are the same specifications as for the proposed array area. Seven trial pits at the proposed intertidal landfall area. Indicative sampling duration is < 12 hours.	
	Potential Operation and Maintenance Base (OMB)	
	Ten boreholes and ten CPT/VCs. Borehole indicative depths: 6 m. CPT and VC indicative depths: 6 m. Diameter of casings and recovered samples for boreholes, VCs, and CPTs within the potential OMB are the same specifications as for the proposed array area.	
	Indicative locations are shown in Figure 2-1.	
	Potential Onshore Substation Location	

Page 23 of 154



Proposed Activity	Proposed sample numbers/locations	Indicative timings
	Ten boreholes and ten CPT/VCs. Borehole indicative depths: 12 m. CPT and VC indicative depths: 6 m. Diameter of casings and recovered samples for boreholes, VCs, and CPTs within the potential onshore substation location are the same specifications as for the proposed array area. Indicative locations are shown in Figure 2-1 .	
Geophysical and UXO surveys	 Proposed Array Area Surveys across the proposed array area to assess ground conditions and to identify possible UXOs. Techniques include Multibeam echosounder (MBES), side scan sonar (SSS), and a gradiometer system using several magnetometers, a sub bottom profiler (SBP), and multichannel high-resolution acoustic seismic surveys <i>i.e.</i>, sparkers. Ultra Short Base Line (USBL), an underwater acoustic positioning system, will be used for towed equipment. Proposed Export Cable Corridor & Operation and Maintenance Base Surveys across ECC and OMB to assess ground conditions and to identify possible UXOs. Techniques include MBES, SSS, and a gradiometer system using several magnetometers, a sub bottom profiler, and multichannel high-resolution acoustic seismic surveys <i>i.e.</i>, sparkers. USBL will be used for towed equipment. Potential onshore substation location Surveys in the potential onshore substation area to assess ground conditions. Techniques include MBES, SSS, and a gradiometer system using several magnetometers, a sub bottom profiler, and multichannel high-resolution acoustic seismic surveys <i>i.e.</i>, sparkers. 	Two to eight months per mobilisation.

Page **24** of **154**



Proposed Activity	Proposed sample numbers/locations	Indicative timings
Fish and shellfish surveys	 Potting survey Surveys will be designed to undertake investigative sampling. Indicatively may include ten locations for potting and trawl surveys within the proposed array area and/or along the proposed ECC and may be required at the potential OMB. Approximate duration of survey is three days. Indicative sampling duration is 24 hours per station. Trawl survey Surveys will be designed to undertake investigative sampling. Indicatively may include ten locations for potting and trawl surveys within the proposed array area and/or along the proposed ECC and may be required at the potential OMB. Indicative duration of survey is three days. Indicative sampling. Indicatively may include ten locations for potting and trawl surveys within the proposed array area and/or along the proposed ECC and may be required at the potential OMB. Indicative duration of survey is three days. Indicative sampling duration is one hour per station. 	Periodically taking place over the following five year period. Potting surveys may be repeated up to quarterly; trawl survey sampling will occur no more than quarterly every annum. In total potting and trawl surveys will take approximately 4 weeks per year.
Benthic and intertidal surveys	 Benthic sampling Benthic sampling will occur up to two times annually. Indicative duration of survey is five days (likely using a 0.1 m² mini Hamon grab, Day grab, or a Van-Veen grab). Up to 60 across the proposed array area. Up to 20 reference sites (see Figure 2-2 for indicative locations). Up to 20 along the proposed ECC up to mean high water springs (MHWS). Up to ten around Wicklow Harbour for the potential OMB. Drop down videos (DDVs) may also be deployed at the same locations as the grab samples. Indicative locations are shown in Figure 2-2. Indicative sampling duration is < one hour per station. Note – grabs may be required to inform a potential Dumping at Sea Permit application. Ecological intertidal walkover survey One at the proposed intertidal landfall area per year. Includes a Phase I walkover survey and a Phase II quantitative intertidal study to derive information on a range of environmental, biological, and ecological features 	Periodically taking place over the following five year period. The survey duration will be approximately 3 weeks per year.

Page **25** of **154**



Proposed Activity	Proposed sample numbers/locations	Indicative timings
	(biotopes, extent of sub-features, zonation, <i>etc</i> .). In total, the Phase II quantitative survey will survey a total of six shore height stations, resulting in 18 faunal core samples and 6 sediment samples for physical and chemical analysis. Indicative sampling duration is < one hour per station.	
	Epibenthic Trawls	
	Indicative 30 locations within proposed array area and/or along the proposed ECC. Single survey to establish baseline and possibly repeated over several mobilisations Indicative duration of survey is two days. Indicative sampling duration is one hour per station.	
Marine mammal	Echolocation click detectors (PODs) and potentially broadband sound	Fixed 12 to 36 month period
monitoring (PAM)	A maximum of eight moorings equally dispersed outside of the proposed array area, but within the Licensed Area. Indicative locations are shown in Figure 2-1 .	for data collection and servicing as required.
Intertidal archaeological walkover survey	Metal detector survey for archaeology at the proposed intertidal landfall area. Walkover at the proposed intertidal landfall area for archaeological features of interest.	Periodically taking place over the following five year period. Approximately 1 week per year.

Page **26** of **154**





5,910,000	
5,900,000	Licence Area _(CWP, 2024.05.20) — High Water Mark _(TE, 2024.04.19) Grab/Drop Down Video Sampling Site Array OECC Reference Site OMB
5,890,000	
5,880,000	@ British Crown and Oceanwise, 2022. All rights reserved. License NO. EK001- FN800-03199. Not to be used for Navigation. Project: Codling Wind Park Contractor: Website: Map title: Fig 2.2: Benthic Sampling Stations Codling doc. number: CWP-CWP-CON-02-01-09-MAP-1514 Internal descriptive code: Sheet size: A3 Scale: 1:180.000 CRS: EPSG 25830
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2.3 Survey Schedule

The intention is to begin survey activities as soon as is feasible following licence award, with a staged programme of investigations, capitalising on suitable weather windows over the licence duration. This phased approach will support the progression of the CWP OWF towards the detailed design stage of development. The exact mobilisation dates will not be known until the process of procuring a contractor is complete.

Timing of the Proposed Activities is dependent on many factors including weather, tidal flows, availability of vessels, ecology, and the granting of a licence. The granting of a licence will have a direct effect on the timing of the Proposed Activities.

2.4 Survey Methodologies

Method statements and types of equipment that will be used during the Proposed Activities are provided below.

2.4.1 Metocean

The metocean surveys across the Licence Area will comprise the deployment of:

- Up to two FLS units for wind measurements, which are used to map the topography of the seabed;
- ADCPs for subsurface wave and current measurements, which are used to measure water current velocities over a depth range using the Doppler effect of sound waves that are scattered back from particles within the water column; and
- Waverider buoys and MetOcean Buoys, used to measure wave data such as height and spread.

Floating LiDAR System

Device Specification

The FLS (**Figure 2-3**) will be equipped with one or two profiling LiDARs, a full suite of metocean monitoring equipment including wave dynamics, and optional environmental and biological sensors (*e.g.*, wildlife radar, precipitation meter, visibility sensor, ceilometer and radiometer).

The final device specifications including dimensions and mooring configurations will be finalised following completion of the procurement process but will likely utilise a simple mooring system (*e.g.*, chain anchor and clump weight), and each FLS is expected to be up to circa 6 x 6 m in dimension.

A set of navigation aids and markings shall be installed in order to protect each FLS and serve as a reference for mariners. In this regard, the system shall be marked, lit, with aids of navigation used, in accordance with agreements with the Commissioner of Irish Lights.

It is expected that the minimum FLS markings will include:

- Yellow marine paint and "X" marking cross (special marker);
- Beacons with yellow light with rhythm specific of SADO/ODAS buoy;
- Automatic Identification Systems (AIS); and
- RADAR Reflector.



The FLS shall be fitted with a geo-location device and a position warning system. The powering system shall ensure that all the navigation aids and geo-location systems are always operational.



Figure 2-3 Example Floating LiDAR System

Deployment, Maintenance, and Recovery

Two indicative locations, a primary and an alternative, have been identified for the deployment of the FLS unit(s).

These locations are included in **Figure 2-1**. The final locations are subject to micro-siting and final positioning during deployment.

Each FLS deployed should remain at the deployment site for a period no less than one continuous year with a maximum deployment period of up to 36 months. The FLS unit(s) may be deployed at the primary and/or alterative indicative locations.

An installation vessel will be required for the launch and recovery of this equipment, and for any required servicing. The FLS shall be secured using a simple mooring system that is attached to the seabed by a single or multi point mooring system. The mooring will connect to the devices with rope or with open link steel chains. Detailed information on the mooring system (schemes, key dimensions, calculations associated with the mooring design, *etc.*), shall be made available during the application for the Statutory Sanction to the Commissioner of Irish Lights.

Depending on the equipment employed, maintenance visits for data recovery, cleaning of sensors, and replacement of consumables may be required. Annual maintenance may involve removing the buoy from the water in order to do a more complete service and recovery to shore. Wherever economically feasible and safe to do so, "Transfers at Sea" or "Quick Turn Operations" will be undertaken to minimise or eliminate completely any interruptions in operations and mobilisation months.

Upon completion of the data collection the FLS unit(s) and all mooring components shall be decommissioned and removed from the deployment site. A similar vessel with winch or deck crane capabilities as used in the deployment will be required to undertake recovery of the FLS and associated mooring components. The seabed shall be left as close to its original condition as possible. No debris from the installation shall be left at or around the deployment site.

Page 30 of 154



While subject to procurement, it is anticipated that deployment and decommissioning will take approximately one day each, while maintenance may take five days when recovered to shore.

ADCPs

Device Specification

An ADCP (**Figure 2-4**) is a hydroacoustic current meter similar to a sonar, used to measure water current velocities over a depth range using the Doppler effect of sound waves scattered back from particles within the water column.



Figure 2-4 Example ADCP Seabed Frame

Deployment, Maintenance and Recovery

Installation of up to four seabed frames with ADCP units containing both wave and current sensors, and turbidity and total suspended solids sensors will be deployed for no less than one continuous year with a maximum deployment period of up to 36 months at each location (servicing anticipated every 12 weeks to replace ADCP batteries). Indicative locations are shown on **Figure 2-1**.

ADCP frames will be deployed from a suitable vessel using a deck crane or winch. An additional clump weight and buoy with an acoustic seabed release will also be deployed to the seabed for recovery of the frames. Following successful deployment, no equipment will be left on or in proximity to the sea surface as a hazard to shipping.

No maintenance visits between deployment and recovery will be required and on recovery the acoustic release will be triggered to allow the buoy to come back up to the surface and the frame and ADCP will be recovered to the vessel.

Final design details will be confirmed following the procurement on appointment of contractors, but it is estimated that the ADCP will sit in a stainless-steel frame of the following approximate dimensions:

- Frame Dimensions L1. 5 m x W1.5 m x H0.6 m;
- Frame weight 250 kg;

Page 31 of 154



- Ground weight 25 kg; and
- Leaded ground line 60 m (3 tonne).

ADCP and stainless-steel mooring will be secured to the seafloor; likely using a ground line and clump weight (approximately 150 kg). An acoustic release carrying a rope retrieval system will be used to facilitate recovery of all equipment from the seabed following the monitoring period (likely minimum period of 12 months).

Detailed information on the mooring system (schemes, key dimensions, calculations associated with the mooring design, *etc.*) shall be made available during the application for the Statutory Sanction.

No surface markers are expected to be required as no part of the frame or mooring will be on or near the sea surface. However, this is subject to the undertaking of a Navigation Risk Assessment (NRA) once locations and devices details are finalised to inform the Statutory Sanction process and following further consultation with Commissioner of Irish Lights.

Following recovery, no equipment will be left on the seabed and there will be no lasting material effects on the seabed from the equipment.

Waverider or MetOcean Buoys

Device Specification

Wave buoys and MetOcean Buoys (**Figure 2-5**) measure wave data such as height and spread. The MetOcean Buoy is designed to carry a dual array of sensors operating independently to maximise data returns and reduce requirement for unscheduled servicing._The buoys float on the water surface and log data continuously. Each logged data point is a time-averaged measurement of the waves that have passed through the buoy during the preceding 30 minutes. From measurements of the buoys movement, a spectrum of different wave frequencies are recorded.

Final details of the proposed buoys and moorings is subject to final procurement but is likely to be up to three m in diameter with a simple mooring system such as a chain anchor and clump weight, or two-point mooring system.





Figure 2-5 Example of a Waverider and MetOcean buoy.

Deployment, Maintenance and Recovery

Waverider buoys (with an optional incorporation of ADCP for the measurement of surface currents) and MetOcean Buoys, will be deployed and recovered from a suitable vessel at a maximum of five locations. Indicative locations are included in **Figure 2-1**.

Maintenance visits between deployment and recovery are not envisaged, however in the event of failures, replacement of parts or entire units may be required. Some removal of marine growth may also be required during the deployment period.

The buoys will be marked and lit with the use of appropriate navigation aids and markings, in order to reduce navigational risk. An NRA will be undertaken to inform the Statutory Sanction process and specific marking and lighting requirements will be agreed with the Commissioner of Irish Lights.

2.4.2 Geophysical Survey

The geophysical surveys across the Licence Area will comprise of the following:

- MBES, which is used to provide detailed bathymetric mapping of the seabed;
- SSS, which is used to image the surface of the seabed for the detection of objects or structures;
- Sub-bottom Profiling (SBP)/Ultra-High resolution seismic (UHRS) data, which are used to produce a 2D image of the sub seabed geology;
- Marine magnetometry/gradiometer, used to locate and identify ferrous objects on or buried in the seabed; and
- Remotely Operated Vehicle (ROV), which is used to inspect certain areas of the proposed ECC or areas where there are features of interest within the proposed array area. An Ultra Short Base Line (USBL) system may be used to communicate the ROV's position relative to the vessel.

Page 33 of 154



Prior to the full deployment of any equipment, it will be calibrated and tested to ensure that the correct settings for that area are being applied. Once satisfactorily completed, depending on the survey requirements, the order and combination of geophysical gear will be determined, deployed from the vessel, and survey lines will be run. The number of parallel lines and spacing between lines will be determined from the known average water depth. To ensure full coverage of the Licence Area, shorter cross lines will also be completed. The survey may utilise hull or ROV mounted geophysical equipment.

Multibeam Echosounder (MBES)

A MBES uses acoustic technology to provide detailed bathymetric mapping of the seabed. The MBES is typically hull or pole mounted on the survey vessel or ROV and is used in conjunction with a Global Navigation Satellite System (GNSS) aided inertial positioning and orientation system, specifically designed for georeferencing and motion compensation in hydrographic surveying.

Side Scan Sonar

SSS uses acoustic technology to image the surface of the seabed for the detection of objects or structures. The SSS is typically towed astern of the survey vessel and used in conjunction with high accuracy GNSS positioning. To obtain those images, it digitises a sound pulse sent out from two transducers mounted on each side of the SSS towfish. Images are based on the amount of reflected sound energy and presented on a time basis resulting in a continuous, highly detailed image of the bottom. Seabed sediment classification can also be interpreted from the SSS data according to the intensity of the acoustic return. The EdgeTech 4205 (**Figure 2-6**) may be taken as an indicative example.



Figure 2-6 EdgeTech 4205 Side Scan Sonar.

Marine Magnetometer

Marine magnetometers detect ferrous objects and are used to locate and identify ferrous objects on, or buried, in the seabed. The device precisely measures the Earth's magnetic field and detects any anomalies, which represent ferrous objects such as lost anchors, abandoned fishing gear, shipwrecks, and buried pipelines or cables. The magnetometer is typically towed behind a survey vessel. To ensure that the accuracy remains consistent throughout, a gradiometer would also be deployed and utilised in a similar fashion. A gradiometer measures magnetic gradient in one dimension by subtracting the difference between two independent sensors.

Sub Bottom Profiler (SBP) and Ultra High Resolution Seismic (UHRS) Surveys

SBP will be required throughout the Licence Area. SBP or UHRS systems use reflection seismology to give a 2D image of the sub-seabed geology. It is typically towed behind the vessel during survey works or affixed to the vessel's hull.



Across the proposed ECC shallow investigation will be sufficient, which is usually achieved with a hull mounted pinger operating in single channel mode. Within the proposed array area acquisition of information to greater depths is needed for foundation design and site layout options. Ultra-high-resolution multi-channel seismic technology such as a sparker or boomer system will likely be used. Penetration depths of 100 m can be achieved by a sparker in multichannel mode; the maximum anticipated penetration depth of piled foundation options at the site are approximately 60 m. Alternatively, a boomer operating in multi-channel mode would provide a penetration to 60 m and may be considered.

UHRS systems may be used to identify and characterise the deeper layers of sediment/bedrock underneath the seafloor across the entire Licence Area. An example of the type of equipment used is the Marine Geo-Source 200 with the Geo-Spark 1000 pulsed power supply.

Remotely Operated Vehicle (ROV)/Ultra Short Base Line System (USBL)

ROV may be required to inspect certain areas of the proposed ECC or areas where there are features of interest within the proposed array area. This can be deployed from a suitable vessel and operated by an ROV pilot via a tether. An ROV will be selected prior to the survey commencing. An UBSL system may be used to communicate the ROV's position relative to the vessel.

2.4.3 Geotechnical Survey

The 271 geotechnical survey locations across the Licence Area will comprise:

- CPT (proposed array site, potential OMB, potential onshore substation location, and proposed ECC), a method of mapping and testing soil profiles on the seabed.
- Boreholes (proposed array area, potential OMB, potential onshore substation location, and proposed ECC), a method of collecting sample from the seabed.
- Vibrocores (proposed array area, potential OMB, potential onshore substation location, and proposed ECC), a method of rapidly retrieving continuous, undisturbed core samples from unconsolidated and semiconsolidated sediments.
- Trial pits (proposed intertidal landfall area only). A method of intrusive ground investigation for determining the condition and composition of the sediment. An estimation of seven trial pits to be used at the proposed intertidal landfall area for a duration of < 12 hrs.

Cone Penetration Testing (CPT)

There are three separate CPT methods which require different vessel types and equipment and therefore each method shall be considered separately below.

CPTs will be conducted along the proposed ECC at one km intervals using equipment incorporated into tracked vehicles (intertidal only) or vessels. In the nearshore, CPTs may be conducted at 200 m intervals out to a distance of 1.5 km. **Figure 2-1** shows indicative geotechnical locations which may be boreholes, CPTs or VCs.

CPTs will be taken within the proposed array area (maximum 78 CPTs/VCs) and proposed ECC (maximum of 48 boreholes or CPTs/VCs). Approximately ten CPTs may also be required at Wicklow Harbour for the potential OMB and ten may be required at the potential onshore substation area, however these are maximum figures and actual numbers are expected to be lower.

Examples of the equipment that may be used for CPTs are the ROSON® and the Manta GT25® (Figure 2-7).





Figure 2-7 Manta GT25® Core Penetration Testing.

Down-borehole CPTs

The CPT is undertaken in conjunction with a traditional drilling assembly. This allows the CPT to be pushed until such time as refusal is reached. A drill string is then used to core out the hole at the CPT location. This reduces the friction on the rods and allows the CPT to be pushed to greater depths. The down-borehole CPT takes longer and is more intrusive as it also involves drilling, however it allows deeper layers to be tested which cannot be reached with the seabed system.

Seabed CPTs

Seabed CPTs involve mobilising a self-contained and automated CPT test unit housed within a seabed frame. This frame is typically kept on the deck of a dynamically positioned vessel. The vessel will typically locate at the required position and then use an on-board crane, A-frame crane, moonpool winch system to lift the CPT frame into the water until it touches down on the seabed. The CPT is connected to the vessel via an umbilical. The cone is then automatically pushed into the seabed until it reaches refusal. The seabed unit will be ballasted depending on the survey requirements, generally weighting between five and 25 tonnes with a footprint of approximately 8-10 m². Seabed CPTs do not involve removing any material from the seabed or taking any samples. The test typically takes less than two hours, after which the seabed frame is lifted back on to the vessel and the vessel moves on to the next location.

Seismic CPTs (SCPTs)

SCPTs involves the recording of shear waves at a known depth below the source (seismic hammer). Shear waves are generated by a driven spring hammer mounted on a seabed frame which are then later received by a geophone incorporated in the conventional piezocone penetrometer.

The SCPT is pushed down to the required depth and then the hammer is activated to generate shear waves. All the signals received on the geophone are monitored by a seismograph.


Boreholes

Borehole sampling will be completed within the Licence Area as part of the detailed site investigation. There will be up 125 boreholes in the main array area and up to 48 boreholes or CPTs/VCs at the proposed ECC. Approximately ten boreholes may also be required at Wicklow Harbour during the baseline surveys for the potential OMB and ten may be required at the potential onshore substation area, however these are maximum figures and actual numbers are expected to be lower. Indicative locations for geotechnical surveys (boreholes, CPTs or VCs) are shown in **Figure 2-1**.

To take the sample, a drilling head is lowered to the seabed via a drill string and stabilised using a seabed frame or robust riser casing. The drill string is then rotated to commence boring. Tools are lowered into the drill string to recover samples or conduct in-situ soil testing. The maximum casing diameter of a borehole is typically 508 mm; the diameter of the sample recovered is c. 105 mm.

All drilling equipment used will follow the International Organisation of Standardisation (ISO) and American Petroleum Institution (API) technical specifications for drilling equipment and at a minimum will have:

- Capability of completing in-situ down-borehole sampling;
- A heave motion compensator system (if required) on board (seabed frame and/or drill string) with a minimum heave compensation of 1.5 m; and
- Capability of mud production to different densities (when mud production is required for the works). The mud shall be water based or bio-degradable organic polymer.

Geophysical downhole logging may also be performed as part of the geotechnical surveys including Down P and P-S Suspension Logging techniques.

Down P logging (or Check-shot) provides compression P wave velocity data from seabed to the end of the borehole for seismic interpretation. The source (such as a sparker) is lowered in the water column and a streamer with spacing between hydrophones of 0.5 m is lowered in the borehole. A shot is triggered and the time for the P-wave to arrive at each hydrophone is recorded.

P and S Suspension Logging is a method for determining shear and compression wave velocity profiles along the borehole for seismic interpretation and to obtain deformation properties of soil/rock in-situ. Measurements are made in an uncased and fluid-filled borehole every 0.5 to 1 m. As the first meters of soil are cased, it is not possible to record data in the shallowest part of the boreholes.

Vibrocores

Vibrocoring is a method of rapidly retrieving continuous, undisturbed core samples from unconsolidated and semi-consolidated sediments. These Vibrocore rigs work by attaching the Vibrocore head to the core barrel and inducing high frequency vibrations. The sediment in immediate contact of the core barrel forms a 'liquefied' boundary layer by the vibration mechanics enabling the core barrel to penetrate the sediment strata. A core catcher is attached to the end of the barrel which holds the sediment inside the barrel when withdrawn from the sediments. The Vibrocore barrel would typically have a diameter of up to 120 mm with an inner sample diameter of up to 96 mm and can typically penetrate up to c. 5 m into the sediment sample volume of approximately 0.05 m³.

Vibrocores will be co-located with CPTs and taken at approximately one km intervals along the proposed ECC. In the nearshore, CPTs may be conducted at 200 m intervals out to a distance of 1.5 km. A maximum of 78 CPTs/VCs will be completed at indicative geotechnical survey locations in the proposed array area, a maximum of 48 boreholes or CPTs/VCs at the proposed ECC, a maximum of ten CPTs/VCs at the potential onshore substation area, and a maximum of ten CPTs/VCs at the potential OMB, however these are maximum figures and actual numbers are expected to be lower (refer to **Table A**).

Page 37 of 154





Trial pits and thermal resistivity tests

Trial pits are a type of intrusive ground investigation that is used as a means of determining the condition and composition of the soil. As the integrity of the geology is important to inform cable installation design, trial pits will be required to determine the geotechnical parameters at the intertidal landfall area. Indicative dimensions of the trial pits will be 2 m long x 1 m wide x 2 m deep. The trial pits will be backfilled using only native materials and completed via Backhoe loader, JCB 3CX or 4CX. The final device specifications will be finalised following completion of the procurement process. Thermal resistivity testing measures the capacity of the ground to conduct or dissipate heat. A correct understanding of the thermal properties of a soil or layer of made ground is important for the design and installation of the export cables.

2.4.4 Fish and Shellfish Survey

The fish or shellfish survey methods across the Licence Area are as follows:

- Potting survey, comprising fleets of pots (*e.g.*, lobster pots) comparable with those used by local fishermen will be set over the Licence Area; and
- Trawl survey, comprising gear comparable to that used locally. The sampling will occur no more than quarterly throughout the year. An estimated ten locations for potting and trawl surveys within the proposed array area and/or along the proposed ECC and potential OMB.

Potting Survey

Up to ten fleets of 20 pots will be set over the Licence Area. The exact nature of the pots will be finalised following further consultation with Sea Fisheries Protection Agency (SFPA) and be comparable with those used by local fishermen. All the pot strings would be marked at either end of the fleet with a dahn buoy so that the individual strings can be clearly seen. A weight will be attached at each end of the foot rope so that the strings remain in the desired position.

Pots would be left to soak for up to 24 hours before being collected. Surveys may be repeated up to quarterly.

Otter Trawls

The trawl survey would use comparable gear to that used locally. Typically, this consists of an otter type trawl that is constructed with 80 mm mesh in the main body and cod end, the foot rope will use rubber discs (hoppers) of a suitable size to allow it to work in the seabed types present.

Duration of each tow and the exact locations sampled will be finalised following further consultation with the SFPA, however it is envisaged that up to fifteen stations will be sampled within the Licence Area, and sampling will occur no more than quarterly throughout the year.

2.4.5 Benthic and Intertidal Survey

The benthic survey will be designed using analysis of the geophysical survey data available which will be reviewed to stratify sampling according to likely habitat types across the Licence Area. This selection of sampling stations provides a representative coverage of the available habitats and physical environments, in combination with a review of the development design (i.e. selecting sampling stations that would still be accessible post construction). This approach ensures a robust survey design, and the ability to sample throughout all phases of the development.

Page 38 of 154



Reference areas and associated sampling station locations will be selected by identifying comparative environmental variables (*e.g.*, sediment type, water depth, topographical features, faunal structure), but which will be located outside the development's area of influence.

Survey techniques will include:

- Deployment of a 0.1 m² mini Hamon grab, Day grab, or Van Veen grab at all sediment-based sampling stations;
- DDV at stations where sensitive habitats or hard substrate may be found;
- Intertidal walkover survey; and
- Epibenthic beam trawl (if required following geophysical and DDV results).

Where geophysical data does not exist to inform placement (*e.g.*, reference sites), DDV followed by grab sampling will be undertaken (grab only conducted where DDV indicates suitable substrate).

The maximum number of grab/DDV samples proposed to be collected across the entire Licence Area will be:

- 60 samples within the proposed array area;
- 20 samples along the proposed ECC;
- 20 samples outside of the proposed array area or proposed ECC as reference stations; and
- 10 samples within and/or outside of Wicklow harbour for the potential OMB.

A benthic survey was undertaken to inform the environmental baseline for CWP OWF, however, it may be repeated if deemed necessary to provide more information on the receiving environment and if a fine-scale level of detail is required due to the presence of particularly sensitive habitats. Benthic sampling will occur periodically over the following five-year period and predicted sampling duration is < one hour per station.

Grab Sample Methodology

Benthic grab sampling will follow Procedural Guidance No. 3-9 of the Joint Nature Conservation Committee (JNCC) Marine Monitoring Handbook (Davies *et al.*, 2001) and the Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects (Judd, 2012). Infauna and sediment samples would be taken with a 0.1 m² mini-Hamon grab deployed from a survey vessel via the vessels winch, where it will be lowered to the seafloor in order to collect a sample.

It may also be necessary to sample for contaminated sediments at selected sampling stations. In this event a separate grab system, for example Van-Veen grab or Day grab) may be used. The same deployment, recovery, and recording protocols will be followed as for the mini-Hamon grab.

Drop down Video (DDV)

DDV data will be collected through use of a high definition DDV or freshwater camera system to verify the physical nature of the seafloor and collect information on the epibenthic biology of the area. The camera system would be housed in a frame and either lowered by winch, or for smaller systems directly over the side of the survey vessel. The proposed locations of the DDV stations are shown in **Figure 2-2**.

Intertidal Survey

A Phase I and II intertidal survey will be undertaken at the proposed intertidal landfall area to identify community assemblages and sediment type. The survey will take place during mean low water spring tidal conditions.

Page 39 of 154



The Phase I walkover survey entails an intertidal walkover survey covering an area of c. 500 m either side of the proposed intertidal landfall area to identify habitats and features present to complete an intertidal biotope mapping exercise. The Common Standards Monitoring Guidance (JNCC, 2004) and Littoral Sediments Habitats Procedural Guidance (Version 4, August 2004) will be adhered to for guidance over the course of the survey. The 'CWW handbook for marine intertidal Phase I survey and mapping' (Wyn et al., 2000) and the 'Guidelines for the conduct of benthic studies at marine aggregate extraction sites (2nd edition)' (Ware and Kenny, 2011) will be consulted for additional guidance. The walkover survey will be carried out to mean low water in order to derive information on the following: biotope composition, biotope distribution, the extent of sub-features, conservation features, and zonation of the shoreline. In addition, any impacts from human activities will be noted and assessed, such as the presence of sewage, litter, and other anthropogenic impacts. During the walkover survey, any observations that appear to be related to ongoing change to the littoral habitat will be recorded. This includes erosion/encroachment of embryonic marram dunes, invasive species, localised erosion, and sediment accretion. Habitat and biotope boundaries will be mapped and detailed records of biotope, sediment character, and taxa will be made. The proposed intertidal landfall area is a typical sediment shore with little natural boulders or hard substrate for epifauna to attach to, therefore habitat and biotope boundaries will likely all be identified through infauna and will not be visible on the surface of the shore. Rock armour is present on the upper shore and epiphtves and epifauna from this area will be recorded. Flora, fauna, and sediment characteristics will be recorded along the upper, mid, and lower shores if present.

A Phase II quantitative intertidal survey will be conducted in the vicinity of the proposed intertidal landfall location. Due to the very slight slope of the shore at this location, the distance from the upper to the lower shore at low water spring tides can be *c*. 1 km in length. Due to this, it is recommended to survey two transects running perpendicular to the shore and 50-100 m either side of the proposed ECC. On each transect, three sampling stations will be representative of the lower, mid, and upper shore zones, respectively. At each station, three 0.1 m² box core faunal samples will be taken to a depth of 25 cm. These faunal samples will be returned to the lab where they will be sieved on a 0.5 mm sieve and fixed and preserved in 6% buffered formalin solution. At each transect station a sediment sample will be collected from the surface 5 cm for sediment granulometry and sediment chemistry. The redox layer depth, if present, will be recorded at each station. The sediment chemistry analysis required is presented in the table below (**Table B**) and include organic carbon and a suite of potential contaminants that could be disturbed by the Proposed Activities.

Determinant	
Total organic carbon	Lead
Granulometry	Arsenic
Density	Cadmium
Mercury	Dibutyltin
Zinc	Tributyltin
Nickel	Lindane
Copper	HCB
Chromium	PCB 7
Aluminum	PAH
Lithium	TEH

Table B: Sediment determinants from sediment chemistry analysis.

Page 40 of 154



In total, the Phase II quantitative survey will survey a total of six shore height stations, resulting in 18 faunal core samples and 6 sediment samples for physical and chemical analysis.

Identification of the faunal samples should be to species level, or lowest possible taxonomic resolution. Fauna should be enumerated, and univariate and multivariate statistical analysis carried out using PRIMER software. Assessment of the faunal analysis will include assignment of JNCC and European Nature Information System (EUNIS) biotopes to the benthic infaunal communities recorded along the proposed intertidal landfall area. These will then be assessed with respect to the Qualifying Interests of the South Dublin Bay Special Area of Conservation (SAC).

2.4.6 Marine Mammal PAM Survey

PAM will be conducted in order to determine baseline levels of dolphin/porpoise echolocation click occurrence and/or to collect data on background noise levels and other vocalisations made by cetaceans (*e.g.*, whistles) across the Licence Area.

Two different types of equipment may be used to collect marine mammal acoustics data:

- Echolocation click detectors (e.g., Chelonia's F-PODs); and
- Broadband sound recorders (*e.g.*, Wildlife Acoustics' SM2M).

PODs and sound recorders are often similar in size, weight and appearance and can therefore use the same mooring arrangements and deployment techniques. Devices are typically moored between two metres above the seabed and five metres below the surface. Care will be taken to use mooring systems which are appropriate to the location and other activities occurring within it. Paired devices (a POD and a sound recorder) may be deployed at some locations using the same mooring (*e.g.*, to identify the dolphin species responsible for the echolocation clicks).

Deployment, Maintenance and Recovery

While subject to consultation and procurement it is anticipated that devices will need to be deployed during the pre-construction phase of the project (likely minimum period of 12 months). A suitable vessel to allow for deployment of the mooring weights/chain along with the devices and marked buoys (if used) will be used. No additional surface markers are expected to be required however this is subject to finalising locations of deployment and following further consultation with Commissioner of Irish Lights.

Within the proposed array area up to four devices may be deployed (**Figure 2-1**). In addition, up to five devices may be deployed along a line running east-northeast from the coast offshore. Another line of up to three devices may run inshore from the proposed array area. Distances between deployment locations and numbers of devices will be informed by underwater noise modelling during the Proposed Activities.

Servicing of the devices will take place approximately every three months from a suitable vessel. At the end of the data collection period the full moorings will be recovered to a suitable vessel and taken ashore. There will be no lasting material effects on the seabed from the equipment. All reasonable effort will be made to ensure that no equipment is left on the seabed.

2.4.7 Archaeological Surveys

The archaeological surveys will be confirmed through the CWPL tendering process in consultation with the National Monuments Service (NMS), however, it is proposed that two survey methods are utilised across the Licence Area:

• An intertidal walkover survey, which is used to survey and record visible archaeological remains within the intertidal zone; and

Page 41 of 154



• A metal detection survey, which is used to detect metallic objects that may be buried below the surface layers of the intertidal zone.

The archaeological surveys will be confirmed through the CWPL tendering process in consultation with NMS however it is proposed that two survey methods are utilised, as described in the sections below.

A Detection Device Survey Licence will be applied for from the NMS prior to the surveys being undertaken.

Intertidal Walkover Survey

Walkover surveys are a practical and systematic method of surveying and recording visible archaeological remains within the intertidal.

The walkover will involve suitably qualified archaeologist(s) following set transects across the intertidal at predefined spacings. Finds will be recovered and their locations logged, and upstanding earthworks or features will be located and recorded.

Metal Detection Survey

A metal detection survey is used to detect metallic objects that may be buried below the surface layers of the intertidal. Detection of such objects may indicate previously unknown sites and events. Metal detection will be undertaken along the same set transects as the walkover survey to detect archaeological features that are buried.

2.4.8 Survey Vessels

In order to undertake these Proposed Activities, an estimation of eight to fifteen vessels will be mobilised at any one point in time with a suite of survey equipment and devices within the Licence Area, and the use of support vessels may increase this to 15. Vessels for geophysical surveys are generally between 10-60 m in length and are also suitable for environmental surveys. For deeper water and geotechnical surveys, larger 30-90 m vessels may be required. For borehole operations, jack-up barges may be used in order to maintain position. The exact vessel types will be defined after the tender process has been completed.

The vessels will conform to the following minimum requirements, as appropriate:

- Endurance (*e.g.,* fuel, water, stores, *etc.*) to undertake the required Proposed Activities;
- Appropriate accommodation and messing facilities on board;
- Station keeping and sea keeping capabilities required by the specified work at the proposed time of year; the appointed contractor may provide supplemental tug assistance if such assistance benefits the operation;
- Staffing to allow all planned work to be carried out as a continuous operation (on a 24 hour per day basis for the offshore activities and on a 12 hour per day basis for the nearshore activities); and
- Equipment and spares with necessary tools for all specified Proposed Activities.



3 NEED AND ALTERNATIVES

The need for the Proposed Activities (as described in **section 2**) is to determine environmental conditions, and the seafloor and subsurface geological characteristics within the Licence Area. The detailed design phase of the proposed CWP OWF cannot be progressed without the data that will be collected as part of the site investigation works.

The alternative to collecting site and project specific data is to use existing, available data for the detailed design of the proposed CWP OWF. Existing available data has been reviewed and is being used to inform the project, however these datasets are not available in the spatial or temporal resolution required for detailed design, thus there is a need to gather additional, site-specific information to inform the detailed design of the proposed offshore windfarm.

Page 43 of 154



4 CONSIDERATION OF DIRECTIVES

This section considers the implication of the Proposed Activities with regard to the following directives:

- Environmental Impact Assessment Directive (EIA Directive).
- Water Framework Directive (WFD).
- Marine Strategy Framework Directive (MSFD).

4.1 EIA Directive Requirements

Article 2(1) of the EIA Directive provides:

"Member States shall adopt all measures necessary to ensure that, before development consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects on the environment. Those projects are defined in Article 4."

Article 4(1) requires that "...projects listed in Annex I shall be made subject to an assessment...". EIA is therefore mandatory for the project types listed in Annex I. Article 4(2) requires that Member States must determine for Annex II project types whether EIA is required, through:

- a) a case-by-case assessment, or
- b) thresholds or criteria set by the Member State.

The MAP Act (2021) transposes the Article 4 requirement through Section 4 as follows:

"Effect or further effect, as the case may be, is given to by this Act to an act specified in the Table to this section, adopted by an institution of the European Union or, where appropriate, to part of such an act:

7. Environmental Impact Assessment Directive."

As is the case under European Union (EU) law, under national law the requirement to carry out EIA or screening for EIA only arises in relation to projects which come within the scope of one or more classes of project listed in Parts 1 or 2 of Schedule 5 of the Planning and Development Regulations 2001, as amended.

EIA or screening for EIA are not required where a proposed development does not fall under any of the classes of project listed in Schedule 5, interpreted broadly, irrespective of the size or location of the proposed development or whether it is considered likely to have a significant effect on the environment.

Part 1 of Schedule 5 of the Planning and Development Regulations 2001, as amended (Planning Regulations) lists the project types for which EIA is mandatory, transposing Annex I of the EIA Directive.

Part 2 lists project types for which EIA is mandatory if a specified threshold is exceeded. For all other project types listed in Part 2, corresponding to Annex II, which do not exceed a threshold or for which no threshold is set, a screening analysis and determination are required on a case-by-case basis. An EIA is also required for projects which do not exceed the threshold, but where the Minister determines that the proposed project will be likely to have significant effects on the environment.

4.1.1 Approach to EIA Screening

The EIA Directive aims to ensure a high level of protection for the environment and human health. It requires that an assessment of the likely significant impacts (both positive and negative) a project will have on the

Page 44 of 154



environment is carried out, where relevant, before a determination is made on a development consent or licence application. The Office of the Planning Regulator issued a practice note, OPR Practice Note PN02, on EIA Screening for development proposals (Office of the Planning Regulator, 2021). While the aim of the Practice Note is to provide guidance for compliance with the planning legislation, it provides useful guidance for EIA Screening for other consent regimes.

The Practice Note recommends a step-by-step approach to EIA Screening, as follows:

Step 1: Understanding the Proposal

The first step comprises the following tests:

- a) Is the proposed development a project as per the EIA Directive? If not, then the proposed development is not subject to the EIA Directive, no screening is required, and no EIA is required.
- b) Is the project listed in Schedule 5 Part 1 or does it meet or exceed the thresholds in Part 2 of the Planning and Development Regulations, , as amended? If it does, no screening is required and EIA is mandatory.
- c) Is the project sub threshold? Sub-threshold being defined as "development of a type set out in Schedule 5 which does not exceed a quantity, area or other limit specified in that Schedule in respect of the relevant class of development."
 If it is, then the project must proceed to Step 2, as preliminary examination is required.

Step 2: Preliminary Examination & Conclusion

This step consists of a preliminary examination of, at least, the nature, size, or location of the development, considering:

- **Nature** of the development including production of wastes and pollutants.
- **Size** of the development.
- **Location** of the development including proximity to ecologically sensitive sites and the potential to affect other environmental sensitivities in the area.

Step 2 will have one of three outcomes:

- a) There is no real likelihood of a significant effect on the environment and no further action is required. The reasons for this conclusion will be recorded.
- b) There is significant doubt as to the effects on the environment; the project must proceed to Step 3, as a formal screening determination is required.
- c) There is a real likelihood of a significant effect on the environment and an EIA is required.

Step 3: Formal Screening Determination

In this step, a Screening exercise must be carried out in order to determine if the proposal is likely to have significant effects on the environment. In making the determination, the planning authority must have regard to Schedule 7 criteria, Schedule 7A information, results of other relevant EU assessments, the location of sensitive ecological sites, or heritage or conservation designations. Mitigation measures may be considered.

The Screening Determination must record the outcome of the Screening exercise and state the main reasons and considerations, with reference to the relevant criteria listed in Schedule 7 of the Regulations and mitigation if relevant.

Page 45 of 154



4.1.2 Screening for Mandatory EIA

Part 1 of Schedule 5

All of the project types in Part 1 have been considered in the preparation of this report. The Proposed Activities do not constitute a project type or class listed in Part 1 of Schedule 5 of the Regulations.

Part 2 of Schedule 5

All of the project types in Part 2 have been considered in the preparation of this report. The following class listed in Part 2 of Schedule 5 is the only class that is considered to be relevant to the proposed surveys, and is therefore given more detailed consideration below:

"Class 2 Extractive Industry

2 (e) With the exception of drilling for investigating the stability of the soil, deep drilling, consisting of-

(iv) any other deep drilling, except where, in considering whether or not an environmental impact assessment will be carried out."

The Proposed Activities include geotechnical surveys comprising borehole drilling at up to 170 locations, a method of collecting samples from the seabed, whereby all drilling equipment used will follow the ISO and API technical specifications. A drilling head is lowered to the seabed via a drill string and stabilised using a seabed frame. The drill string rotates to commence boring.

The boreholes that will be undertaken at the potential OMB, at the proposed landfall and the potential land reclamation at the potential onshore substation location will be shallow in nature, ranging from c. 6 m up to 12 m close to the intertidal landfall area, to investigate the stability of the soils and to determine the most suitable route and cable burial method for the project's export cable. The boreholes within the proposed array area may be up to 50 m.

The drilling proposed under this application is shallow in nature and its purpose is to investigate composition of the soil to establish the stability of the soil and is excluded from Class 2(e). As deep drilling for investigating the stability of the soil is excluded from Class 2(e), the Proposed Activities are not of a class listed in Part 2 of Schedule 5 of the Planning and Development Regulations and, therefore, do not required EIA.

4.1.3 Screening of Significance of Impacts on Environment

Schedule 7 of the Regulations sets out the criteria that must be considered in determining whether 'subthreshold' projects should be subject to an EIA. These criteria relate to the characteristics of the development, the location of the development, and the type and characteristics of potential impacts (Office of the Planning Regulator, 2021). Schedule 7 mirrors Annex III of the EIA Directive. Schedule 7 lists the criteria that should be taken into account by the competent authority when undertaking an EIA screening assessment and determination.

The Schedule 7 criteria are grouped under three headings as follows:

- 1. Characteristics of the Proposed Development
- 2. Location of Proposed Development
- 3. Characteristics of Potential Impacts

In determining if the project will have significant environmental impacts, Schedule 7A of the Planning and Development Regulations 2001, as amended, sets out the information to be provided by the applicant or developer to the competent authority for the purposes of screening sub-threshold development for EIA. Schedule 7A mirrors Annex IIA of the EIA Directive.

Page 46 of 154



This comprises:

- 1. "A description of the proposed development, including in particular
 - a) description of the physical characteristics of the whole proposed development and, where relevant, of demolition works, and
 - b) description of the location of the proposed development, with particular regard to the environmental sensitivity of geographical areas likely to be affected.
- 2. A description of the aspects of the environment likely to be significantly affected by the proposed development.
- 3. A description of any likely significant effects, to the extent of the information available on such effects, of the proposed development on the environment resulting from
 - a) the expected residues and emissions and the production of waste, where relevant, and
 - b) the use of natural resources, in particular soil, land, water and biodiversity."

4.1.4 Conclusion of the EIA Screening

In answering Step 1, question (a): is the proposed development a project as per the EIA Directive? as per OPR Practice Note 02, the answer is 'No'. Therefore, the Proposed Activities are not subject to the EIA Directive, thus no Screening is required, and no EIA is required.

Similarly, in answering Step 1, question (b) Is the project listed in Schedule 5 Part 1 or does it meet or exceed the thresholds in Part 2 of the Planning and Development Regulations, as amended. The Proposed Activities do not constitute a project type or class listed in Part 1 of Schedule 5 of the Regulations. Class 2 Extractive Industry as listed in Part 2 of Schedule 5 is the only class that is considered to be relevant to the proposed survey activities. Notwithstanding, the drilling proposed under this application is shallow in nature and its purpose is to investigate composition of the soil to establish the stability of the soil and is excluded from Class 2(e). As deep drilling for investigating the stability of the soil is excluded from Class 2(e), the Proposed Activities are not of a class listed in Part 2 of Schedule 5 of the Regulations. Thus, examination of Schedule 5 – Part 1 and Part 2 of the Planning and Development Regulations shows that the project is not of a class or category that requires EIA and therefore no EIA report is required.

4.2 Water Framework Directive

Council Directive 2000/60/EC (WFD) on establishing a framework for community action in the field of water policy was adopted by all Member States in October 2000. Since 2000, the WFD has been the main law for water protection in Europe. It applies to inland, transitional, and coastal surface waters as well as groundwaters. It ensures an integrated approach to water management, respecting the integrity of whole ecosystems, including by regulating individual pollutants and setting corresponding regulatory standards. It is based on a river basin district approach to make sure that neighbouring countries cooperate to manage the rivers and other bodies of water they share.

The key objectives of the WFD are set out in Article 4. It requires member states to use their River Basin Management Plans and Programmes of Measures to protect and, where necessary, restore water bodies in order to reach good chemical and good ecological status and to prevent deterioration. The WFD as the primary legislation is supported by the Groundwater Directive and other directives targeting the quality of surface waters. Ecological status is required to be assessed for all surface waters extending to coastal waters whose outer boundary is defined as being one nautical mile from the baseline from which the breath of territorial waters is measured. Chemical status must also be assessed for all surface waters, including coastal waters, and territorial waters. The baseline for marine coastal water in the Licence Area has been reviewed and the potential effects are discussed in **section 6.3**. The potential impact of the Proposed Activities on the hydromorphological and physio-chemical elements that support the achievement of good ecological status are presented in **section 6**. These supporting elements are shown in **Table C** with reference to sections where they are assessed.

Page 47 of 154



Quality Elements	Details	Section references
Hydromorphological	Depth variation	6.3
Hydromorphological	Structure and substrate of the coastal bed	6.3
Hydromorphological	Structure of the intertidal zone	6.3
Hydromorphological	Direction of dominant currents	6.3
Hydromorphological	Wave exposure	6.3
Physico-chemical	Transparency	6.3
Physico-chemical	Thermal conditions	6.3
Physico-chemical	Oxygenation Conditions	6.3
Physico-chemical	Salinity	6.3
Physico-chemical	Nutrient condition	6.3

Table C: Water Framework Directive supporting quality elements (Annex 5).

4.3 Marine Strategy Framework Directive (MSFD)

In 2008, the EU adopted the MSFD to maintain healthy, productive, and resilient marine ecosystems while securing a more sustainable use of marine resources. The MSFD Directive requires Member States to develop national marine strategies in order to achieve, or maintain where it exists, 'good environmental status'. Such status should have been achieved by 2020.

The marine strategies comprise regular assessments of the marine environment, setting objectives and targets, establishing monitoring programmes, and putting in place measures to improve the state of marine waters. All these actions must be done in close coordination with neighbouring countries at regional sea level (MSPF Directive 2008/56/EC).

Section 6 assessment of impacts describes the marine environment and undertakes an analysis of the likely effects of the Proposed Activities on 'good environmental status (GES)'. These are shown in **Table D** with reference to sections where they are assessed.



Table D: Marine Strategy Framework Directive good environmental status (GES) descriptors.

	GES Descriptors	Details	Section references
1	Biodiversity	The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic, and climatic conditions.	Section 6.4
2	Non-indigenous species	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.	Section 6.4
3	Populations of commercial species	Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.	Section 6.5
4	Food web structure	All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.	Section 6.4 & 6.5
5	Eutrophication	Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms, and oxygen deficiency in bottom waters	Section 6.4 & 6.3
6	Sea floor integrity	Sea floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.	Section 6.4.1 & 6.4.2
7	Alterations to hydrography	Permanent alteration of hydrographical conditions does not adversely affect marine.	Section 6.3
8	Contaminants	Contaminants are at a level not giving rise to pollution effects.	Section 6.11 & 6.14
9	Sea-food contaminants	Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.	Section 6.5
10	Marine litter	Properties and quantities of marine litter do not cause harm to the coastal and marine environment.	Section 6.14
11	Energy and noise	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	Section 6.12 & 6.7

Page 49 of 154



5 PLANNING AND DEVELOPMENT

This section has been prepared to demonstrate that the Proposed Activities are consistent with Irish ORE and supporting policies.

5.1 The National Marine Planning Framework (2021)

The NMPF is a national plan for Ireland's seas, setting out, over a 20-year horizon, how Ireland will use, protect, and enjoy its seas. The NMPF sits at the top of the hierarchy of plans and sectoral policies for the marine area.

The NMPF establishes a vision for the future development of the marine planning system towards 2040. It will play an important role in supporting both the short-term recovery and the longer-term planning for Ireland's maritime area, to have a lasting effect on Ireland's most significant natural resource.

The NMPF is Ireland's first comprehensive marine spatial planning framework, as required under Directive 2014/89/EU of the European Parliament and Council, published 23 July 2014, which establishes a framework for maritime spatial planning, known as the Maritime Spatial Planning (MSP) Directive. Member States establishing and implementing MSP must consider economic, social, and environmental aspects to support the sustainable development and growth of the maritime sector.

The NMPF is also a parallel document to the National Planning Framework, which guides strategic terrestrial planning and development, and it is important that each is consistent with the other, as well as regional and local plans.

Some of the high-level objectives laid out in the NMPF in relation to ORE include:

- To support the development of ORE in Ireland;
- To make Ireland a leader in climate action through reaching ORE targets;
- To increase the sustainable ORE use of our extensive marine resource;
- To support Ireland's decarbonation journey through increased use of ORE; and
- To provide enhanced security of supply.

This application relates to a licence to carry out the Proposed Activities to inform the design and development of a Phase One offshore wind farm, which would contribute to all of the above objectives, and bring economic, social, and environmental benefits to the country and local coastal communities.

More specifically, chapter 13 of the NMPF sets out 11 policies in relation to the ORE, some of which developers must comply with and others which are aimed at the various regulatory authorities and other marine stakeholders. Those policies that are relevant to this application are discussed below in **Table D** to further demonstrate how this application is consistent with the NMPF.

The other ORE Policies contained in the NMPF are not deemed to be directly applicable to this MULA. Those deemed non-applicable include ORE Test projects (ORE Policy 5), Proposals for local use of excess energy (ORE Policy 6), ports (ORE Policy 7), consideration of cables (ORE Policy 8), visualisation assessments (ORE Policy 9), land based coastal infrastructure (ORE Policy 10), proposals related to the provision of emerging technologies (ORE Policy 11), *etc*.

The above points, together with **Table E**, demonstrates that this application is consistent with both the highlevel objectives of the NMPF and those ORE policies that are considered relevant to the Proposed Activities subject to this licence application.

Page 50 of 154



Table E: Table outlining consistency of this licence application with relevant National Marine Planning Framework (NMPF) Offshore Renewable Energy (ORE) policies.

Policy Number	Description	As described in the National Marine Planning Framework	Consistency with relevant policies
1	Meeting Government offshore renewable energy targets.	Proposals that assist the State in meeting the Government's offshore renewable energy targets, including the target of achieving 5 GW 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. All proposals will be rigorously assessed to ensure compliance with environmental standards and seek to minimise impacts on the marine environment, marine ecology and other maritime users.	The Proposed Activities will inform the detailed design of the CWP OWF and hence support the development of offshore renewable energy in line with the Government's offshore renewable energy targets.
2	Consistent with National Policy	Proposals must be consistent with national policy, including the Offshore Renewable Energy Development Plan and its successor. Relevant projects designated pursuant to the Transition Protocol and those projects that can objectively enable delivery on the Government's 2030 targets will be prioritised for assessment under the new consenting regime. Into the future, areas designated for offshore energy development, under the Designated Marine Area Plan process set out in the Maritime Area Planning Bill, will underpin a plan-led approach to consenting (or development of our marine resources) (Note – see Appendix D of the NMPF on Spatial Designation Process).	The Proposed Activities will inform the detailed design of the CWP OWF and hence support the development of offshore renewable energy.



3	Non-ORE proposals	 Any non-ORE proposals that are in or could affect sites held under a permission or that are subject to an ongoing permitting or consenting process for renewable energy generation (wind, wave or tidal) should demonstrate that they will in order of preference: a) Avoid, b) Minimise, c) Mitigate Adverse impacts, or d) If it is not possible to mitigate significant adverse impacts, proposals should set out the reasons for proceeding. 	The Proposed Activities will inform the detailed design of the CWP OWF and hence support the development of offshore renewable energy.
		Applicants for non-ORE proposals in or affecting ORE sites should engage ORE developers in consultation during the pre-application processes as appropriate.	
4	Consideration of other nationally important activities	Decisions on ORE developments should be informed by consideration of space required for other activities of national importance described in the NMPF.	The Proposed Activities will inform the detailed design of the CWP OWF.
10	Opportunities for land- based, coastal infrastructure	Opportunities for land-based, coastal infrastructure that is critical to and supports development of ORE should be prioritised in plans and policies, where possible.	The Proposed Activities will inform the detailed design and siting of the OMB and onshore substation associated with the CWP OWF.



6 ASSESSMENT OF IMPACTS

6.1 Overview

This chapter aims to identify and outline each topic of interest assessed in **section 6.2** to **section 6.17**. The following sections provide a summary of the receiving environment, the extent and characteristics of that environment in relation to the topic of interest, an assessment of each topic through consultation of existing literature, site investigations, and surveys/reports, and potential pathways and impacts from the Proposed Activities to identify potential receptors and effects. The potential impacts which have been identified are listed in **Table F**, and in the following sections each topic is considered separately, including a review of the receiving baseline environment.

Page 53 of 154



Table F	: Pote	ntial in	npact a	nd as	sses	smer	it of the Pro	posed Activ	ities on	the follow	ving topic	s covered	l in secti	on 6.2 te	o section	6.17.

Section	Topic of Interest	Potential Impact
6.2	Land and Soils	The Proposed Activities are all within the marine environment thus there is no overlap with land and soils. There will therefore be no predicted impacts on land and soils as a result of the Proposed Activities.
6.3	Water	 Potential impacts to water include: Risk of collision of survey vessels and subsequent fuel spillages. To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. Marine notices will be issued, radio broadcasts made where required and a
		 fisheries liaison officer (FLO) appointed to make all marine uses aware of the position of survey vessels. Release of harmful substances and pollution events. To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always.
		 Increase in nutrient/chemical concentration. Through adherence to the above guidelines and through abiding to safety guidelines and good housekeeping practices, there will be no planned release of substances to the environment that would increase nutrient/chemical concentrations.
		 Temporary increase in Suspended Sediment Concentration (SSC) and turbidity levels. These will be localised and temporary and will return to background levels following cessation of works.
		 Changes to hydromorphological characteristics and wave exposure. The temporary nature and small scale on which the Proposed Activities will operate are unlikely to result in permanent changes to the seabed and consequently, hydromorphological characteristics.

Page **54** of **154**



		 Decrease in integrity of the intertidal zone structure. Physical walkovers of the intertidal are not predicted to have any significant impact on the structure of the intertidal zone and small volumes of sediment will be retained for analysis. There will be no predicted impact on the receiving water bodies or water quality as a result of the Proposed Activities.
6.4	Biodiversity	Potential impacts to biodiversity include:
		Benthos
		• Direct physical disturbance on benthic community from geotechnical and environmental surveys. Sensitive ecosystems (<i>e.g.</i> , reef) will be surveyed and avoided by intrusive survey methods. Benthic and intertidal habitats and associated species are generally tolerant to disturbance and the Proposed Activities are not likely to exceed the natural levels experienced, and these effects will be temporary due to the nature of the Proposed Activities.
		• Smothering/scour from increased SSC arising from geotechnical and environmental surveys. Sediments across the Licence Area are predominantly coarse and will settle almost immediately after mobilisation due to survey activities. In more sheltered areas where fine sediment is more prevalent, water movements are reduced and increases in SSC are quite localised, with all material predicted to settle within a few 100 m of the works. Generally low background levels of sediment contamination are reported in the Licence Area and there is low potential for the remobilisation of contaminated sediments onto SAC features.
		 Benthic community or habitat changes resulting from introduction of invasive non-native species arising from Proposed Activities. Potential routes for of invasive non-native species (INNS) to the Licence Area will be mitigated against through adherence to International Convention for the Control and Management of Ships' Ballast Waters and Sediments, and all relevant project vessels will adhere to the Guidelines for the control and management of ships' biofouling.

Page **55** of **154**



Benthic community or habitat changes resulting from littering or pollution events arising from Proposed Activities. Strict maritime regulations and survey protocols will prevent a route for impact due to littering or pollution. All vessels undertaking work will adhere to MARPOL requirements.
There will be no predicted impact on benthos or benthic habitats as a result of the Proposed Activities.
Marine Mammals
• Behavioural response in marine mammals (disturbance and/or displacement) from geophysical surveys, geotechnical surveys, and positioning equipment. Behavioural responses due to noise and vibration are assessed in section 6.7 . Avoidance behaviour of cetaceans is often associated with fast, unpredictable boats compared to neutral or positive reactions associated with larger, slow moving vessels and these are akin to what will be used for the Proposed Activities. Resident species of the Irish Sea are more agile than large whales and have been shown to avoid ships.
• Temporary Threshold Shift or Permanent Threshold Shift from increased anthropogenic noise from geophysical surveys, geotechnical surveys, and positioning equipment. Impacts due to noise and vibration are assessed in section 6.7 .
• Mortality or injury from collision events with vessels undertaking the Proposed Activities. Slow vessels following a consistent trajectory allow animals the opportunity to avoid collisions and the risk of fatality is reduced by slower velocities. Vessels undertaking the Proposed Activities will follow a pre-defined linear route at low to moderate speeds, will be stationary, and will transit in a predictable manner to reduce the risk of collisions.
• Mortality or reduced health/fitness resulting from litter or pollution arising from the Proposed Activities. To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention.
There will be no predicted impacts on marine mammals as a result of the Proposed Activities.

Page **56** of **154**



Birds
 Disturbance and/or displacement to birds due to increased noise (above- and under-water) and visual disturbances resulting from Proposed Activities (including associated vessel movements).
 Indirect effects on birds through impacts on prey species from underwater noise, from geotechnical activities, fisheries surveys, and intertidal archaeological walkover survey.
• Mortality or injury resulting from accidental release of litter or pollutants due to Proposed Activities.
There will be no predicted impacts on birds as a result of the Proposed Activities.
Fish
Impacts on commercially important and migratory fish species include:
Exposure to underwater noise;
Disturbance from increased levels of suspended solid concentrations; and
Mortality or reduced health/fitness due to unintentional littering/pollution.
Proposed impacts to shellfish are assessed under aquaculture in section 6.5.2 and potential impacts due to underwater noise are assessed in section 6.7 . Codling Bank has one of the lowest levels of sediment mobility within the Irish Sea Basin and low tidal currents in areas of finer sediment create temporary, localised elevations in SSC. Migratory fish are highly tolerant to increased SSC and the fish species under consideration are highly mobile, so will likely act to avoid unfavourable environments.
To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention.

Page **57** of **154**



		There will be no predicted impact on fish as a result of the Proposed Activities.
6.5 C	Commercial Fisheries and Aquaculture	 There will be no predicted impact on fish as a result of the Proposed Activities. Fishing Activities Potential temporary loss or restricted access to fishing grounds and subsequent temporary displacement of fishing activity to other areas. Potential for entanglement of static fishing gear with vessels or equipment used resulting in damage or loss to gear; and Risk to fishing vessels due to the presence of static survey equipment on seafloor. The potential for the geotechnical survey to displace fishing activity is low due to the minimal area of seabed that will be occupied and the short duration of the Proposed Activities. Extensive alternative fishing grounds are available, hence the potential for temporary loss or restricted access to fishing grounds is considered negligible.
		Pre-scouting surveys and the appointment of a fisheries liaison officer (FLO) and an Offshore FLO) will reduce any possible effect from static fishing gear. Pilot vessels will be used where appropriate. Locations of static survey equipment will be communicated to the fishing community through the issue of Marine Notices and via the FLO. In the unlikely event fishing gear becomes entangled or damaged, the Dispute Resolution Mechanism (DRM) as established by the Seafood ORE working group will be used where appropriate. It is predicted clearance and compensation will be requested prior to geophysical surveys.
		Hence, there will be no predicted impact on fishing activity as a result of the Proposed Activities.
		Aquaculture and Shellfish
		 Disturbance from increased suspended solids concentrations from geotechnical and environmental surveys. Potential increases in SSC are predicted to be localised and temporary and it is expected upon cessation of the temporary activity, recolonisation by the species under consideration would be possible.
		 Mortality or reduced health/fitness from unintentionally released litter or pollution arising from Proposed Activities.

Page 58 of 154



		 Injury and disturbance from underwater noise from geophysical and geotechnical surveys; assessed in section 6.7.
		There has been no evidence in literature or reports of a negative impact on whelks due to similar activities in the Irish Sea. The whelk fishery is considered data-poor, and due to the small spatial scale on which the geotechnical and environmental surveys will cover and the ability to avoid unfavourable habitat, there is no evidence for potential impacts on the whelk fishery due to the Proposed Activities. Due to the immobility of mussels, they may experience a temporary habitat disturbance however the small spatial and temporal scale will allow for rapid recolonisation upon cessation of works.
		In order to ensure no adverse effects on aquaculture and shellfish resulting from littering or pollution associated with the Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for safe management and operation of ships for pollution prevention.
		There will be no predicted impact on aquaculture or shellfish as a result of the Proposed Activities.
6.6	Air Quality	There will be no releases to air, other than routine vessel exhaust, and air quality standards will not be exceeded, hence there are no predicted impacts on air quality as a result of the Proposed Activities.
6.7	Noise and Vibration	Behaviour response (disturbance and/or displacement), Temporary Threshold Shift (TTS), or Permanent Threshold Shift (PTS) from increased anthropogenic noise from geophysical survey, positioning equipment, and geotechnical surveys due to pulsed sound on Annex IV species, seals, fish, and shellfish.
		 Behaviour response (disturbance and/or displacement), TTS, or PTS from increased anthropogenic noise from geophysical survey, positioning equipment, and geotechnical surveys due to non-pulsed sound on Annex IV species, seals, fish, and shellfish.
		 Behaviour response of benthic organisms (shellfish) due to vibrations including retreat and potential displacement of mobile organisms.
		Geophysical survey equipment emits pulsed sound. Through mitigation measures including PAMs, visual surveys, and reduction of operating time of higher risk equipment, the potential for TTS or PTS is considered negligible. While fish species may be vulnerable to increased anthropogenic sound, studies have shown no

Page **59** of **154**



		 evidence of mortality or physical injury that could lead to mortality arising from pulsed sound in the fish examined. Additionally, the fish species under consideration are highly mobile and likely to move aw unfavourable environments. Mitigation measures based on those detailed in 'Guidance to Manage the Marine Mammals from Man-Made Sound Sources in Irish Waters' (DAHG, 2014) will be employed. Geotechnical sampling techniques produced non-pulsed sound. While the survey equipment opera frequencies which overlap the auditory range of all species under consideration, the low-level sounds provide the network of the auditory range of all species under consideration, the low-level sounds provide the network of the term of the auditory range of all species under consideration the low-level sounds provide the network of the auditory range of all species under consideration and the survey equipment opera frequencies which overlap the auditory range of all species under consideration, the low-level sounds provide the network of the auditory range of all species under consideration and the survey equipment operation of the survey of the auditory range of all species under consideration and the survey equipment operation of the survey of the auditory range of all species under consideration and the survey equipment operation of the survey of the auditory range of all species under consideration and the survey equipment operation of the survey of the auditory range of all species under consideration and the survey equipment operation of the auditory range of all species under consideration and the survey equipment operation of the auditory range of all species under consideration and the survey equipment operation of the auditory range of all species under consideration and the survey equipment operation and the survey equipment operation and mussels have not identified negative impacts due to increased noise/vibration that would impact the health/fitness of the organism, however behavioural responses hav					
		temporary and mobile nature of the surveys will impact a minimal among of seabed and hence any vibration or noise exposure will be limited, and potential effects are predicted to be negligible.					
6.8	Landscape and Seascape	The temporary visual impact of increased survey vessels on the Licence Area is considered to be negligible as the area is already characterised by a number of high-density vessel routes and the area is not subject to international, national, or regional designation intended to protect landscape quality. The increase in vessels due to Proposed Activities will not be a noticeable visual intrusion on the seascape, when considered against the existing baseline. Hence, there will be no predicted impact on landscape and seascape as a result of the Proposed Activities.					
6.9	Marine Traffic	 Risk of allision. Temporary displacement in the nearshore Dublin Bay area. Risk of collision. Reduced access to local ports. 					

Page **60** of **154**



		 Increased risk of snagging anchors or fishing gear as a result of anchorage interactions of sulequipment with subsea-structures. All static equipment will be moored to the seabed, and these willocated predominantly in the proposed array area which avoid busier shipping areas. All static equipment will be appropriately lit and marked, and communicated through Marine Notices, <i>etc.</i> The proposed array area is located in a region of lower vessel usage and hence limits potential for allision. Proceated outside the proposed array area are subject to further consultation with the Commissioner of Irish Lig votices to Mariners will be issued and include the location and duration of the Proposed Activities to a sollisions with static equipment and associated activities. Appropriate marks and lights will be agreed with Commissioner of Irish Lights and a statutory sanction will be underpinned by an NRA. Vessels will comply he International Regulations for the Prevention of Collisions at Sea (COLREGs) (IMO, 1972). An FLO will appointed and discussions with Port Authorities will make all marine users aware of the survey vessels. Displacement may occur and result in increased vessel density and will likely be at greater magnitudes in an of higher vessel density. Displacement will be temporary and spatially limited to the area around the operal varine Notices will be issued to ensure marine users are aware of the activity. Discussions with Dublin Port (other relevant ports and harbours such as Wicklow and Dun Laoghaire) will ensure busy periods are avo and encoachment into main channels is avoided where possible. Vessels will exhibit appropriate marks ights. Port operations with Port Authorities will aid in ensuring disruption to fishing interests. Ma Votices and discussions with Port Authorities will aid in ensuring disruption to fishing interests. Ma Votices and discussions with Port Authorities will aid in ensuring disruption to fishing interests. Ma Votices and discussions with Port				
6.10	Archaeology and Cultural Heritage	 Potential for direct physical disturbance during intrusive Proposed Activities (deployment of FLSs, Metocean and PODs, geotechnical surveys, and benthic surveys). Potential for indirect physical disturbance during intrusive Proposed Activities (deployment of FLSs, Metocean and PODs, geotechnical surveys, and benthic surveys). 				

Page **61** of **154**



		The geophysical survey will be used to inform and finalise the locations of intrusive Proposed Activities and set out the locations of any previously unidentified wrecks or other potential cultural heritage features to be avoided. Archaeological Exclusion Zones of a least 100 m will be established around sites identified as being of high vulnerability, while an exclusion zone of a minimum 50 m will be established around those of medium vulnerability. Additional mitigation measures may be considered where the Archaeological Exclusion Zones are not sufficient. Intertidal walkover surveys and metal detection surveys will be implemented in the nearshore to identify areas for avoidance or additional mitigation efforts, and where sampling is required, these areas will be avoided following discussions with the Underwater Archaeology Unit (UAU).
6.11	Population and Human Health, including tourism and recreation	Potential for temporary and localised displacement or disruption to recreational activities including vessel-based fishing and recreation craft. However, this impact is considered negligible as the activities are temporary in nature and alternative areas are available. Marine Notices and appropriate navigational signals (lights and marks) will be in place. The proposed intertidal landfall area is used by the public for recreation, however access to the shore will not be restricted during the intertidal surveys. Hence, there will be no predicted impact on population and human health as a result of the Proposed Activities.
6.12	Major Accidents and Disasters	Licence Area is susceptible to fog and severe weather conditions. The survey vessels and static equipment will be appropriate for weather conditions likely to be experienced. Through adherence to strict maritime regulations and precaution, the risk from severe weather or fog will not present environmental problems. There will be no predicted impact as a result of the Proposed Activities.
6.13	Climate	The Proposed Activities will be temporary in nature over a short timeframe hence impacts due to climate change will not arise. Emission of greenhouse gases is not expected to be significant in the context of overall emissions in Ireland. There will be no predicted impact on climate habitats as a result of the Proposed Activities.
6.14	Waste	All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. Adoption of routine measures and standard best practices in terms of waste management, auditing, pollution prevention measures and implementation of a dropped object protocol will prevent the unintentional release of any waste materials. All solid wastes will be retained on the vessels, returned to shore, and disposed of at a suitable licensed facility. Hence there are no predicted impacts due to waste resulting from the Proposed Activities.

Page **62** of **154**



6.15	Material Assets	Port assets have ample capacity for all the survey operation requirements and the potential for any significal effects on material assets as a result of the Proposed Activities will be negligible, therefore no impacts a predicted as a result of the Proposed Activities.				
6.16	Health, Safety, Environment and Quality (HSEQ) Management	CWPL will provide accurate positional information of the location of test equipment well in advance of the commencement of any deployment. This information will be submitted to the Marine Survey Office, to the Commissioners of Irish Lights, the Irish Coast Guard and local shipping interests including harbour authorities, fishing cooperatives and local sailing clubs. Ferry operators will be advised. CWPL will appoint a competent Project Supervisor Design Process (PSDP) and where required a Project Supervisor Construction Stage (PSCS) for the project under the requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (updated). Spill kits will be available on site where machinery is operating, and any fluid leaks or spills will be cleaned up immediately. Survey vessels will operate under international standards according to the MARPOL (maritime pollution) Convention with respect to wastewater and food waste discharges. All refuse and waste materials will be kept onboard the vessel and safely disposed of onshore in a suitable licensed waste facility. There will be no predicted impact on HSEQ as a result of the Proposed Activities.				
6.17	Interactions	Interactions between the Proposed Activities and other activities, plans, and projects which may in combination with the Proposed Activities increase the level of risk on the receiving environment have been assessed and determined that any in-combination effects are low to negligible. In addition, initial consultations with bodies such as the Marine Survey Office of the Department of Transport and the Commissioner of Irish Lights are underway and will continue over the duration of the Proposed Activities as a way to monitor and avoid any potential for incombination effects. There will be no predicted impact on the environment due to interactions with other activities, plan, and projects assessed in this AIMU.				

Page **63** of **154**



The following documents, also submitted in support of this Licence Application, provide a description of the known receiving environment for the Licence Area, identify the potential environmental impacts of the Proposed Activities, and assess the possible effects of these impacts on the receiving environment. This report should be read in conjunction with the other reports which have been prepared to support the MULA:

- Supporting Information for Screening of Appropriate Assessment
- Risk Assessment for Annex IV Species

Table G sets out, for each of the documents listed above, the specific sections and sub-sections where relevant information for this AIMU can be found.



Table G: Relevant sections and sub-sections in other reports submitted in support of the Licence Application.

Report	Section/Subsection	Content Description
Supporting Information for Screening of Appropriate Assessment (SISAA)	Section 4. Identification of Potential Impacts and Effects. 4.1 Marine Ornithology 4.2 Marine Mammals 4.3 Annex I Habitats 4.4 Annex II Diadromous Fish 4.5 Other Annex II Species	Describes potential environmental impacts from the Proposed Activities on the receiving environment.
	Section 5.1 Identification of Designated Sites and Associated Interests	Identification of relevant Natura 2000 sites using Source-Pathway-Receptor model and compilation of information on Qualifying Interests and conservation objectives.
	Section 5.2 Assessment of Likely Significant Effects	Assesses the likelihood of significant effects from the Proposed Activities on the integrity of relevant Natura 2000 sites and their Conservation Objectives.
	Section 5.3 Conclusion of AA screening	Describes other known or proposed plans and projects in the vicinity of the site investigation activities, including other proposed wind farm and export cable route activities known at the time of submission of the Application documentation, and their interactions with the Proposed Activities. Assesses the likelihood of significant in-combination effects from the Proposed Activities with the described plans and projects on the integrity of relevant Natura 2000 sites and their
		Conservation Objectives.
	Section 5.4. Screening Statement Outcome.	Details the conclusions of the AA Stage 1 Screening and identifies the Natura 2000 sites screened in for a Stage 2 AA.
	Section 4. Annex IV species	Describes the European Protected Species (Annex IV species) which may be found on site.

Page 65 of 154



Risk Assessment for Annex IV	in the vicinity of the MUL Area.	
Species	Section 6. Baseline	Describes the sightings, distribution, and density of Annex IV species within the Zone of Impact and nearby
	Section 7. Risk Assessment.	Assesses the impacts identified on Annex IV species taken forward from the Baseline section, in the absence of any mitigation measures.
Risk Assessment for Annex IV	Section 8. Mitigation measures.	Proposes measures necessary to avoid, reduce or offset any identified negative effects.
Species		

Page 66 of 154

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6.2 Land and Soils

The Proposed Activities are all within the marine environment thus there is no overlap with land and soils. Therefore, there is no potential for impacts on land and soils.

6.3 Water

6.3.1 Background

The Proposed Activities will take place within, and offshore, of three identified WFD water bodies, namely Southwestern Irish Sea Killiney Bay, Irish Sea Dublin, and Dublin Bay (**Figure 6-1**). Two of these water bodies, namely Dublin Bay and Irish Sea Dublin, are currently in good ecological status, and the remaining water body, Southwestern Irish Sea – Killiney Bay, is in high ecological status (EPA, 2022).

The offshore waters of the western Irish Sea have been classified under the OSPAR Convention as a nonproblem area with regard to eutrophication which means there is little evidence that human activity is causing nutrient enrichment of the ecosystem in this region (OSPAR, 2017).

Page 67 of 154



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6.3.2 Assessment of Potential Impacts to Water

Potential impacts to water due to the Proposed Activities are:

- 1. Risk of collisions and allisions of survey vessels and subsequent fuel spillages.
- 2. Release of harmful substances and pollution events.
- 3. Increase in nutrient/chemical concentrations.
- 4. Temporary increase in suspended sediments and turbidity levels.
- 5. Change to hydromorphological characteristics and changes to wave exposure.
- 6. Decrease in integrity of the structure of the intertidal zone.

The Proposed Activities will be undertaken within the marine environment. This will result in a temporary increase in vessels utilising the area, whereby a variety of survey vessels are required to complete the scope of work, and this has the potential to increase the risk of accidents and subsequent fuel spillages. Collisions and allisions are assessed in greater detail in **section 6.9**. All vessels carry fuel during the survey activities and lubricants may also be present onboard, both of which have the potential to be harmful to the environment if released. There will be no planned release of potentially harmful substances from the survey vessels, and any potential pollution events from the survey vessels associated with the Proposed Activities will be governed by the MARPOL Convention (adopted 1973). Strict maritime regulations compliant with all International Maritime Law and National Maritime legislation will ensure there will be a low risk of unplanned release and hence in relation to potential impacts 1 and 2, there are no significant effects predicted to arise as a result of the Proposed Activities.

Through adherence to the above guidelines and safety protocols, and abiding to safety regulations set out by the Commissioner of Irish Lights, the Proposed Activities are therefore unlikely to cause any increase in the existing concentration of nutrients (*e.g.*, nitrogen and phosphorus) or chemical substances in the environment that would result in the exceedance of national environmental quality standards for both physico-chemical elements and chemical substances listed in national regulations implementing the WFD in Ireland (SI 272 Of 2009 and amended regulations). The Proposed Activities are also very unlikely to release substances into the environment that would increase the level of biochemical oxygen demand (BOD) and will therefore have no impact on ambient oxygen conditions. In relation to potential impact 3, it is predicted that there is no potential for effects on these features to arise from the Proposed Activities.

All drilling equipment used will follow the ISO and API technical specifications for drilling equipment. Drilling of boreholes will use water or biodegradable organic polymer when mud production is required, hence no harmful substances will be released to the environment. Geophysical downhole logging may be performed for seismic interpretation to determine shear and compression wave velocity profiles and to obtain deformation properties of the substratum *in situ*. It provides a continuous record on the sedimentological/lithological properties and changes with high precision.

The geotechnical surveys, the benthic grab sampling, and the ecological sampling in the proposed intertidal landfall area have the potential to temporarily increase SSC in the water column and resultant turbidity levels. However, these temporary increases in turbidity levels are likely to return to normal background levels following the cessation of the Proposed Activities. Background turbidity levels are typically higher in the western Irish Sea due to strong tidal currents which can result in the resuspension of material from relatively shallow waters. It is therefore very unlikely that any of the Proposed Activities will result in a permanent change to the transparency conditions of the receiving environment, thus in relation to potential impact 4, due to the temporary and localised nature of geotechnical surveys and benthic surveys occurring in an area of typically higher background turbidity levels, there are no significant impacts predicted to arise from the Proposed Activities.

Page 69 of 154



The Proposed Activities are very unlikely to have any impact on salinity conditions (*i.e.*, there will be no predicted input of fresh or saline waters over the duration of the proposed activities) of the environment as the activities will have no impact on those factors which determine salinity levels in the western Irish Sea and nearshore waters (*i.e.*, the mixing of freshwater and marine water masses).

The Proposed Activities will not result in the discharge of either heated or cooled effluent and will not impact on the thermal conditions of the receiving water bodies.

The Proposed Activities will have no permanent impact on the hydromorphological elements that are required to support the achievement of good ecological status. The Proposed Activities are unlikely to result in a permanent change in the depth variation or to the structure and substrate of the seabed. Oceanic currents are driven by wind, differences in density between water masses, and tides. They tend to follow predictable paths, and play important roles in the transportation of nutrients, BOD, and organic compounds. The shape of the coastline and bathymetric features also may affect currents. Due to the temporary nature and small spatial scale on which the Proposed Activities will operate, and as there is no predicted impact on the hydromorphological elements of the Irish Sea, the Proposed Activities are unlikely to have an impact on the direction of dominant currents in the Irish Sea. Similarly, there will be no change to the wave exposure characteristics of the area. In relation to potential impact 5, there is no potential for effects on these features resulting from the Proposed Activities.

The Proposed intertidal surveys involve physical walkovers for the identification of archaeological features and for intertidal sampling of biotic assemblages and habitats present. This includes the retention of small volumes of sediment (up to ten sediment/faunal samples using a 0.1 m^2 box core to depths of 25 cm) which will not impact on the integrity of the structure of the intertidal zone, thus in relation to potential impact 6, there are no significant effects predicted to arise from the Proposed Activities.

It can be concluded that the Proposed Activities will have no potential impact on the physico-chemical and hydromorphological elements that are required to support the achievement of good ecological status as described above, and it can be further concluded that the Proposed activities will not cause a deterioration in the existing WFD status of these waters.

It can also be concluded that the Proposed Activities will have no potential impact on good environmental status for MSFD Descriptor 5 Eutrophication; Descriptor 6 Seafloor Integrity, Descriptor 7 Hydrographical Alterations and Descriptor 8 Contaminants.

In conclusion, it is considered that there are no likely significant effects to water quality and hydrodynamics expected as a result of the Proposed Activities.

6.4 Biodiversity

6.4.1 Marine Benthos

A benthic survey was conducted in 2021 off the east coast of Ireland in the vicinity of the Licence Area that investigated 71 stations for fauna through grab samples, of which 62 stations returned grabs with valid faunal returns and nine stations were on hard ground or rock/boulder substrate (AQUAFACT, 2021) (see **Figure 6-2**). Of the 62 valid stations, 27 had sediment suitable for quantitative infaunal analysis. The remaining 35 consisted of cobbles and boulders and were assessed qualitatively based on the epifauna and infauna present (referred to as hard ground data). Six stations were surveyed by DDV of which two were not surveyed by grab.

Eighteen biotopes were recorded according to the JNCC classification across the 71 stations. Two of these biotopes comprised the reef forming polychaete *Sabellaria spinulosa*, however *Sabellaria* reef was recorded

Page 70 of 154



at 18 stations (**Figure 6-2**). The Licence Area was found to comprise the habitat formed by *S. spinulosa* 'CR.MCR.CSab.Sspi.Byb - *Sabellaria spinulosa* with a bryozoan turf and barnacles on silty turbid circalittoral rock' and the mosaic 'SS.CSC.CCS.Pkef – *Protodorvillea kefersteini* and other polychaetes in impoverished mixed gravelly sand and SS.SBR.PoR.SspiMx – *Sabellaria spinulosa* on stable circalittoral mixed sediment'. Reefs formed by *S. spinulosa* are identified as priority habitat under OSPAR and listed as an Annex I habitat under the Habitats Directive. This priority habitat was interspersed along the proposed ECC route and in the Licence Area, with well-established reef structures visible in DDV footage.

Twelve JNCC biotopes and a further six biotope mosaics were recorded. Mosaics occurred where elements of two mosaics were evident in the species composition, where a gradient was present from one biotope to another, and due to different substrates in close proximity reflecting the heterogeneous nature of the seabed. Of the 18 biotopes recorded, 536 taxa attributed to 14 phyla consisting of 18,569 specimens were recorded and this is a function of the heterogeneity of the survey area. The 536 taxa included one foraminiferan, two Porifera (sponges), 21 cnidarians (hydroids, anemones), one platyhelminth (flatworm), one nematode (round worm), two nemerteans (ribbon worms), four sipunculans (peanut worms), 202 annelids (segmented worms), 139 arthropods (sea spiders, amphipods, crabs, etc.), 105 molluscs (gastropods, bivalves, etc), 24 bryozoans (sea mats), one phoronid (horseshoe worm), 22 echinoderms (brittlestars, urchins, sea cucumbers), and 10 chordates (tunicates and fish).

Page 71 of 154




6.4.2 Marine Benthic Habitats in Licence Area

The Irish Sea opens to the Atlantic at both ends and can be considered a channel approximately 300 km long of varying width (Hadziabdic & Rickards, 1999). The Codling Bank forms part of a series of banks in the Irish Sea and runs approximately 10 km offshore parallel to the coast, standing in 20–30 m of water and rising to within metres of the water's surface. The banks are a reflection of the strong currents and sediment movement due to the effects of the principal tidal currents in the region resulting in a series of punctuated banks from north to south: Dundalk Bank; Bray Bank; Kish Bank; Codling and Greater Codling Banks; Arklow Bank; Rusk Bank; Glasgorman Bank; Blackwater and Lucifer Bank; and Long Bank.

The 2021 geophysical survey found that the substrate type at the Codling Bank is made up of coarse sediment with some sand in patchy distribution surrounding the proposed Licence Area and is exposed to strong hydrodynamic conditions in the area. These data also correlate with INFOMAR data (**Figure 6-3**). It is likely there will be a low proportion of fine fractions within the sediment (Wheeler *et al.*, 2009) and low organic content (Wheeler *et al.*, 2009; AQUAFACT, 2012). Offshore habitats include rocky reefs and submarine structures, coarse/mixed sediment, fine sand or muddy sand, and subtidal bedrock. Inshore sheltered areas such as Dublin Bay are characterised by finer sediment and muds, and areas of rocky reef habitat with associated epifaunal communities. Intertidal habitats within the Licence Area include rocky coastline interspersed with mudflats and sandflats, intertidal rock, and saltmarsh. In more sheltered areas, seagrass beds and salt meadows may be present, in addition to extensive sand and mud flats.

The Greater Codling Bank was surveyed in 2012 (AQUAFACT) and found that finer substrates ranged from medium sand in the north to gravelly sands in the northeastern and southwestern regions, with isolated areas of bedrock in shallow regions mainly in the northwestern region of the Greater Codling Bank.

For Descriptor 6 of the good environmental status descriptors according to the WFD (**Table C**), Seafloor Integrity, no temporary or permanent loss of the seabed will occur as a result of the Proposed Activities. Any adverse effects on the seabed as a result of the Proposed Activities will be temporary, minimal and recoverable given the dynamic nature of the environment.





6.4.2.1 Assessment of Potential Impacts to Benthic Habitats and the Benthos

Potential impacts to subtidal and intertidal habitats from the Proposed Activities are:

- 1. Direct physical disturbance from geotechnical and environmental surveys.
- 2. Smothering/scour from increased suspended sediment concentrations arising from geotechnical and environmental surveys.
- 3. Community or habitat changes due to remobilisation of contaminated sediments during the geotechnical and environmental surveys.
- 4. Community or habitat changes resulting from introduction INNS arising from site investigation and environmental surveys.
- 5. Community or habitat changes resulting from littering or pollution events arising from site investigation and environmental surveys.

Reefs provide a diverse habitat for many species, forming an important part of the benthic ecosystem. They are sensitive to direct disturbance and habitat loss and could potentially be affected by the Proposed Activities. Following the review of geophysical survey data, confirmed or suspected reef will be surveyed by DDV and avoided by intrusive survey methods. Geotechnical sample locations and metocean deployments will also be located to avoid reef features. In relation to potential impact 1 above, there is no potential for any effects on these features to arise from the Proposed Activities.

Benthic and intertidal habitats and associated species are generally tolerant of regular disturbance due to the mobile nature of the environment in which they occur. Disturbance from the Proposed Activities is not likely to exceed the natural levels of disturbance experienced by benthic habitats and species, and any disturbance effects will be temporary due to the nature of the Proposed Activities. Therefore, regarding potential impact 1 above, no potential effects from the Proposed Activities on these habitats and species are likely to occur. As no extractive sampling will occur in the intertidal zone and no sampling is planned to occur within saltmarsh habitat, there is no pathway for effects from the Proposed Activities on these features.

Regarding potential impact 2, due to the coarse nature of the sediments across much of the Licence Area, no elevation in SSC beyond close proximity (*i.e.*, km) of the Proposed Activities is predicted, as any sediment mobilised by the work will settle almost immediately due to its coarse nature. In more sheltered areas, where fine sediments may be more prevalent, water movements are much reduced and, as such, any increase in SSC is not considered to be transported any great distance, with all material predicted to settle within a few hundred metres of the work. Therefore, no smothering/scour from increased SSC is expected to result from the Proposed Activities.

Pollution by contaminated sediments can impact on the fitness or health of organisms or communities and thus alter community structure or habitats. Potential connectivity is considered to be in line with that associated with increases in SSC, however typically contaminated sediments are only associated with finer sediments as they do not bind effectively with coarse sands and gravels. No pathway between remobilisation of contaminated sediments and the habitats located above the high-water mark exist. Published marine sediment contaminant data in the Licence Area indicates a generally low background level of contamination in line with that to be expected around heavily industrialised areas, with no patterns of consistently high levels of contaminants recorded spatially or temporally (Marine Institute, 2017). In addition, there is low potential for contaminated sediments to be present in the area for remobilisation onto the SAC features due to the strong hydrodynamics of the Licence Area which are likely to result in a low proportion of fine fractions within the sediment and low organic carbon content (Wheeler *et al.*, 2009). INFOMAR data also indicates the substrate type is well sorted medium sand and coarse sediment, which has a low affinity to retain contaminants. Therefore, regarding potential impact 3, there is limited potential for the Proposed Activities to remobilise contaminated sediments in the Licence Area.

Two mitigation measures will be implemented to specifically remove the potential route to introduce INNS to the Licence Area. These mitigation measures are as follows:

• All relevant survey vessels will adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Ballast Water Management Convention).

Page 75 of 154



 All relevant survey vessels will adhere to the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (resolution MEPC.207(62)).

For potential impact 4, it can be concluded following adherence to the measures outlined above that the Proposed Activities will not directly impact the achievement of good environmental status MSFD Descriptor 3 Invasive Alien Species.

In relation to the 5th potential impact listed above, it is considered unlikely that there will be littering or pollution resulting from the Proposed Activities. Whilst all marine surveys have the potential for direct effects on benthic habitats via pollution or littering pathways, there is no route to impact due to strict maritime regulations and survey protocols. All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. Therefore, there is no potential for littering or pollution effects on the Licence Area. It can therefore be concluded that the Proposed Activities will not impact the achievement of good environmental status for MSFD Descriptor 10 Marine Litter.

It is considered that there is no likely significant effect predicted due to the Proposed Activities on the marine benthos and benthic habitats.

6.4.3 Marine Mammals

A review of existing data sources regarding marine mammals was carried out, with support from the Annex IV Risk Assessment and SISAA reports which accompany this AIMU. More than 24 cetacean and two seal species have been found to occur in Irish waters, however only six are regularly found in the Irish Sea. Of the six species, harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), and grey seal (*Halichoerus grypus*) are thought to be present year-round, whilst Minke whale (*Balaenoptera acutorostrata*) are considered seasonal visitors with highest relative abundances in the western Irish Sea recorded in spring (Berrow, 2001; NPWS, 2008; Wall *et al.*, 2013). Killer whale (*Orcinus orca*), fin whale (*Balaenoptera physalus*), and humpback whale (*Megaptera novaeangliae*) also occur in the Irish Sea as seasonal/occasional visitors (NPWS, 2008; Ryan *et al.*, 2015). Common/harbour seal (*Phoca vitulina*) are also present in the Irish Sea, however gaps in harbour seal distribution on the south and east coasts of Co. Wexford and Waterford have been observed in a 2003 population assessment (Cronin *et al.*, 2004). High densities of grey seal occur on the east and southeast coasts of Ireland; however, densities are highest on the western coasts.

The Small Cetaceans in European Atlantic waters and the North Sea (SCANS) III survey and the ObSERVE survey took place in the Irish Sea. The Proposed Activities are located within SCANS III Block E and ObSERVE Stratum 5 areas. Sightings were continuously higher for marine mammal species in summer months compared to winter during the ObSERVE aerial surveys. Only one sighting of a group of five bottlenose dolphins was recorded for the entirety of the survey (two summers and two winters). Similar to the SCANS III surveys, no common dolphins were recorded within the Irish Sea with sightings occurring predominantly off the south and west coasts of Ireland. The Risso's dolphins sighted during these surveys were thought to represent a community frequently located near the Saltee Islands, Co. Wexford. Group sizes within this community were estimated to range from one to ten individuals (Wall *et al.*, 2013; Rogan *et al.*, 2018). Predictive modelling carried out using these data suggested that the Irish Sea was more important for Minke whales during the summer period rather than during the winter.

The SCANS-IV survey began in the early 2020s with the aim of providing a robust, large-scale estimate of cetacean abundance. The SCANS-IV report assessed cetaceans in sea regions and by internal survey area units. The SCANS-IV report is awaiting supplementation of data from the ObSERVE II programme, which is due to be complete in 2025. Differences in distribution were evident between the SCANS-III and -IV reports, with the observed distribution of bottlenose dolphins increased in SCANS-IV, particularly in northern regions of the Irish Sea, and population estimates were assessed as broadly stable. Common dolphins and beaked whale species (*Ziphiidae*) were absent in the Irish Sea in SCANS-III, and these species were observed in IV, including Curvier's beaked whale (*Ziphius cavirostris*) and an unidentified beaked whale. Harbour porpoise estimates were presented according to current assessment units (IMR/NAMMCO, 2019) which assess the



Irish and Celtic Seas as one. Harbour propoise densities over this region were estimated at 0.09 animals/km² and an estimated abundance of 26,870.

Block CS-D of the SCANS_IV survey corresponds to the area of the Irish Sea in which the Licence Area is situated. Abundance estimates of cetaceans in the survey were assessed as group abundance estimates from group sightings and animal abundance estimates, both of which were extrapolated from the aerial survey. The density of harbour porpoise groups was estimated at the density of groups to be 0.2109/km² and animal density at 0.2803/km². Abundance was estimated at 9,773 individuals, which falls well above the median value for the entire survey of 3325.5. Bottlenose group density was 0.0858/km² and animal density was 0.2352/km². The estimated abundance in this region was 8,199 individuals, which falls above the median value of 1,930. Risso's dolphin group density was estimated at 0.0022/km² and animal density was 0.0022/km². Abundance was estimated at 0.0022/km² and animal density was 0.0022/km². Abundance was estimated at 0.0022/km² and animal density was 0.0022/km². Abundance was estimated at 0.0022/km² and animal density was 0.0022/km². Abundance was estimated at 0.0022/km² and animal density was 0.0021/km² and the median of 8,548 at 949 individuals in block CS-D. Beaked whales (*Ziphiidae* sp.) group density was 0.0021/km² and the animal density was 0.0021/km². Abundance was estimated at 73 and falls below the median value of 132. Minke whale group density was 0.0137/km² and animal density was 0.0137/km². Abundance was estimated at 477 which was similar to the median value of 467.

The Eurasian otter (*Lutra lutra*) is geographically widespread in Ireland and found within a diverse range of aquatic habitats. Otters usually feed in shallow, sheltered waters within 100 m of the shore (Kruuk *et al.*, 1998) and avoid deeper waters (Scottish Executive, 2007). The adult population of otters in Ireland is estimated between 12,000 and 15,000 individuals (Mullen *et al.*, 2021). Otters usually have multiple dens located up to 500 m from watercourses and are particularly sensitive to disturbances near these natal dens or holts. Changes to holts/dens may have a large-scale effect on otter populations. In air, hearing ranges for Eurasian otters are thought to be between 0.2 and 32 kHz (Voigt *et al.*, 2019). Sightings have been recorded near to Dublin Bay and in the Wicklow area (Lysaght & Marnell, 2016), and there is potential for otters to be present in coastal environments which overlap the Licence Area.

Otter surveys were undertaken by CWP in 2021, along suitable habitat within the onshore development boundary, plus a 150 m buffer (where feasible) following methodologies outlined within the NRA (2006) and Chanin (2003). Any evidence of otter such as tracks, spraints, couches, slides, feeding remains or holts, were recorded. Otter are likely to forage and commute along the estuaries around the Poolbeg Peninsula, however no otter holts or resting sites/couches were recorded within the study area during surveys. Although none found, the rock armour around the perimeter of the onshore substation site may provide suitable resting sites for otter.

The National Biodiversity Data Centre¹ documents wildlife around Ireland and has information on the distribution of otters. In the Wicklow area, there have been multiple sightings between the years 1969-2017, with three sightings of individuals in the Broad Lough in 1969, 2014, and 2016; two sightings of individuals occurred in 2016, one in Wicklow town and the other in Wicklow Harbour; in 2015, an adult was sighted with two young in the Vartry River, and in 2017 an individual was sighted in the Murrough. In the Dublin area, evidence of otter activity was observed in the form of droppings near Howth in 1980, and in the form of spraint in the Dublin Port area in 2010 and a sighting of two individuals at east link toll bridge in Dublin city in 2015. In Dun Laoghaire, an individual was sighted in 2018, on the West Pier; an individual was sighted in 2015; and in the Harbour, an individual was sighted in 2018. The ECC passes the coastline of Dalkey and islets adjacent to the mainland shore, and otters have been recorded in this area. One individual was sighted off Hawk Cliff in 2012, and again in 2014; in 2014 an individual was observed at Vico Bathing Place; in 2016 an individual was sighted off Hawk Cliff, in the Killiney area. However, there were no otter sightings in the 2021 otter survey conducted by CWPL.

The leatherback turtle (*Dermochelys coriacea*) is the most common turtle species found in Irish waters and is the only species considered resident, however sightings are concentrated off the southwest coast of Ireland (Doyle *et al.*, 2008; King and Berrow, 2009) rather than in the Irish Sea. An estimated 0.06 leatherbacks are found per 100 km² in the Celtic and Irish Seas (Doyle *et al.*, 2008).

Page 77 of 154

¹ https://maps.biodiversityireland.ie/



6.4.3.1 Assessment of Potential Impacts to Marine Mammals

All of the above-mentioned cetaceans, the Eurasian otter, and the leatherback turtle are Annex IV species; grey seal and harbour seal are Annex II and V species. Potential impacts of the Proposed Activities on these species include:

- 1. Behavioural responses (disturbance and/or displacement), temporary threshold shift (TTS), or permanent threshold shift (PTS) from increased anthropogenic noise from geophysical survey and positioning equipment.
- 2. Behavioural responses (disturbance and/or displacement), TTS, or PTS from increased anthropogenic noise from geotechnical surveys.
- 3. Mortality or injury from collision events (with vessels undertaking Proposed Activities).
- 4. Mortality or reduced health/fitness resulting from litter or pollution arising from the Proposed Activities.

Potential effects resulting from noise relating to potential impacts 1 and 2 are addressed in **section 6.7 Noise & Vibration** below.

Vessel strikes are a known cause of mortality in marine mammals (Laist *et al., 2001*). Non-lethal collisions have also been documented (Laist *et al., 2001;* Van Waerebeek *et al., 2007*). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary infections. Slower vessels, following a consistent trajectory, allow animals the opportunity to avoid collisions. The risk of fatality is also reduced if vessels are moving slowly.

Avoidance behaviour by cetaceans is often associated with fast, unpredictable boats such as speedboats and jet-skis (Bristow and Reeves, 2001; Gregory and Rowden, 2001; Leung and Leung, 2003; Buckstaff, 2004), while neutral or positive reactions have been observed with larger, slower moving vessels such as cargo ships (Leung and Leung, 2003; Sini *et al.*, 2005). The species under consideration are considered to be more agile than the large whales and have been shown to avoid ships *e.g.*, Palka and Hammond (2001).

Due to the nature of the Proposed Activities, the vessels will either be:

- Following a pre-defined linear route at low to moderate working speeds (geophysical survey).
- Stationary (geotechnical survey when sampling).
- Transiting in a predictable manner (geotechnical survey when travelling between sampling locations).

Therefore, it will be more likely that animals can predict their path and avoid them, which will greatly reduce the risk of collision. The risk is also reduced when vessels are slow moving (Vanderlaan and Taggart, 2007). Therefore, the potential for adverse effects resulting from collision is considered to be negligible. In addition, it is considered that the small number of additional vessels associated with the Proposed Activities will not significantly increase the high level of vessel traffic which already uses the western Irish Sea, and therefore will not present a more significant risk of collision than animals currently experience. Therefore, regarding impact 3, considering the negligible risk of collision which is not elevated beyond the baseline arising from the high level of vessel traffic already in the area, it is concluded that no adverse effects on any conservation objectives will occur, and no adverse effects on the integrity will arise from the project alone.

In order to ensure no adverse effects on marine mammals resulting from littering or pollution associated with the Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures, and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always. With this best practice approach, regarding potential impact 4, there will be no potential for effects from litter and pollution relating to the Proposed Activities, on marine mammals.

It is considered that there is no likely significant effect expected for any marine mammal species resulting from the Proposed Activities.



6.4.4 Birds

Ireland is a highly important breeding, wintering, and migratory stopover destination for many species of birds. The coastline of Ireland and its associated islands and estuaries host nationally and internationally important assemblages of bird species throughout the year, with many of the islands and coastal cliffs providing important habitats for breeding seabird species, several of which are protected under national and European legislation. During at sea surveys in Irish waters at least 45 species of seabird (including divers and grebes) have been recorded, with 23 of these species regularly breeding in Ireland (Pollock *et al.*, 1997, Mackey *et al.*, 2004). At coastal sites such as estuaries 59 species of waterfowl and wader regularly occur including two species of heron, 26 species of wader, 26 species of wildfowl and five species of grebe (Crowe, 2005). Some of the species are resident all year round in Ireland while others migrate to Ireland to breed or to winter in the area. Other species are recorded during migration and only found in spring and autumn periods (Lewis *et al.*, 2019; Jessop *et al.*, 2018).

Seabird species identified in the Licence Area as being particularly significant in relation to the Proposed Activities are: fulmar (*Fulmarus glacialis*), Manx shearwater (*Puffinus puffinus*), gannet (*Morus bassanus*), shag (*Phalacrocorax aristotelis*), kittiwake (*Rissa tridactyla*), herring gull (*Larus argentatus*), little tern (*Sternula albifrons*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), guillemot (*Uria aalge*), and razorbill (*Alca torda*). Greenland white-fronted goose (*Anser albifrons flavirostris*), pale-bellied brent goose (*Branta bernicla hrota*), greylag goose (*Anser anser*), Bewick's swan (*Cygnus columbianus*) and whooper swan (*Cygnus cygnus*) are migratory goose and swan species identified within the Licence Area. The relevant species susceptible to disturbance from vessel activities are present in **Table H**.

6.4.4.1 Assessment of Potential Impacts to Birds

Table H presents the sensitivity of the key species to disturbance from vessel activities. Red-throated diver is the only identified species that has a high sensitivity to disturbance with evidence that they avoid approaching vessels at a distance of up to 2 km, however the majority are expected to flush at 1km or less (Bellebaum *et al.*, 2006). All other species have very low to moderate sensitivity to disturbance.

Special Protected Area (SPA) feature	Vulnerability to disturbance (Bradbury <i>et al.</i> , 2014, Fliessbach <i>et al.</i> , 2019)
Red-throated diver	High
Little tern	Moderate
Roseate tern	Moderate
Shag	Moderate
Guillemot	Moderate
Razorbill	Moderate
Black-headed gull	Low
Common tern	Low
Arctic tern	Low
Herring gull	Very low

Table H: Sensitivity to disturbance for key seabird species

Page 79 of 154



Kittiwake	Very low
Fulmar	Very low
Manx shearwater	Very low
Gannet	Very low

The potential direct and indirect effects on birds from the Proposed Activities are disturbance and displacement resulting from survey activity and vessel movements. This includes:

Increased above water noise from:

- Vessel-activity associated with the following survey activities;
 - Metocean survey device deployment and retrieval;
 - Geotechnical surveys in the proposed array area, proposed ECC and around the proposed intertidal landfall location;
 - Geophysical and UXO surveys in the proposed array area and proposed ECC;
 - Fish and shellfish surveys including potting surveys, trawl surveys and epibenthic trawls in the proposed array area, proposed ECC and around the proposed intertidal landfall location;
 - Benthic sampling surveys in the proposed array area, proposed ECC and around the proposed intertidal landfall location; and
 - Marine mammal acoustic recording device deployment and retrieval.
 - Use of survey equipment for geotechnical surveys (borehole excavation in intertidal areas).
 - Onshore activity associated with the following surveys in intertidal areas;
 - Geotechnical surveys around the proposed intertidal landfall location (survey staff and associated plant);
 - Ecological intertidal walkover surveys (survey staff); and
 - Intertidal archaeological walkover surveys (survey staff and survey equipment).

Above-water noise disturbance from construction activities is not considered in isolation as a risk factor for birds, instead is combined with the presence of vessels, man-made structures and human activity. Fliessbach *et al.*, (2019) found Common tern and Arctic tern to have very low vulnerability to vessel disturbance. According to an ongoing bird monitoring campaign between Dublin Port Company and Bird Watch Ireland, both of these species breed on permanent man-made structures within Dublin Port and have done for around 70 years (Bird Watch Ireland, 2022) within an environment where vessel traffic and other noise producing human activities are constant. Roseate terns are also considered to have low vulnerability to vessel (and even helicopter) disturbance (Furness *et al.*, 2013).

Increased underwater noise from:

- Vessel-activity associated with the following survey activities;
 - Metocean survey device deployment and retrieval;
 - Geotechnical surveys in the proposed array area, proposed ECC and around the proposed intertidal tidal landfall location;
 - Geophysical and UXO surveys in the proposed array area and proposed ECC;
 - Fish and shellfish surveys including potting surveys, trawl surveys and epibenthic trawls in the proposed array area, proposed ECC and around the proposed intertidal landfall location;
 - Benthic sampling surveys in the proposed array area, proposed ECC and around the proposed intertidal landfall location; and
 - Marine mammal acoustic recording device deployment and retrieval.
- The use of survey equipment for the following activities:
 - Geotechnical borehole of CPT surveys in the proposed array area, proposed ECC, and around the proposed intertidal landfall location;

Page 80 of 154



- Geophysical and UXO surveys using towed or vessel mounted noise-emitting devices in the proposed array area and proposed ECC;
- Fisheries surveys using trawling equipment (trawl surveys and epibenthic trawls) in the proposed array area, proposed ECC, and around the proposed intertidal landfall location; and
- Benthic sampling surveys in the proposed array area, proposed ECC and around the proposed intertidal landfall location.

For underwater noise, and in particular terns, potential impacts were considered and subsequently screened out due to very low sensitivity and associated risk. This was on the basis that seabirds that may shallow dive, dip, dive, or surface feed are of limited sensitivity to underwater noise, due to the brevity of exposure time and sensitivity to disturbance. Terns, that feed by shallow dives, are therefore considered unlikely to be vulnerable. While assessed for marine mammals and fish, subsea noise is not considered a risk factor for seabirds as they spend most of their time above or on the water surface. Furthermore, based on what is known about the physiology of hearing in birds they do not hear well underwater and, therefore, are unlikely to be impacted when diving. Anatomical studies of ear structure in diving birds, such as Dooling and Therrien (2012), suggests that there are adaptations for protection against the large pressure changes that may occur while diving, which may protect the ear from damage due to acoustic over-exposure. Furthermore, unlike marine mammals, birds have the ability to stay above the water and escape the area by flying, therefore avoiding potential damage.

It is considered that there is no likely significant effect expected for any of the bird species due these activities.

Increased visual disturbance from:

- Vessel-activity associated with the following survey activities:
 - Metocean survey device deployment and retrieval;
 - Geotechnical surveys in the proposed array area, proposed ECC, and around the proposed intertidal landfall location;
 - Geophysical and UXO surveys in the proposed array area and proposed ECC;
 - Fish and shellfish surveys including potting surveys, trawls surveys and epibenthic trawls in the proposed array area, proposed ECC, and around the proposed intertidal landfall location;
 - Benthic sampling surveys in the proposed array area, proposed ECC, and around the proposed intertidal landfall location; and
 - Marine mammal acoustic recording device deployment and retrieval.
 - Onshore activity associated with the following surveys in intertidal areas:
 - Geotechnical surveys around the proposed intertidal landfall location (survey staff and associated plant);
 - Ecological intertidal walkover surveys (survey staff);
 - Intertidal archaeological walkover surveys (survey staff); and
 - Vessel-based surveys and intertidal surveys.

Based on the ranges provided by Woodward et al., (2019), there is a large area of alternative foraging habitat with each species-specific range which seabirds can exploit if they are disturbed from an area. Any impacts associated with survey impacts will be limited in terms of duration and spatial extent, allowing birds to return to areas once the survey has moved to another area.

Red-throated divers are sensitive to the presence of vessels, and there is potential for vessels related to the Proposed Activities using Wicklow Harbour to approach to within 2 km of birds inside the Murrough SPA, without crossing the SPA boundary. However, disturbance caused by vessels is considered to be small scale and temporary, and unlikely to impact the birds in any meaningful way. In addition, the constant presence of other vessels using the harbour makes it likely that either no birds will be within disturbance range, or, if there are birds within range, a degree of habituation has occurred. As such, a relatively small number of additional vessels using the harbour is not considered likely to have any impact on red-throated divers.

Based on the above, there is no likelihood that a significant effect would result from disturbance to seabird species.

It is considered that there is no likely significant effect expected for any of the bird species due these activities.

Page 81 of 154



Indirect effects through impacts upon prey species from:

- Underwater noise inducing activities within the proposed array area, proposed ECC, and around the proposed intertidal landfall location. Specifically, from vessel noise from surveys and equipment noise from surveys.
- Impacts to seabed and intertidal habitats (habitat restructuring or increased suspended sediment levels) associated with the following activities:
 - Geotechnical borehole excavation or CPT surveys in the proposed array area, proposed ECC, and around the proposed intertidal landfall location;
 - Fisheries surveys using trawling equipment (trawl surveys and epibenthic trawls) in the proposed array area, proposed ECC, and around the proposed intertidal landfall location; and
 - Excavation during intertidal archaeological walkover surveys.

Any impacts associated with site investigation and ecological monitoring activities will be limited in terms of duration and spatial extent, with activity centred around one sample site at any one time. Further to this, as referenced, the foraging ranges provided by Woodward *et al.*, (2019) indicate there is a substantial amount of alternative foraging habitat within each species-specific range which seabirds can exploit if the prey species are disturbed temporarily from an area.

It is considered that there is no likely significant effect expected for any of the bird species due these activities.

Mortality or injury resulting from litter and pollution:

- Accidental release of litter in the proposed array area, proposed ECC, and around the proposed intertidal landfall location from all survey activities; and
- Accidental release of pollutants in the proposed array area, proposed ECC, and around the proposed intertidal landfall location from all vessel-based survey activities.

All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention.

It is considered that there is no likely significant effect expected for any of the bird species as a result of the Proposed Activities.

All other Proposed Activities are considered to have no potential route to impact for birds, directly or indirectly.

Mitigation measures presented in **Table J** for tern species are aimed at limiting disturbance during roosting and nesting periods ensuring there is no pathway to effect.

For waterbirds and waders the Zone of Impact for disturbance is 0.5 km (Cutts *et al.*, 2013) and for the relevant SPAs mitigation measures have been proposed during the winter months to ensure there is no pathway for effect.

Although guillemot, razorbills and shags have a moderate sensitivity to disturbance (**Table H**), they are not prone to significant disturbance from vessel activities.

Potential impacts to ornithological features of designated sites have also been considered and assessed as part of the accompanying SISAA (Document No. CWP-CWP-CON-02-01-09-ASM-0001). Following the Screening for AA, it cannot be excluded based on objective scientific information that the Proposed Activities, individually or in combination with other plans or projects, will have a significant effect on a number of Natura 2000 sites. Each Natura 2000 Site/Impact/SCI combination for which Likely Significant Effects could not be ruled out in the Supporting Information for Screening for AA document (Document No: CWP-CWP-CON-02-01-09-ASM-0001) will be assessed as part of the NIS, following receipt of the SISAA document from MARA.



6.4.5 Fish

6.4.5.1 Commercially Important Fish Species – spawning and nursery grounds

As identified using Ireland's Marine Atlas², the Licence Area overlaps with the spawning and/or nursery grounds of several commercially important species of fish, namely cod and haddock spawning areas, and mackerel, horse mackerel, cod, and haddock nursery areas (Ireland's Marine Atlas²) (see **Figure 6-4**). The area of the Codling Bank which the Licence Area overlaps is known for blonde and thornback rays; it is unknown if they spawn there or if it is simply where they aggregate (Gerritsen, 2024). Shellfish are assessed in **section 6.5.2**.

² Marine Institute Marine Atlas. Available at: https://www.marine.ie/site-area/data-services/interactive-maps/irelands-marine-atlas

Page 83 of 154



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		Map title: Fig 6.4: Key Fish Species Spawning and Nursery Areas and Shellfish Water Directive Areas							
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6.4.5.2 Migratory Fish Species

A number of river SACs on the south and east coasts of Ireland have been designated for Annex II migratory fish: sea lamprey (*Petromyzon marinus*), Atlantic salmon (*Salmo salar*), river lamprey (*Lampetra fluviatilis*), Allis shad (*Alosa alosa*), and twaite shad (*Alosa fallax*). The migratory fish for which these river SACs were designated have a marine phase in their lifecycle and rely on the sea to migrate to feeding grounds before returning to rivers to spawn. The European eel (*Anguilla anguilla*) and seatrout (*Salmo trutta*) also have a marine phase in their life cycle, although they are not Annex II species.

6.4.5.3 Assessment of Potential Impacts to Fish

Potential impacts on commercially important fish species and migratory fish include:

- 1. Exposure to underwater noise;
- 2. Disturbance from increased levels of suspended solid concentrations; and
- 3. Mortality or reduced health/fitness resulting from litter/pollution.

Potential impacts from underwater noise are addressed in **section 6.7**. Potential impacts to shellfish are assessed in **section 6.5.2**. Regarding potential disturbance effects from SSC, Coughlan *et al.* (2021) through a detailed hydrodynamic modelling exercise of the entire Irish Sea Basin concluded that Codling Bank had one of the lowest levels of sediment mobility within the region, due to the coarse nature of the sediments in the area, despite (or perhaps because of) the strong tidal currents the area is exposed to. It was also noted that in areas of finer sediment, such as those within the nearshore areas of Dublin Bay, similarly low seabed mobility exists, principally due to the low tidal current speeds in these areas which have created areas of net sediment accretion (Coughlan *et al.*, 2021). Considering this, and the small (in comparison with wider natural processes such as storm events) and very localised increases in suspended sediment that may arise from the Proposed Activities, no elevation in SSC beyond close proximity (*i.e.*, one km) to the Proposed Activities that may disturb the seabed is predicted. Migratory fish species are highly tolerant of increased SSC and the fish species under consideration are highly mobile so will likely act to avoid unfavourable environmental conditions such as increased SCC. In relation to potential impact 2, due to the localised nature and the pre-existing environmental conditions, there will be no predicted adverse effects arising due to the Proposed Activities on commercially important and migratory fish species.

All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always. Therefore, no route for litter and pollution to impact on fish species will exist from the Proposed Activities, as such it can be concluded that in relation to impact 3, there will be no adverse effects from the Proposed Activities on commercially important and migratory fish species.

In conclusion, due to the negligible potential for effects to occur to fish species considering the large suitable alternative habitat available, mobility of fish, and tolerance of migratory fish species to increased SCC, it is considered that no adverse effects are likely to occur on fish species resulting from the Proposed Activities.



6.5 Commercial Fisheries and Aquaculture Activities

6.5.1 Fishing Activity

The main commercial fishing activity on the Codling Bank targets whelk (*Buccinum undatum*) with pots and occurs across the whole of the Codling Bank (Ireland's Marine Atlas²). According to Ireland's Marine Atlas, creel fishing for crab (*Cancer pagurus*) and lobster (*Homarus gammarus*) occurs to a lesser extent within the vicinity of the Codling Bank (**Figure 6-5**). Seed mussel (*Mytilus edulis*) grounds are located inshore between the proposed array area and the coastline around Wexford Bay and Wicklow and are typically targeted by dredge for the purpose of aquaculture supply (**Figure 6-6**). Near Wexford Harbour extensive areas of mussel aquaculture occurs. Razor clams (*Ensis* sp.) are targeted by dredge along the nearshore to the north of Howth up to Dundalk Bay and south in Wexford Bay (**Figure 6-6**). Low levels of pelagic trawling are reported in nearshore areas. Little to no demersal trawling activity is reported on the Codling Bank (**Figure 6-7**).

Page 86 of 154







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6.5.1.1 Assessment of Potential Impacts to Fishing Activities

Potential impacts to fishing activities in the Licence Area include:

- 1. Temporary loss or restricted access to fishing grounds and the subsequent displacement of fishing activity into other areas;
- 2. Entanglement of static fishing gear arising from geophysical surveys; and,
- 3. Risk to fishing vessels due to presence of static survey equipment on seafloor.

The presence of survey vessels and infrastructure may cause temporary loss or restricted access to fishing grounds and subsequently displace fishing activity into other areas. Surveys which may displace fishing activity are geotechnical and as a result will occupy a minimal amount of the seabed (within proposed array area < 30 m^2), and subsequently access restrictions to these areas will be minimal. Regarding potential impact 1, the resultant effects on static and mobile gear fisheries will be small and temporary, and the effects are considered to be negligible due to the minimal footprint of the geotechnical survey (using the maximum number of geophysical survey specifications), the small region the geotechnical survey encompasses, and the extensive alternate fishing grounds available in the wider area.

There is potential for entanglement of static fishing gear with vessels or equipment used in the geophysical survey, however mitigations such as pre-scouting surveys and the appointment of a Fisheries Liaison Officer (FLO) will substantially reduce any possible effect from static gears. An FLO has been appointed to liaise directly with fishermen and Marine Notices will be issued prior to any proposed site investigation activity to comply with safety requirements. It is predicted clearance and compensation will be requested prior to geophysical surveys. In relation to damaged fishing gear, a Dispute Resolution Mechanism tool will be used where appropriate to assist in resolving matters as established by the Seafood ORE working group. Thus regarding potential impact 2, the potential effects to entanglement of static fishing gear is considered negligible.

Seabed obstacles pose a risk to fishing vessels which use gear in contact with the seabed and are considered to be limited to static survey equipment placed within the Licence Area. Locations of static survey equipment will be communicated to the fishing community through the issue of Marine Notices and via the FLO. Regarding potential impact 3, the potential risk to fishing vessels is considered negligible.

The Proposed Activities will be temporary and short term, and the effect on static gear fisheries is expected to be negligible. FLOs are employed to liaise with the fishing community to minimise disruption. Offshore FLOs (OFLOs) and pilot vessels will be used where appropriate to minimise the potential for negative interactions.

It is considered that there are no likely significant effect expected on commercial fishing activity as a result of the Proposed Activities.

6.5.2 Aquaculture and Shellfish Ecology

The Department of Agriculture, Food, and the Marine (DAFM) has the responsibility of regulating aquaculture in Ireland and under Section 6 of the Fisheries (Amendment) Act, 1997 (as amended), it is illegal to participate in aquaculture without an appropriate aquaculture licence. Aquaculture includes the culture or farming of fish, aquatic invertebrates, aquatic plants, or another form of aquatic food suitable for the nutrition of fish.

There is no overlap between the DAFM aquaculture sites and the Licence Area. There are no aquaculture sites within or adjacent to the Licence Area. The closest aquaculture facility is located approximately 26 km from the Licence Area (based on the nearest point of the Licence Area to the aquaculture site) in Clogga Bay, Co. Arklow and is licensed for *M. edulis*.

Shellfish species which are present in the Licence Area, and which are of commercial importance, are *B. undatum*, *M. edulis*, razor clam (*Ensis* sp.), *C. pagurus*, and *H. gammarus*. Dublin bay prawn (*Nephrops norvegicus*) are also known to be present in the wider area. Seed mussel grounds are located inshore between

Page 90 of 154



the proposed array area and the coastline around Wexford Bay and Wicklow and are typically used to supply aquaculture. Nearby Wexford Harbour contains extensive areas where mussel aquaculture is undertaken.

6.5.2.1 Assessment of Potential Impacts to Aquaculture and Shellfish

The potential routes to impact shellfish species from the Proposed Activities are considered to be:

- 1. Injury and disturbance from underwater noise from geophysical and geotechnical surveys; assessed in **section 6.7**.
- 2. Disturbance from increased levels of SSC from geotechnical and environmental surveys.
- 3. Mortality or reduced health/fitness resulting from litter or pollution arising from the Proposed Activities.

Potential impact 1 is assessed in **section 6.7**. In relation to effects from increased SSC, only sessile and slowmoving shellfish species are anticipated to have the potential to be impacted, *i.e.*, mussels and whelks.

Buccinum undatum is the third most valuable shellfish in the Irish Sea and landings in 2017 in the United Kingdom (UK) were 20,800 tonnes (Emmerson *et al.*, 2020). The whelk fishery is considered 'data-poor' and the sustainability of the fishery has been under debate (Emmerson *et al.*, 2020), with increases in demand driving the expansion of the fishery in the recent past (Fahy *et al.*, 2000). The region is predicted to be a whelk spawning ground due to the large number of small, young whelks harvested from the Codling Banks (Fahy *et al.*, 2002), however national and EU regulations now stipulate a minimum landing size for whelks of 45 mm along the long axis and the prohibition of selling whelk under 25 mm (S.I. No. 237 of 2006).

Declines have occurred across Irish waters due to the existence of discrete stocks vulnerable to overexploitation (Fahy et al., 2000; Fahy et al., 2005). Buccinum undatum is not a filter-feeding species and as such it is considered there is no potential for negative effects (e.g., smothering) due to the proposed activities (Fahy et al., 2002). A study in 2002 investigated the whelk fishery overlapping part of the Codling Bank for the purpose of dredge activities and while there was a small, localised decrease in catch per unit effort, this was not conclusively attributed to the dredging activities/operations (Fahy et al., 2002). It was also concluded that the disturbance would be localised and limited to the site of the activities, and that the short nature of the activities would favour rapid recolonisation of the disturbed seafloor area. The nature of the Proposed Activities are akin to those undertaken in the Fahy et al. (2002) study (i.e., localised, limited to site of activities, spatially short, and temporary) and there were no negative impacts or effects attributed due to those works. There were no other studies available at the time of writing this report regarding the effects of SSC on whelks, however background turbidity levels are typically higher in the western Irish Sea indicating the whelk fishery in this area is accustomed to higher SSC. It is considered that as the surveys (such as benthic and geotechnical) and metocean deployment will affect such a small area of the seabed coupled with the whelk's ability to move (and therefore recolonise disturbed areas), the high background levels of turbidity experienced in this region, and also its extensive habitat preferences, any potential effects on this species to arise from the Proposed Activities are considered to be negligible.

Given this immobile life cycle of mussels, they may be potentially affected by temporary habitat disturbance. It is considered however that given that the surveys will affect such a small area of the seabed and that recolonisation of any affected areas would be possible on cessation of this temporary activity, that the only effects on this species to arise from the Proposed Activities are considered to be negligible. It is also considered due to the planktonic larval stage in the life history cycle of mussels that resettlement by planktonic larvae would result in rapid recolonisation of these areas (Fahy *et al.*, 2002). Regarding potential impact 2, impacts on shellfish species will be temporary and localised, and no long term effects are predicted as a result of the Proposed Activities.

In order to ensure no adverse effects on aquaculture and shellfish resulting from littering or pollution associated with the Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for safe management and operation of ships for pollution prevention. This will involve adaptation of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures, and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be

Page 91 of 154



adhered to. With this best practice approach, regarding potential impact 3, there will be no route from the Proposed Activities for litter and pollution to impact aquaculture and shellfish.

It is considered that there is no likely significant effect on shellfish and aquaculture as a result of the Proposed Activities.

6.6 Air Quality

There will be no releases to air, other than routine vessel exhausts. Air quality standards will not be exceeded. Therefore, the Proposed Activities are not considered likely to have a significant effect on the environment regarding air quality.

6.7 Noise & Vibration

Geophysical and geotechnical surveys (including vessels and ADCP equipment operations) in the marine environment are a potential source of noise and vibrations and therefore may have an impact on the marine environment. These have been assessed in the Annex IV Risk Assessment for cetaceans, marine turtles, seals, and otters, and the conclusion was that there is no risk of fatal effects to Annex IV species. Annex IV species, fish, seals, and shellfish are covered in this section. The impact of noise and vibration on birds has been assessed in **section 6.4.4**.

Permanent Threshold Shift (PTS) is the permanent reduction of auditory sensitivity in an animal. Temporary Threshold Shift (TTS) is a temporary effect that may affect the hearing sensitivities of an individual on a scale of minutes to days. Eight discrete marine mammal hearing groups are identified by Southall *et al.*, (2019) and in the Irish Sea, four groups are considered in this AIMU covering nine species that are regularly found in the Irish Sea or are occasional/seasonal visitors: harbour porpoise (very high frequency specialist), bottlenose dolphin (high frequency specialist), killer whale (high frequency specialist), Risso's dolphin (high frequency specialist), minke whale (low frequency specialist), fin whale (low frequency specialist), humpback whale (low frequency specialist), harbour seal (phocid carnivore in water), and grey seal (phocid carnivore in water). Southall *et al.* (2019) suggests that while these groups could be further segregated, there are insufficient TTS/PTS-onset data available.

In air, hearing ranges for Eurasian otters are thought to be between 0.2 and 32 kHz (Voigt *et al.*, 2019). Studies have shown marine turtle species can detect sound at frequencies under 2 kHz (Dow Piniak, 2012; Dow Piniak *et al.*, 2012a; Dow Piniak *et al.*, 2012b; Lavender *et al.*, 2012; Lavender *et al.*, 2014; Martin *et al.*, 2012; Ridgeway *et al.*, 1969), however few studies have been conducted to assess the physiological effects of anthropogenic noise on marine turtles. Popper *et al.* (2014) provides mortality and potential mortal injury thresholds for marine turtles from explosives between peak 229-234 dB re 1 μ Pa and > 207 dB re 1 μ Pa for seismic airguns.

Bottlenose dolphins and harbour porpoise have demonstrated auditory gain control during echolocation (Li *et al.*, 2011; Mooney *et al.*, 2011; Linnenschmidt *et al.*, 2012), and in both species there have been measures from studies of alterations of hearing thresholds post conditioning using an auditory cue to warn of the impending arrival of a loud sound (Nachtigall & Supin, 2014; Nachtigall *et al.*, 2016).

The sounds emitted by geophysical and geotechnical survey equipment have the potential to induce the onset of PTS or TTS when the frequencies emitted fall within the species' hearing ranges in each marine mammal hearing group as described by Southall *et al.* (2019):

- Low frequency cetaceans (e.g., minke whale): 0.007 35 kHz
- High frequency cetaceans (e.g., bottlenose dolphin): 0.15 160 kHz
- Very high frequency cetaceans (e.g., harbour porpoise): 0.2 180 kHz
- Phocid carnivores in water (e.g., harbour seal, grey seal): 0.05 86 kHz

Page 92 of 154



6.7.1.1 Assessment of Potential Impacts of Noise and Vibration

Potential impacts identified in this section relating to noise and vibration on Annex IV species, marine mammals, fish, and shellfish are:

- Behaviour response (disturbance and/or displacement), TTS, or PTS from increased anthropogenic noise from geophysical survey, positioning equipment, and geotechnical surveys due to pulsed sound.
- Behaviour response (disturbance and/or displacement), TTS, or PTS from increased anthropogenic noise from geophysical survey, positioning equipment, and geotechnical surveys due to non-pulsed sound.
- Behaviour response of benthic organisms due to vibrations including retreat and potential displacement of mobile organisms.

Marine Mammals

Southall *et al.* (2007) provides thresholds for received non-pulsed sound levels that may induce onset PTS in each marine mammal hearing group. Geotechnical sampling techniques emit non-pulsed sound (*i.e.*, continuous sound).

PTS

- Low frequency: 230 dB re 1 µPa;
- High frequency: 230 dB re 1 µPa;
- Very high frequency: 230 dB re 1 μPa;
- Phocid carnivores in water: 218 dB re 1 µPa.

The geotechnical sampling techniques proposed are boreholes, CPT, and vibrocores. The anticipated noise levels from drilling activities are 145 dB re 1 μ Pa (Erbe and McPherson, 2017). The operating frequencies of the sampling techniques are within the auditory range of all species, however due to the low-level sounds predicted from the geotechnical sampling techniques (124 to 194 dB re 1 μ Pa), no instantaneous PTS onset is predicted to arise as a result. No thresholds exist for non-pulsed instantaneous TTS. Mitigation measures based on those detailed in 'Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters' (DAHG, 2014), including mitigation measures for drilling activities therewithin will be employed and therefore, in relation to potential impact 1, it is considered that there are no likely significant effects expected on marine mammal species.

Geophysical survey equipment emits pulsed sound and Southall *et al.* (2019) provides thresholds for received pulsed sound levels that may onset instantaneous PTS and TTS in each marine mammal hearing group:

PTS

- Low frequency: 219 dB re 1 µPa;
- High frequency: 230 dB re 1 µPa;
- Very high frequency: 202 dB re 1 µPa;
- Phocid carnivores in water: 218 dB re 1 µPa.

TTS

- Low frequency: 213 dB re 1 µPa;
- High frequency: 224 dB re 1 µPa;
- Very high frequency: 196 dB re 1 μPa;
- Phocid carnivores in water: 212 dB re 1 μPa.

Of the geophysical equipment proposed, the magnetometer/gradiometer is passive and emits no sound, and MBES and SSS utilised will operate outside of the hearing frequency thresholds of all species (*i.e.*, above 200 kHz). SBP and UHRS overlap the range of all hearing groups (including otters) as they operate at low

Page 93 of 154



frequencies (0.2 to 16 kHz) and they may emit sound at relatively high intensities (up to and including 247 dB re 1 μ Pa) and have the potential to induce PTS and TTS. However, the threshold is limited to near the source and it was concluded through an acoustic impact assessment that they are not likely to cause physical effects on marine mammals (IFREMER, 2016). There is no potential for PTS or TTS from the operations of ADCPs as they operate outside the frequency hearing range of cetaceans. USBLs operate over a wide range of frequencies (*e.g.*, 18 to 55 kHz) with high levels of sound (up to 207 dB re 1 μ Pa) and have the potential to induce the onset of PTS or TTS in marine mammals of the very high frequency group in the absence of mitigation measures. Through the implementation of mitigation measures such as ensuring separation of animals from survey equipment (PAMs), visual surveys, and through the reduction of operation times of higher risk equipment (*e.g.*, UHRS), the potential for PTS or TTS to arise from survey work is considered negligible for the relevant species and no adverse effects is predicted due to the Proposed Activities. Mitigation measures based on those detailed in 'Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters' (DAHG, 2014) will be employed and therefore, in relation to potential impact 2, it is considered that there are no likely significant effects expected on marine mammal species.

None of the following aspects of the Proposed Activities require sound generating equipment, *i.e.*, trawls, benthic sampling, ecological/archaeological intertidal walkovers, metocean, or marine mammal passive acoustic monitoring, as such there is no route to impact on marine mammal species relating to underwater noise from these activities. It should also be noted that there is no potential for the lethal effects or physical injury to arise as a result of increased anthropogenic noise from the geotechnical or geophysical surveys. Such effects are only considered to have the potential to arise through the use of explosives, or in relation to the behaviour of deep diving species following exposure to low frequency active sonar, neither of which are proposed as part of this application.

Thus, it is considered that there will be no likely significant impacts expected as a result of the Proposed Activities.

Fish

Fish vary in their abilities to detect and utilise sound as well as their potential susceptibility to damage by sound (Popper *et al.* 2014; Popper & Hawkins, 2019; Popper *et al.* 2022). Anticipated drilling operations (145 dB re 1 μ Pa) are below the levels published by Popper *et al.*, (2014) and would result in injury to the most sensitive fish species, however, studies have shown that when the cause of a disturbance is visible to fish, the organism tends to begin to react directionally and move out of the vicinity of the source (Wardle *et al.*, 2001).

The magnetometer is passive and emits no sound, so has no potential to cause any effect. MBES and SSS emit high frequency sound outside of the hearing range of fish (Popper *et al.*, 2014).

The SBP and UHRS emit lower frequency sound which may be audible at up to 247 dB re 1 μ Pa. USBL also emits sound at audible frequencies at levels of up to 207 dB re 1 μ Pa. Popper *et al.* (2014) provides the most up to date and authoritative sound exposure guidelines on the quantification of effects arising from sound producing activities on fish receptors. The report outlines that for impulsive sound such as that from airgun arrays, UHRS, or SBP, injurious effects could result from sound sources in excess of 207 dB re 1 μ Pa for fish with a swim bladder (*e.g.*, shad and salmonids), and 213 dB re 1 μ Pa for fish with no swim bladder (*e.g.*, lamprey species). Despite this, studies undertaken show no evidence of mortality, or physical injury that could lead to mortality, arising from pulsed sound sources in the fish species examined (Popper *et al* 2014; Popper *et al.* 2007; Popper *et al.*, 2005; Hastings *et al.* 2008; McCauley and Kent 2012). Additionally, these fish species are highly mobile and, as such, are anticipated to move away from the activities prior to suffering any negative effects from underwater noise (Xodus, 2015). Regarding potential displacement effects from underwater noise, the marine distribution of shad, for example, is very large (Davies, 2020), therefore considerable habitat will remain available to this species in the event any individual is displaced from the relatively small area around ongoing Proposed Activities.

In relation to potential impacts 1 and 2, there are no predicted significant effects on fish as a result of the Proposed Activities. Due to the negligible potential for effects to arise on Qualifying Interests, the limited level of interaction predicted due to the distance of the works from the SACs, and large suitable alternative habitat available, the effect of underwater noise is negligible, with no effect on the conservation objectives and no adverse effects on integrity will arise from the project alone.



Shellfish

Acoustic energy in water creates a particle motion of sound effect and sound pressure. Invertebrates are typically sensitive to sound pressure. Particle motion decreases near the source of the sound with the inverse proportion to distance from the source and can be considered negligible after approximately one wavelength (Sole *et al.*, 2023), hence after *c.* one wave length, particle motion becomes insignificant. Lower frequency waves results in longer wavelengths, hence lower frequency equipment sound sources have the potential to travel further.

Geotechnical survey activities were assessed in the SISAA for Annex I habitats as they may introduce vibrations to the seabed. Benthic organisms are sensitive to vibration (Rogers *et al.*, 2016) and responses include temporary retreat of tube dwelling species and movement of mobile organisms away from the source of disturbance. Some factors which influence the level of substrate vibrations include: vibration source/cause, substrate type, sediment layers, water depth, bathymetry, distance from source, and type of wave propagation (Ballard and Lee, 2017).

Shellfish may be susceptible to disturbance from underwater noise resulting from the Proposed Activities. While whelks cannot perceive noise per se, they may be sensitive to vibrations in the seabed caused by the survey equipment. It is considered that as the Proposed Activities are temporary and only affect a very localised area at any one time, any vibration exposure will be limited, and effects are predicted to be negligible. There are no relevant studies as to noise exposure on whelk, however no evidence of direct impacts due to noise exposure associated with site investigation surveys have been found through an extensive review of literature in BlueWise Marine (2023). As mussels are sessile, benthic shellfish they are unable to move away from unfavourable noise and vibration conditions. Wale (2017) found that mussels responded negatively to noise exposure but resulted in no mortality or apparent injury. Although the proposed survey area overlaps known seed mussel beds the temporary and mobile nature of the surveys will limit exposure and reduce any effects from underwater noise. It is considered, given that the surveys will affect such a small area of the seabed, and that re-colonisation of any affected areas would be possible on cessation of this temporary activity, that the effects on mussels to arise from the proposed survey work would be negligible. Crustaceans are not currently thought to have the ability to perceive noise, rather they are sensitive to particle motion which will primarily be localised to the site of sound introduction (Edmonds et al., 2016). With this in mind and considering the low noise exposure and temporary nature of the surveys, only negligible effects are likely to occur.

Based on the above, it can be concluded that the Proposed Activities will have negligible effects on shellfish in relation to noise and vibration, and those effects will be limited temporally and spatially to the site of the investigative activities over their duration.

6.8 Landscape and Seascape

The Licence Area is not subject to international, national, or regional designation intended to protect landscape quality. Onshore landscape designations exist, however visual impacts from the Proposed Activities will be limited to the presence of approximately 8 survey vessels at any one time, on site in an area already characterised by a number of high-density vessel routes. The survey vessels will be active for the duration of the Proposed Activities and the static survey equipment will be on station for a maximum of 36 months.

Therefore, there is no likely significant impacts predicted on landscape and seascape as a result of the Proposed Activities.

6.8.1.1 Assessment of Potential Impacts to Landscape and Visual

The Proposed Activities will involve the presence of survey vessels and static equipment in the area. Thus, there is potential for the Proposed Activities to give rise to potential effects on the seascape. However, the inshore area from Dublin Port southwards to Wicklow is already subject to a high density of marine traffic. The survey vessels and static equipment will not be a noticeable visual intrusion on the seascape, when considered

Page 95 of 154



against the existing baseline. It is considered the potential for any significant effects on seascape as a result of the Proposed Activities will be negligible, therefore no significant impacts are predicted.

6.9 Marine Traffic & Transport

Shipping and navigation receptors for this application will be considered against the following two baseline assessments:

- Navigational features; and
- Vessel traffic survey data.

Navigational Features

Vessel routeing in the inshore area of the Licence Area is primarily dictated by the presence of shallow banks in the area, namely the Bray Bank, Kish Bank, Codling Bank, India Bank, and the Arklow Bank. The banks are marked by multiple navigational buoys to warn passing traffic of the navigational hazard created by the shallow depths and over falls. Traffic to the east of the Licence Area is largely dictated by the Codling East Cardinal Buoy and East Codling lateral mark which define the outer extent of shallower waters in the area.

Whilst not within or in direct proximity to the Licence Area, the Traffic Separation Schemes (TSS) associated with the Irish Sea (**Figure 6-8**) are still considered relevant navigational features given vessels will tend to position themselves on transit in advance with the correct directional lane. On this basis the TSS's which dictate vessel routeing in the area are considered to be Off Skerries (approx. 35 nautical mile (nm) to the northeast), Off Tuskar Rock (approx. 50 nm to the south), and Off Smalls (approx.70 nm to the south).

A review of the Irish Coast Pilot NP40 (UK Hydrographic Office, 2023) and navigational charts has identified one charted anchorage area in proximity to the Licence Area within Dublin Bay. There is also a preferred anchorage located at Scotsman's Bay to the east of Dun Laoghaire and a second preferred area for commercial traffic awaiting entrance to Dublin port to the south of Dublin Bay.

Page 96 of 154







Vessel Traffic Survey Data

The marine traffic data collected as part of the 2024 CWP NRA process has been used to characterise usage of the Licence Area by vessels. To illustrate seasonal variations in shipping densities, summer and winter data has been presented separately. **Figure 6-9** and **Figure 6-10** shows data collected over a 14-day period in Summer 2022 (July to August) and a 14-day period in Winter July 2023 (February to March) respectively. The survey periods include AIS and Radar tracks ensuring all vessel types are captured. The same density range brackets have been used in both figures, allowing direct seasonal comparison.

Commercial vessel routes have been recorded both inshore and offshore of the proposed array area but are crossed by the proposed ECC route. Greater vessel densities are in found inshore of the proposed array area, and enroute to and from Port of Dublin. Most of the inshore commercial traffic was observed to maintain a separation from the proposed array area (likely due to the shallow banks); however, a limited number of vessels were observed to transit on a route passing between the Codling Bank and India Bank. The commercial vessels on this route passed south of the proposed array area but within the Licence Area.

Offshore of the proposed array area, routeing was observed to be largely dictated by vessel preference to align in advance with the Off Tuskar Rock and Off Smalls TSS. Similarly, to the inshore commercial traffic, many vessels maintained a 2 nm separation from the proposed array area (noting shallow sand banks prevent most vessels passing in proximity), with only limited levels of vessels intersecting.

Greater vessel densities were observed during the summer period when compared to the winter period, particularly in coastal areas. This was likely due to the levels of coastal recreational activity observed during summer that was not reflected within the winter data (which is the expected pattern given winter conditions are usually unfavourable to recreational users). It is noted that while considered notable in terms of traffic levels, the majority of the recreational activity recorded during summer remained coastal, with only limited numbers of recreational vessels recorded further offshore, including within the array area.

Based on the assessment of the survey data, vessels recorded within the proposed array area were in transit in a north south direction rather than actively engaged in fishing. Within the study area and largely inshore of the Codling Bank and India Bank active fishing was noted in the summer and winter periods with some overlap with the Licence Area.

As part of the 2024 CWP NRA, an assessment of anchoring activity indicated that anchoring within the Licence Area was most predominately associated with the Wicklow and Dublin anchorages. The majority of anchoring recorded was from cargo vessels and tankers awaiting orders or berths outside of Dublin.







6.9.1.1 Assessment of Potential Impacts to Marine Traffic and Transport

The DCCAE (2017) Guidance provides an indicative list of impacts that should be considered within marine navigation risk assessments and are considered in this application. These are:

- 1. Allision risk;
- 2. Displacement; and
- 3. Collision risk.

These potential impacts are considered relevant for the Proposed Activities given the type, size, and duration of the works. Given the use of moored devices and subsea infrastructure, impacts on anchor interactions are also considered (potential impact 4).

There is limited potential that the Proposed Activities may result in increased risk of allision as a result of the deployment of equipment such as FLSs, metocean equipment, and PODs. The locations of the Proposed Activities are planned to occur within the proposed array area and are therefore located in areas of lower vessel usage as illustrated by the vessel traffic survey data (**Figure 6-9** and **Figure 6-10**), thus limiting potential allision risk. Any PAM locations including those outside of the proposed array area are subject to further consultation with the Commissioner of Irish Lights as part of the statutory sanction process. Notice to Mariners will be issued to all marine users and will include the locations and durations of the Proposed Activities. Therefore, vessels will be able to avoid static equipment and associated activities (*e.g.,* deployment/removal of devices). Appropriate marks and lights will be agreed with the Commissioner of Irish Lights (if required) and Statutory Sanctions will be applied for where required. The Statutory Sanction application will be underpinned by an appropriate risk assessment. Regarding potential impact 1, there is no expected significant effect of allision resulting from the Proposed Activities.

Displacement may occur where vessels need to avoid or route around the Proposed Activities and away from their normal or intended route. Displacement of vessels may then result in increased vessel to vessel collision risk. This is likely to be a greater magnitude in areas of higher vessel density (illustrated in **Figure 6-9** and **Figure 6-10**) and in close proximity to ports and harbours. The main vessel routes are located outside of the proposed array area and where the majority of proposed activities will occur, minimising the potential for displacement. There will be some displacement associated with the survey work along the proposed ECC, however any such displacement will be temporary and spatially limited to the area immediately surrounding the operation. Any PAM locations including those outside of the proposed array area are subject to further consultation with Commissioner of Irish Lights as part of the statutory sanction process. Notice to Mariners will be issued to ensure marine users are aware of the proposed activity. Discussions with Dublin Port (and other relevant ports and harbours such as Wicklow and Dun Laoghaire) will ensure busy periods are avoided and encroachment into main channels is avoided where applicable. Vessels will fully comply with the International Regulations for the Prevention of Collisions at Sea (COLREGs). Regarding potential impact 2, there is no significant effect on displacement expected as a result of the Proposed Activities.

As well as the low-level displacement there will also be a small increase in the number of vessels (approximately 8-15 vessels at any given time) within the Licence Area as a result of the Proposed Activities, which may result in a negligible increased collision risk to third party traffic. Notice to Mariners will be issued, and radio broadcasts made where required which will make all marine users aware of the operational area of the project vessels. Vessels will fully comply with COLREGs, thus there is no predicted impact of collision risk due to the Proposed Activities.

All static equipment will be moored to the seabed via mooring systems suitable to the device used or be located on the seabed (*e.g.*, ADCPs). Therefore, they may create a possible snagging risk for anchors. Such activities are to be located predominantly within the proposed array area and therefore are away from higher vessel density. All static equipment will be appropriately lit and marked, and locations depicted on navigational/nautical charts and in Notice to Mariners, therefore, avoidance of anchor interactions should be possible.



The final details of the proposed activities including the timing, duration and final locations are not currently known and are dependent on when the MUL is granted, and the results of the geophysical survey and consultation with relevant bodies to inform the final survey locations. It is proposed however, that the following mitigation measures will be implemented in order to mitigate navigational risk to As Low As Reasonably Practicable (ALARP):

- Ongoing engagement with the Commissioner of Irish Lights, Marine Survey Office and the Irish Coast Guard;
- Marking, lighting, charting requirements and Statutory Sanction requirements will be agreed with Commissioner of Irish Lights;
- Compliance of all project vessels with international marine regulations i.e. COLREGs;
- Use of a FLO for engagement and communication with fishers;
- Engagement will be completed on a regular basis before, during and after site investigations take place;
- Close and ongoing liaison with ports and harbours where proposed activities are taking place within or close to port or harbour limits; and
- Promulgation of information including issuing of Notice to Mariners at agreed intervals.

As the proposed activities and disruption will be temporary and the spatial extent limited, when considered against the proposed mitigations the effect on shipping and navigation is expected to be negligible and ALARP.

6.10 Archaeology and Cultural Heritage

Archaeological and cultural heritage assets which may be located within the proposed Licence Area can be characterised into seabed prehistory, maritime archaeology, aviation archaeology, and intertidal heritage assets, each of which are considered in relation to the indicative locations of the Proposed Activities.

Other themes include the setting of known marine heritage assets and the historic seascape character in and around the area, although it is considered that these are not relevant to the Proposed Activities forming this application due to the temporary nature of the Proposed Activities.

Baseline data was collected using records of charted wrecks and monuments from the Irish Underwater Archaeological Unit (UAU) NMS online database for other maritime archaeological receptors including data from the Wreck Viewer and National Monument Viewer located in the Licence Area (see **Figure 6-11**).

Wessex Archaeology have been commissioned by CWPL to prepare an Underwater Archaeology Impact Assessment (UAIA) for the Array Site of CWP (Wessex Archaeology, 2023). Wessex Archaeology have advised on the content of this MULA and survey data collected within the proposed Licence Area as part of previous site investigation activities has also been used to inform the archaeology baseline herein.

The assessment of the marine cultural heritage baseline consisted of a desk-based assessment, a palaeogeographic assessment, and two separate assessments of the geophysical survey data previously collected within the Array Area and ECC, comprising sub-bottom profiler (SBP), sidescan sonar (SSS), magnetometer (Mag.) and multibeam echosounder (MBES) data sets (Wessex Archaeology, 2023).





6.10.1.1 Assessment of Potential Impacts to Archaeology and Cultural Heritage

The geophysical surveys are non-intrusive and will therefore will not harm any archaeological features of interest. They will, however, be subject to an application for an archaeological device survey licence. During intrusive Proposed Activities including geotechnical surveys, benthic surveys, and the deployment of FLSs, metocean survey equipment, and PODs, the following impacts may occur on both known and unknown assets:

- 1. Direct physical disturbance; and
- 2. Indirect physical disturbance.

The exact location of these intrusive activities will be informed by the geophysical survey in conjunction with previously gathered survey data. The geophysical survey will be used to finalise the locations of the intrusive Proposed Activities (and other activities where appropriate), particularly with reference to the geotechnical and benthic survey mobilisations and set out the location of any wrecks or other potential cultural heritage features within the Licence Area that will be avoided by those intrusive survey activities. Archaeological analysis and interpretation of the geophysical surveys, where appropriate, will be undertaken by a suitably qualified archaeology professional and submitted to UAU. Archaeological Exclusion Zones (AEZs) are proposed to be implemented around known wrecks at a distance of 100 m around the full extent of the asset, however the archaeological interpretation will be used to finalise the required mitigation measures including the final extent of the AEZs and other mitigation measures in consultation with UAU. Additional mitigation measures may be considered where AEZs are not sufficient, or to mitigate concern about impacts to unknown assets *e.g.*, agreeing and Protocol for Archaeological Discoveries (PAD) and/or ensuring that a qualified archaeologist is present during geotechnical sampling. With the implementation of the specified mitigation measures, the

Intertidal walkover surveys and metal detection surveys will be undertaken in the nearshore to identify areas for avoidance or additional mitigation required, particularly regarding investigations related to the OMB at Wicklow Harbour and the potential onshore substation location at Poolbeg. Further consideration of potential intertidal assets will be undertaken in discussion with UAU once proposed survey locations are determined, and where sampling is required, these areas will avoid known features of interest and will be agreed following discussion with UAU. The potential impact on pre-history assets are considered low but are subject to the final locations of the Proposed Activities. Again, once final locations of intrusive activities are known, further discussions including consideration of geophysical surveys and other relevant data sources will be undertaken with UAU to identify any requirements for further mitigation. Mitigation may include refinement of final locations, use of qualified archaeologists on surveys vessels, or retaining boreholes for further analysis.

Summary of Known and Potential Archaeological Receptors

Palaeogeographic Assessment

The assessment of the geophysical data within the study area resulted in the identification of a total of 32 features of palaeogeographic interest. These are summarised as follows:

- a total of six channels and one fine-grained deposit were identified as features of probable archaeological interest, either because of their palaeogeography or likelihood for producing palaeoenvironmental material; and
- a total of 25 cut and fills were identified as feature of possible archaeological interest.

As terrestrial features interpreted as being deposited during periods of known human occupation of Britain and Ireland, those features identified as features of probable archaeological interest, either because of its palaeogeography or likelihood for producing palaeoenvironmental material are considered of high archaeological potential. Those features identified as features of possible archaeological interest are considered of medium archaeological potential, partly due to the uncertainty of features formation and fill.

Based on a review of 12 boreholes acquired during a geotechnical survey undertaken in 2023 within the CWP Array Area, a sequence of Quaternary deposits was identified comprising the Upper Till of the Cardigan Bay Page **104** of **154**



Formation, the chaotic facies (Unit 2a) and prograded facies (Unit 2b) of the Western Irish Sea Formation and overlain by possible alluvial and fluvial sediments associated with submerged palaeochannel features. In few instances, these deposits are capped by intertidal to shallow marine gravelly sands and shell-rich modern seabed sediments.

In three boreholes recovered from the CWP Array Area in 2023, silty sands with organic wood fragments were recorded. Organic deposits are typically considered to be of high geoarchaeological and palaeoenvironmental potential, however, these fragments are detrital in nature and are likely reworked from a marginal environment in the wider area. Therefore, these deposits were assigned a low priority status.

A total of seven borehole logs from the Dublin Port Company (DPC) 2022 geotechnical survey within the South River Liffey were reviewed as part of the geoarchaeological assessment of the potential onshore substation location, with the aim of identifying deposits of potential archaeological significance. The archaeological potential of the recorded sediment sequences is judged to be low.

Seabed features – Array Area

The assessment of the geophysical data within the Array Area resulted in a total of 194 anomalies identified as being of possible archaeological interest. These are summarised as follows:

- a total of one anomaly was identified as an anthropogenic origin of archaeological interest;
- a total of 36 anomalies were identified as an anomaly of likely anthropogenic origin but of unknown date which may be of archaeological interest or a modern feature; and
- a total of 157 anomalies were identified as an anomaly of possible anthropogenic origin but interpretation is uncertain so this may be anthropogenic or a natural feature.

Seabed features – ECC

The assessment of the geophysical data collected in 2023 within the Licence Area resulted in a total of 260 anomalies identified as being of possible archaeological interest. These are summarised as follows:

- one anomaly was assigned identified as anthropogenic origin of archaeological interest;
- a total of 109 anomalies were identified as an anomaly of likely anthropogenic origin but of unknown date which may be of archaeological interest or a modern feature;
- a total of 148 anomalies were identified as an anomaly of possible anthropogenic origin but interpretation is uncertain so may be anthropogenic or a natural feature;
- one item, a recorded wreck, was identified as a historic record of possible archaeological interest with no corresponding geophysical anomaly; and
- one item, a recorded obstruction, was identified as a historic record of possible archaeological interest with no corresponding geophysical anomaly.

Intertidal heritage assets

There is one known maritime site located within the intertidal zone. This is the Ringsend wreck, and redeposited timbers from the wreck at four different locations. An intertidal walkover survey conducted in 2023 observed five new features, including parts of a carvel-built hull and possible associated timber elements. There is also potential for further unknown intertidal heritage to be located within the intertidal zone of the ECC.

Maritime and Aviation Archaeological Potential

There are a number of records consisting of reported wrecks or obstructions charted by the NMS within the Application Area (Figure 6-11) with 24 records protected under Section 3 of the 1987 Act, being over 100 years old.

There is also the potential for the presence of archaeological material of a maritime nature, currently uncharted, to exist within the Application Area. This is signified by the records of 78 Documented Losses within the NMS

Page 105 of 154



Wreck database. Documented Losses are records for ships or aircraft that are known to have wrecked or crashed offshore, but their remains on the seafloor have yet to be located. Recorded Losses are often grouped together by their general area of loss into Maritime Named Locations, and often relate to vessels reportedly lost or for which no physical wreck remains have ever been identified. There are a number of records relating to archaeological sites, artefacts, material and standing remains within the intertidal zone (to MHWS) of the Application Area.

Maritime Potential

There is potential for discoveries of previously unrecorded maritime craft from the Mesolithic to the modern period (Brady 2008, 13–47; Bolton 2012). There is little direct archaeological evidence of ships and boats from earlier periods, but there is indirect evidence for seafaring that includes the exploitation of marine resources and seaborne trade. Post-medieval and modern wrecks, as they were generally made of more substantial material, are more likely to have been discovered through surveys, and thus recorded in the archaeological record in Ireland. However, there is still potential for discovery of previously unrecorded wreck sites, particularly of wooden wrecks, broken up wrecks or partially buried wrecks that are more difficult to detect through geophysical survey.

The area around Dublin Harbour, which includes Poolbeg, has the highest concentration of wrecks in the Republic of Ireland (Brady 2008, 244).

Aviation Potential

There are no known aircraft crash sites recorded within the Licence Area, however there is potential for the discovery of previously unknown aircraft material.

There is potential for the presence of aviation material dating from the early 20th century until more recent times, with a concentration dating to the World Wars and in particular to the Second World War (Wessex Archaeology 2008). Discoveries may occur anywhere within the Licence Area. Aircraft crash sites are also difficult to identify through archaeological assessments of geophysical survey, although past experience indicates material from a crash site, such as engines or other material may be recorded as small obstructions or anomalies.

Summary of Potential Impacts to Archaeology and Cultural Heritage

In summary, there are a number of sites which have been identified within the Licence Area through previous survey activities as having the potential to be of archaeological importance. These identified sites will be considered and avoided through employment of AEZs during intrusive survey activities being conducted as part of this MUL.

The geophysical survey in conjunction with previously collected survey data will identify the location of any additional wrecks or other potential cultural heritage features in the Licence Area which were not previously surveyed, which will be identified, recorded and avoided by the intrusive survey activities. Thus, with regard to potential impacts 1 and 2, with the implementation of the specified mitigation measures (**Section 7**), the potential for disturbance on underwater or intertidal archaeology is considered to be negligible.

6.11 Population and Human Health

The primary interaction with the population will be with commercial and recreational fishing, commercial shipping, and recreational boating. The Proposed Activities at the proposed intertidal landfall area may result in temporary restrictions for recreational users of the shoreline, however only during survey activities which will be short term and temporary (< 12 hours) and access restrictions will be limited to the perimeter of the survey site. The resulting impact on the population is expected to be negligible as most of the activities are

Page 106 of 154



located at a distance from land. The Proposed Activities are highly localised, temporary, and the level of noise is not considered to be significantly greater than the baseline of vessel and traffic noise in the area.

6.11.1 Tourism and Recreation

The east coast of Ireland is a renowned location for recreational angling, with both onshore and vessel-based angling occurring here. The Proposed Activities have the potential to temporarily disrupt or displace vessel-based recreational angling. The impacts would be temporary and localised, and extensive alternate fishing grounds are available in the wider area. The inshore waters around the coast are used by recreational craft and the proposed intertidal landfall site is used for recreation, with limited recreational craft in the waters seawards of the Codling Bank. The use of exclusion zones around survey vessels in operation may disrupt or displace recreational craft, however these activities are localised and temporary in nature, and alternative areas are available for recreation. Mitigation measures including Notices to Mariners, appropriate navigation lights, and liaison with marinas and sailing clubs will be in place during and prior to the commencement of the Proposed Activities.

The Proposed Activities include an ecological intertidal walkover survey, an archaeological walkover survey, and trial pits at the intertidal landfall area. For safety and security public access to areas of the shoreline will be restricted over the duration of the trial pits (< 12 hours) or walkover surveys in the intertidal area. The perimeter of the activities in the intertidal area will be temporarily closed off to the public and appropriate barriers and signage will be in place to inform the public of the Proposed Activities and restrictions. The Proposed Activities will be temporary and short term in nature as will any related restrictions to recreational users of the shoreline. The effects on recreational users will be negligible, and no significant impacts are predicted.

It is considered there will be no significant impact on population or tourism as a result of the Proposed Activities.

6.12 Major Accidents and Disasters

The project location is not susceptible to earthquakes, subsidence, landslides, erosion, or flooding. The Licence Area is susceptible to fog and severe weather conditions.

The survey vessels and static equipment will be appropriate for the weather conditions likely to be experienced. The mitigation measures proposed, including adherence to strict maritime regulations and normal vessel operating standards and precautions will ensure the risk from severe weather or fog will not present environmental problems. With the implementation of the specified mitigation measures in **section 7**, the potential for any significant effects on major accidents as a result of the Proposed Activities will be negligible, therefore no significant impacts are predicted.

6.13 Climate

The Proposed Activities will be conducted over a relatively short timeframe and impacts due to climate change will not arise. The vessels and plant undertaking the Proposed Activities will use fossil fuels and will emit greenhouse gases. However, given the modest scale of the vessels proposed for use in conducting the Proposed Activities, and the nature of the vessels similar to those currently present and active within the Licence Area, the emission of greenhouse gases is not expected to be significant in the context of overall emissions in Ireland. Therefore, the potential for any significant effects on climate will be negligible and no significant impacts are predicted.

Page 107 of 154



6.14 Waste

All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. Adoption of routine measures and standard best practices in terms of waste management, auditing, pollution prevention measures and implementation of a dropped object protocol will prevent the unintentional release of any waste materials. All solid wastes will be retained on the vessels, returned to shore, and disposed of at a suitable licensed facility. Therefore, the potential for any significant effects due to waste will be negligible and no significant impacts are predicted.

6.15 Material Assets

The Proposed Activities will make use of existing port assets. The survey vessels and plant will use fuel and other consumables. Borehole drilling operations will produce drill cuttings consisting of the seabed material and other surveys will produce minimal waste. The vessels conducting the surveys will produce solid waste in small quantities as a part of normal vessel operations.

The port assets have ample capacity for all the survey operation requirements. Solid wastes will be retained on the vessels, returned to shore, and disposed of at a suitable licensed facility. The potential for any significant effects on material assets as a result of the Proposed Activities will be negligible, therefore no significant impacts are predicted.

6.16 Health, Safety, Environment and Quality (HSEQ) Management

All surveys carried out shall be carried out by competent contractors who will have safe systems of works prepared prior to starting the Proposed Activities and will be integrated with CWPs Health and Safety Protocols. CWPL will appoint a competent Project Supervisor Design Process (PSDP) and where required a Project Supervisor Construction Stage (PSCS) for the project under the requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (updated). The role of PSDP is to oversee the coordination of the design work & design changes during the project, identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project and work to eliminate the hazards or reduce the risks where possible. The PSDP must then communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the project safety and health plan. The role of PSCS is to manage and co-ordinate health and safety matters during the Proposed Activities operations phase and prepare the project health and safety plan.

6.16.1 Waste Management and Pollution Control

Survey vessels will operate under international standards according to the MARPOL (maritime pollution) Convention with respect to wastewater and food waste discharges. All refuse and waste materials will be kept onboard the vessel and safely disposed of onshore in a suitable licensed waste facility. Particular care will be taken when handling or storing hazardous materials, radiation sources or chemicals. These will be stored, handled, used, and documented in accordance with accepted guidelines, assessments, and recommendations of the Control of Substances Hazardous to Health (COSHH) Regulations 1994. Spill kits shall be available on board all vessels. All machinery or vehicles on the intertidal foreshore area will be fuelled on the hard-standing surface of a car park or road and at least 10m from a drain or gully. Spill kits will be available on site where machinery is operating, and any fluid leaks or spills will be cleaned up immediately. Staff welfare facilities such as a mobile welfare unit may also need to be provided on site. All waste from the borehole drilling operations will be removed from site by a permitted waste contractor and disposed of in a suitable licenced/permitted waste facility. Therefore, the potential for any significant effects due to waste will be negligible and no significant impacts are predicted.

Page 108 of 154


6.17 Interactions

The Proposed Activities outlined in this AIMU must also be considered in the context of other activities and potential plans, projects, and activities in the area. A review of available information was undertaken to assess the level of potential interaction. This included a review of planning consents, foreshore applications and maritime usage licence applications listed on the respective websites of An Bord Pleanála, the Department of Housing, Local Government and Heritage (DHLGH), relevant local authorities and MARA. The review is based on information contained on these sites up to the 15 May 2024. Other activities such as aquaculture, commercial fisheries, shipping and navigation (as described in **section 6**) were also considered.

The different activities considered included different site investigation works (*i.e.*, geophysical, geotechnical, environmental, ecological, and metocean) for various projects; capital and maintenance dredging, development of harbour and port infrastructure, installation of submarine cables, and construction of wastewater treatment plant long-sea outfalls.

The potential for these activities, plans, and projects to interact with the Proposed Activities described in this application was assessed based on their spatial and temporal overlap. A spatial buffer of 25 km from the boundary of the Licensed Area was applied to ensure a conservative approach was taken in assessing potential spatial overlap of activities. The effect of mitigation measures to control and manage the impact of the Proposed Activities as presented in **section 7** were also considered in assessing interactions.

The activities, plans, and projects which activities have a spatial and temporal overlap with the current AIMU application are listed below (**Table I**).

Page 109 of 154



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
FS007031	Statkraft North Irish Sea Array (NISA) Site Investigations	Louth	Site investigation works	Determined 2022	31/03/2021	Beginning 2022	2027 (5-year licence)	20.77	23.06	57.39
FS006915	Celtix Connect - Havhingsten Telecommunicati on Cable Dublin	Dublin	Installation and maintenance of a fibre-optic Havhingsten Telecommunications Cable - landing site is at Loughshinny, Fingal, Co Dublin.	Determined 2022	09/01/2020	April 2020 (works will take 7 days)	N/A	22.90	23.60	62.18
FS007029	Innogy - Site Investigation - Dublin Array at Kish and Bray Banks	Dublin	Site investigation works	Determined 2021	28/01/2021	2024	applying for a 5-year licence for metocean devices to be left out but other works will take 1wk - 6 month	0.22	0.49	40.67
FS007132	Maintenance Dredging in Dublin Port	Dublin	Dublin Port Company (DPC) need to carry out regular maintenance dredging of the navigation channel, basins and berthing pockets in order to maintain their advertised charted depths and hence provide safe navigation for vessels to and from the Port. Maintenance dredging campaigns are required	Determined (2022)	20/08/2020	This application is for DPC's maintenance dredging requirements to be carried out in 2022 to 2029.	2029	0.83	0.03	41.31

Table I: Project, plans, and activities with spatial and temporal overlap with the current AIMU application.

Page **110** of **154**



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			approximately every 18 months but may need to be carried out more regularly as a result of extreme weather events causing excessive siltation in the channel.							
FS006842	Rockabill Cable Systems Ltd	Dublin	Pre-installation survey, localised site investigations and installation of a subsea fibre optic cable	Determined (2019)	18/06/2018	10/06/2019	10/06/2054	17.21	17.74	56.92
FS006758	Techworks Marine	Dublin	Foreshore Lease/Licence application for placement of monitoring buoys in Dublin bay (buoys removed).	Completed	30/03/2017	03/08/2017	03/08/2022	0.00	9.18	35.47
FS006631	America Europe Connect Ltd	Dublin	Geophysical survey and localised site investigations for a subsea fibre optic cable. Donabate, Dublin	Determined 2018	09/08/2016	01/04/2018 (2 weeks of surveys)	01/04/2019	15.42	15.93	55.21
FS006241	Codling Wind Park Ltd	Wicklow	CWP old site investigations licence application	Consultation	13/11/2013	N/A	N/A	0.00	12.61	0.00
FS006077	Dun Laoghaire Rathdown Co.Co Dalkey Island	Dublin	Foreshore lease application for refurbishment works to the existing slipway and pier on Dalkey Island	Consultation / Approved subject to conditions 2014	13/02/2012	N/A	N/A	0.90	10.37	32.41

Page **111** of **154**



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
FS006192	Providence Resources P.L.C.	Dublin	Foreshore licence application for site investigation and exploratory well drilling	Determined 2013	24/11/2011	N/A	Surrendered 2013	0.00	10.11	13.81
FS006460	Codling Wind Park 11 Ltd	Wicklow	CWPII original foreshore lease for OWF	Applied	25/03/2009	N/A	N/A	0.00	30.15	8.12
FS004527	Eirgrid Plc - Rush	Dublin	Foreshore licence application for an Ireland - UK Submarine Electricity Interconnector	Determined (2010)	26/09/2008	09/11/2010	09/11/2109	20.80	21.50	60.18
FS006806	Dublin Port Company	Dublin	Foreshore lease application for the provision of a new Pontoon at Berth 50 to accommodate Dublin Port Company Tugboats	Determined (2019)	13/03/2018	21/02/2019	N/A	1.42	0.70	42.05
FS006713	Dun Laoghaire Harbour Company	Dublin	Foreshore Licence application for the provision & maintenance of existing moorings within Dun Laoghaire Harbour. Varied maintenance schedules from annually to every 4- 5yrs.	Consultation	17/08/2017	Applying for a 10-year licence	N/A	0.03	6.50	35.71
FS006497	Dublin Port Company Site Investigations	Dublin	Foreshore Licence application for geophysical and geotechnical marine based site investigation works, to support the design	Determined (2016)	03/09/2015	01/04/2016	01/04/2021	0.83	0.03	41.31



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			of new quay walls, jetties, land reclamations and capital dredging at Dublin Port, Co. Dublin							
FS006980	Dublin Port Company - Alexandra Basin Re- development	Dublin	This application is for DPC's maintenance dredging requirements to be carried out in 2020 and 2021.	Determined (2020)	13/07/2015	20/06/2016	20/06/2022	0.83	0.03	41.31
FS007132	Dublin Port Company - Maintenance dredging	Dublin	Foreshore Lease/licence application for Maintenance Dredging.	Determined (2022)	19/02/2021	2022-2029	2029	0.83	0.03	41.31
FS006495	Dublin Port Company - Maintenance dredging	Dublin	Foreshore Lease/licence application for Maintenance Dredging.	Determined (2016)	04/03/2015	08/05/2016	08/05/2019	0.83	0.03	41.31
FS007134	ESB Wind Development Limited (ESB)	Dublin	This application relates to the Site Investigation works only. These activities are required to inform: the overall project feasibility; the conditions at site and along the cable route; the various assessments required to progress the project; and the development of the project.	Consultation	23/11/2020	Q2/Q3 2022 or 2023	5-year licence period	0.00	2.74	21.78

Page 113 of 154



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
FS007163	Wicklow Sea Wind	Wicklow	Geophysical, geotechnical, environmental and metocean - license area 226.81km2	Public Consultation closed on 31.5.23	21/12/2021	Q2 2022- Q4 2024		2.04	38.55	6.72
FS007232	DP Energy Latitude 52		Geotechnical, geophysical, hydrographical, ecological and potential deployment of metocean devices - licence area 1036km2	Applied	22/12/2021	2024	5 year licence applied for	4.71	46.29	5.65
FS006843	Irish Water Greater Dublin Drainage	Dublin	Construction of a 5.232km pipeline and marine diffuser - marine license area 1.11km2	Applied	07/05/2020	Q1 2021 - Q4 2024 (not granted yet)	n/a	8.85	10.17	48.43
FS007261	Shelmalere	Wicklow/Wexfor d	Hydrological, geotechnical, geophysical, hydrographical, ecological and potential deployment of metocean devices - license area 639.66km2	Public consultation closed on 30.11.22	07/10/2021	2022	n/a	23.30	59.35	19.89
FS007330	Realt na Mara Offshore Wind Farm Limited	Louth	Geophysical, geotechnical, archaeological, ecological, metocean, benthic surveys - licence area 459.40km2	Applied	10/03/2022	2023-2025 (if granted)	n/a	0.00	0.70	13.63
FS007351	GDG deployment of 3 ADCP	Dublin	Acoustic doppler current profiler, trawl	Determined (2022)	21/10/2021	2022 (6 weeks)	n/a	0.00	45.63	22.79

Page **114** of **154**



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			resistant bottom mount unit							
FS007588	Wicklow Sea Wind (cable)	Dublin/Wicklow	geotechnical, geophysical and ecological - licence area 198.74	Public consultation closed 31.5.23	05/08/2022	Q2 2023- Q3 2024 (not yet granted) (24 months)	n/a	5.20	30.99	3.66
FS007367	Greystones (OWL) Windfarm	Dublin/Wicklow	Geotechnical, geophysical, environmental and metocean - licence area 251.13km2	Applied	27/06/2022	2023 - 2026 (not yet granted) (3 years)	n/a	0.00	0.70	25.67
FS007472	Mac Lir Offshore Wind Limited	Wicklow/Wexfor d	Geophysical, geotechnical and environmental	Applied	14/02/2023	(licence sought for 5 years)	n/a	0.00	0.69	12.76
FS007635	Mares Connect	Dublin/Louth	Geophysical, geotechnical and environmental - licence area 730.70km2	Public consultation closed 13.08.23	03/03/2023	multi-year licence sought	n/a	10.23	10.97	50.13
FS007583	Wicklow County Council Dredging	Wicklow	Dredging	Determined (2024)	19/06/2023	2024	2027 (3 year licence)	0.00	12.61	0.00
FS007555	Arklow Bank Wind Park	Dublin/Wicklow	Geophysical, geotechnical, ecological, metocean, corrosion survey consisting of microbial corrosion frame	Consultation	24/04/2023	Unknown	Unknown	7.14	50.57	10.07
FS007546	Codling I	Dublin/Wicklow	Geotechnical, geophysical and ecological and wind, wave and tidal measurements - licence area 556 km2	Determined – Approved (12/05/2023)	19/05/2022	Unknown. Currently inactive	5 years. Currently undergoing judicial review.	0.00	0.44	0.12



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
FS007031	NISA I	Dublin/Louth	Geotechnical, geophysical, ecological and metiocean monitoring - licence area 22689 hectares	Determined (6/12/21)	17/12/2019	2026	2026 (5 year licence)	20.77	23.06	57.39
FS006973	SSE Renewables Braymore Point	Dublin/Louth	Geophysical, geotechnical, metocean surveys, environmental surveys comprising a benthic - licence area 37160.65 hectares	Determined (22/01/21)	19/03/2019	2026	2026 (5 year licence)	55.70	55.17	96.06
FS006862	Arklow Waste Water Treatment Plant	Dublin	Construction of waste water treatment plant and associated works. Planning permission obtained	Determined (1/3/22)	06/06/2019	2026	2037 (35 year licence)	25.26	60.32	21.50
FS006788	Hiberian Wind Power, Kilmichael Point	Wicklow	Geophysical, geotechnical, archaeological, ecological and benthic	Determined (19/12/18)	21/11/2017	Not known	2023 (5 year licence)	23.35	62.52	21.70
LIC230001	North Irish Sea Array Windfarm Limited	Dublin/Louth	Hydrographical, and Geophysical, Geotechnical, Metocean, Ecology, Archaelogical and Water Quality Monitoring	Consultation	19/10/2023	Not known	7 year licence applied for	20.77	23.06	57.39
PWSDZ3406/ 22	Pembroke Beach DAC	Dublin	Redevelopment of former glass bottle site, phase 1b	Determined	08/02/2023	2023	22/04/2028	0.32	0.85	41.28
PWSDZ4121/ 21	Redevelopment of former glass bottle site	Dublin	Foreshore application in respect of the replacement of	Determined	31/08/2021	2023	2024	0.32	0.85	41.28



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			the existing fendering system at Carlisle Pier.							
PWSZD3270/ 19	Pembroke Beach DAC - Redevelopment of former glass bottle site	Dublin	Redevelopment of former glass bottle site. PERMISSION and RETENTION: Permission for development to amend the Parent Permission and for retention permission for development on a site of c. 15.06 hectares on lands known as the Former Irish Glass Bottle & Fabrizia Sites, Poolbeg West, Dublin 4	Determined	02/06/2022	2022	2027	0.32	0.85	41.28
PWSDZ3207/ 21	Pembroke Beach DAC	Dublin	Phase 2 of Phase 1	Determined	28/01/2022	2022	2030	0.32	0.85	41.28
4894/22	Dublin Port Company	Dublin	Port terminal redevelopment . PERMISSION & RETENTION: Development at this site which extends from Promenade Road to Alexandra Road and includes the western part of Circle K Fuel Terminal 1, part of Promenade Road at its junction with Terminal 10 Link Road (T10 Link Road), T10 Link	decided (additional information requested)	15/11/2022	2023	2028	1.11	0.34	41.66

Page **117** of **154**



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			Road, part of Tolka Quay Road, No. 1 Branch Road North and part of Alexandra Road. It also incorporates land comprising parts of Terminal 4 and Terminal 4 North, all at Dublin Port, Dublin 1.							
2804/19	E D & F Man Liquid Products Ireland Ltd - New Storage tank	Dublin	Planning permission for development at our existing molasses storage terminal at the corner of South Bank Road and Pigeon House Road, Ringsend, Dublin, D04 TC98. The development will consist of the construction of a new molasses storage tank within the existing bund at the existing molasses storage terminal.	Granted	18/07/2019	2019	2024	0.26	0.57	41.26
4483/19	Dublin Port Company - Port terminal redevelopment	Dublin	The proposed development will consist of the demolition of 10 no. redundant buildings (c. 6830sqm) and removal of temporary structures including portacabins and general site clearance (an existing substation and pump house will	Decided (grant permission)	18/11/2019	2020	2025	1.11	0.34	41.66

Page 118 of 154



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			remain in situ) to optimise the use of the site as a multi- functional storage yard (primarily for heavy goods vehicles) and facilitate wider infrastructural upgrades to provide additional capacity within the Port.							
4507/18	Dublin Port Company - Port terminal redevelopment	Dublin	The development will consist of temporary permission for 5 years for facilities to cater for cruise ship operators to include: a marquee (c.2,250sq.m) 8m in height, 300 car parking spaces, bus and car drop off area, fencing 2m in height, mini-roundabout, 6m access off Tolka Quay Road and all associated site development works at Tolka Quay Road; and; a marquee (c.1750sq.m) c.8m in height at Ocean Pier.	Decided (grant permission)	20/03/2019	2019	2024	1.11	0.34	41.66
3649/17	Dublin Port Company	Dublin	Port terminal redevelopment	Decided (grant permission)	21/11/2017	2018	2023	1.11	0.34	41.66

Page **119** of **154**



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
ABP-304888- 19	Dublin Port Company - MP2 Project	Dublin	Jetty development	Granted with conditions	11/07/2019	2020	2035 (15 year licence)	1.11	0.34	41.66
S0004-01	Dublin Port Company - Dredge disposal	Dublin	The application is for the disposal of a maximum of 4,000,000 tonnes of dredge material (consisting of a mixture of sediments predominately silt sand mix) from maintenance dredging from Dublin Port fairway, basins and berths.	Granted	01/10/2009	2011	2017 (6 year dumping)	2.85	9.61	39.04
S0024-02	Dublin Port Company - Dredge disposal	Dublin	The proposed capital dredging activities form an integral part of Dublin Port Companys MP2 Project (ABP- 304888-19). The MP2 Project complements the Alexandra Basin Redevelopment (ABR) Project (29N.PA0034), which is currently under construction, in providing capacity for growth in the Roll On Roll Off (Ro-Ro) and Load On Load Off (Lo-Lo) modes on the north side of the port and at its eastern end in addition to providing suitable	Granted 27/07/2022	04/08/2020	2022	Possibly 2028	2.85	9.61	39.04

Page **120** of **154**



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			infrastructure for increasing numbers of ferry passengers. No expiry date							
N/A	3FM Project	Dublin	The 3FM Project is Dublin Port Company's (DPCs) third and final Masterplan Project which qualifies as a Strategic Infrastructure Development (SID). It focuses on development in the south port area, known as the Poolbeg Peninsula, which contains nearly one-fifth of the Dublin Port estate.	In planning	n/a	n/a	n/a	2.85	9.61	39.04
FS007180	Tech Works Marine Ltd Data Buoy Deployment	Dublin	Deployment of a small Data Buoy with multiple environmental (non- acoustic) sensors to test communications technology for data acquisition.	Granted with conditions 07/ 05/2024	18/05/2023	2025	2029 (5 years)	0.29	7.56	34.67
FS007188	Dublin Array	Dublin	Site Investigations for the proposed Dublin Array Offshore Wind Farm	Granted with conditions 13/ 01/2023	01/10/2021	2024	2026 (5 years)	0.00	0.43	4.77
LIC230028	Iarnród Éireann / Irish Rail	Dublin/Wicklow	A Geotechnical Investigation (GI) and Geophysical site investigation surveys to inform design options for the	Applied	n/a	2025	n/a	0.00	2.65	38.71

Page 121 of 154



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
			proposed East Coast Rail Infrastructure Protection Projects (ECRIPP). The purpose of ECRIPP is to implement protection measures to at risk sections of the Dublin to Wexford railway line from the effects of climate change and coastal erosion.							
LIC230016	Microsoft Ireland Operations Ltd.	Dublin	Geophysical survey and site investigations for a proposed subsea fibre optic cable having a landfall in Dublin Port, County Dublin Port, County Dublin and to evaluate options for the route traversing Dublin Bay, across the Irish Sea to Anglesey, Wales.	Consultation	n/a	2025	n/a	0.82	0.83	41.01
LIC230018	Microsoft Ireland Operations Ltd	Dublin	Geophysical survey and site investigations for a proposed subsea fibre optic cable having a landfall in Portmarnock, County Dublin to evaluate options for the route traversing the Irish Sea to Abergele, Wales.	Consultation	n/a	2025	n/a	10.63	10.79	49.86



Application codes	Applicant	County	Description	Status	Date Received	Expected Start Date	Licence Expires	Distance from Licence Area Boundary	Distance from Potential Onshore Substation Location	Distance from OMB
LIC230007	Dublin City Council	Dublin	DCC Environmental survey and ground investigation works in order to inform the design of proposed Point Bridge and Tom Clarke Widening Project.	Applied	n/a	2025	n/a	1.51	1.99	42.26
MAC2023001 2	Kish Offshore Wind & Bray Offshore Wind	Dublin	ORE Operations and Maintenance facility at St. Michael's Pier, Dun Laoghaire Harbour. 60-70m pontoon; access gangway; demolition of existing RoRo ramp and part removal of existing fender structure	Applied	n/a	2025	n/a	0.66	6.42	35.48
MAC2023001 3	Codling Wind Park	Wicklow	Amendment to existing MAC (2022- MAC-006)	Applied	n/a	unknown	45 years	0.00	0.00	0.00

Page 123 of 154



Having further considered the nature (extent, duration and management measures) of these consented and planned activities it was concluded that their potential to interact negatively with the Proposed Activities outlined in the current MULA is low to negligible.

For certain other activities such as commercial fisheries and navigation and marine transport which do overlap with the Licensed Area, a number of measures will be included to manage and control the level of interaction between these activities and the Proposed Activities. These mitigation measures are detailed in **section 7** and include, amongst other things, the appointment of a fisheries liaison officer (appointed April 2020), the creation of a dedicated Commercial Fisheries Management strategy, ongoing engagement with local stakeholders, issuing of marine notices, and other means to inform stakeholders of upcoming activities. Furthermore, all of the Proposed Activities will be undertaken in compliance with international convention and best practice including compliance with the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) (International Maritime Organisation, 1972) and the International Convention for the Safety of Life at Sea (SOLAS) regulations.

In addition, initial consultations have already commenced with bodies such as the Marine Survey Office of the Department of Transport and the Commissioners of Irish Lights and these consultations will continue with these and other relevant public bodies during the operation of the Proposed Activities. The purpose of these consultations will be to ensure that any potential negative interactions between the Proposed Activities and other maritime users will be managed and controlled to minimise their effects.

It can be concluded therefore that with the adoption of these actions and measures and the other measures outlined in **section 7** that the potential for the Proposed Activities to interact negatively on other activities in the vicinity of the Licensed Area is low.

6.17.1 In-combination effects on European sites

The in-combination effects of other plans and projects considered to have potential to cause in-combination effects on European sites will be considered in the NIS which will be produced to accompany this MUL application upon receipt of the MARA screening determination. Therein it will be determined if they are likely to have a significant effect in-combination with the Proposed Activities on the integrity of a European site.

Page 124 of 154



7 MITIGATION MEASURES

The potential impacts on the receiving environment from the activities proposed under this Licence Application were identified above. A summary of all mitigation measures proposed is provided in Table J below. Several of these mitigation measures are expanded upon in section 7.1 – 7.6 below.

Table J: Summar	y of the pro	oosed mitigation	measures for th	e Proposed Activities.
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Section	Mitigation
Land &Soils	No impacts expected thus no mitigations proposed.
Water	The vessels conducting the surveys will use fuels and carry lubricants <i>etc.</i> , which have the potential to be harmful to the environment, however, compliance with the MARPOL Convention on Marine Pollution, and normal vessel operating standards and precautions, will ensure the risk of a release of the aforementioned contaminants is low.
Biodiversity Benthic/Intertidal	Geophysical survey data will identify any area which can be considered reef, and these will be avoided by intrusive survey/sampling techniques (benthic grab, epibenthic beam trawl, geotechnical studies, metocean, POD) or be sampled by DDV for benthic surveys.
	Ensure all vessel jack-up operations associated with geotechnical survey works, or placement of metocean devices are positioned to avoid any known reef features (identified from the geophysical survey).
	All borehole operations will use water or biodegradable polymer-based drilling muds only.
	In order to remove the risk of introducing invasive-non-native species, all relevant project vessels will adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Ballast Water Management Convention) and the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (resolution MEPC.207(62)).
	All work undertaken in the intertidal by tracked vehicles will avoid the <i>Zostera</i> sp. dominated community, the boundary of which will be delineated through an intertidal survey of the area prior to such work commencing.
	Movement of tracked vehicles in the intertidal will be restricted to the minimum number of access tracks necessary to achieve the proposed sampling. This will reduce areas affected by compaction allowing rapid recovery of the small receiving area after the cessation of the work, ensuring the natural condition of the feature is maintained.
	Proposed Activities on the intertidal using a tracked vehicle will be overseen by an Ecological Clerk of Works.

Page 125 of 154



Section	Mitigation
	Any trial pits excavated will be reinstated as soon as practical to do so (< 12 hours).
	To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures, and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always.
Biodiversity Marine Mammals including Otters	Mitigation measures will be implemented for all audible sources where there is potential for instantaneous TTS or PTS onset (USBL, SBP, UHRS and check-shot logging). Mitigation measures based on those detailed in the 'Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters' (DAHG, 2014) will be employed (refer to Annex IV Risk Assessment for full PAM details). In addition, DAHG (2014) guidance recommends the implementation of mitigation measures for drilling activities. A full post-survey report will be provided to the National Parks and Wildlife Service (NPWS). This report will contain details of all pre-start surveys conducted, marine mammal detections, and any action taken, and how and when the sound-emitting equipment was used.
	Surveys to determine whether or not otter holts are present will be undertaken within suitable habitat up to 100 m landward of the high-water mark in the area of the Proposed Activities. The survey would be completed prior to non-mobile Proposed Activities commencing within any area 100 m seaward of the highwater mark. In the event that a holt is discovered, work will not proceed within 100 m of the holt until any further mitigation or licensing requirements are agreed with NPWS.
	In order to ensure no adverse effects on marine mammals resulting from littering or pollution associated with the Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures, and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always.
	A full post-survey report will be provided to the National Parks and Wildlife Service (NPWS). This report will contain details of all pre-start surveys conducted, marine mammal detections and any action taken, and how and when the sound-emitting equipment was used.
	Due to the low level of potential risk resulting from the geophysical surveys (comparatively low energies involved, the high directionality of the sound source and the proximity to the sound source to the seabed compared to true seismic surveys), the monitored zone for use of relevant geophysical survey and positioning equipment (UHRS, seismic bore-hole) will be 500 m (rather than 1,000 m).

Page **126** of **154**



Section	Mitigation
	Due to the low level of potential risk resulting from the geophysical surveys (comparatively low energies involved; the high directionality of the sound source and the proximity to the sound source to the seabed compared to true seismic surveys), the period over which ramp up procedures (for the UHRS) will be conducted over 20 minutes (rather than 40 minutes). This will reduce the total duration of noise emissions into the marine environment during the Proposed Activities.
Biodiversity	No Proposed Activities within South Dublin Bay and River Tolka Estuary SPA during the period of October to March, inclusive.
Birds	Key species: Waterbirds and waders
	For intertidal benthic habitat surveys within South Dublin Bay and River Tolka Estuary SPA, should works be undertaken during mid-July to September, activities will be avoided during the hours in which roosting terns may be present. This would be between one hour before the end of civil dusk and one hour after the start of civil dawn.
	Key species: Roseate, common and Arctic terns
	For intertidal geotechnical and archaeology surveys within South Dublin Bay and River Tolka Estuary SPA, should works be undertaken during mid-July to September, activities will be avoided during the hours in which roosting terns may be present. This would be between one hour before the end of civil dusk and one hour after the start of civil dawn. These works may, however, continue into crepuscular and nocturnal periods on the condition that an Ecological Clerk of Works determines that no potentially roosting terns are present within 200 m of any areas in which those activities are to be undertaken during any particular nocturnal or crepuscular period. This would include within 200 m of ingress and egress routes to work areas. Should potentially roosting terns be present within a 200 m vicinity, no works would be undertaken within that area after one hour before the end of civil dusk until one hour after the start of civil dawn. Key species: Roseate, common and Arctic terns
	No works will be undertaken north of the Great South Wall, within Dublin Port, the channel of the River Liffey or the Tolka Estuary part of the South Dublin Bay and River Tolka Estuary SPA, during the period of mid-April to mid-July, inclusive. Key species: Roseate, common and Arctic terns
	To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always.

Page **127** of **154**



Section	Mitigation
Biodiversity Fish	To prevent marine litter and pollution events arising from Proposed Activities, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures, and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always.
Commercial Fisheries & Aquaculture	A FLO will be in place prior to and during commencement of Proposed Activities, (appointed in April 2020 and working on an ongoing basis).
	In the unlikely event of fishing gear becoming entangled with vessel or survey equipment, CWPL will follow their gear damage claim process, and will compensate where appropriate. If gear removal is required from the entire site to allow the survey to be completed, compensation agreements with local fishermen may be required, the methodology of said agreement will be subject to government compensation framework(s) (if/when applicable), and what is agreed within the Seafood ORE WG coexistence subgroup. If an agreement cannot be achieved initially, CWPL will follow a dedicated dispute resolution mechanism as established by the Seafood ORE working group. The Dispute Resolution Mechanism (DRM) is a tool to be used, where and when appropriate, to assist with resolving matters of disagreement related to specific interactions between the Seafood and ORE sectors.
	A dedicated Commercial Fisheries Mitigation and Management Strategy will be developed as part of the project's planning application.
	Continued engagement with fishers and relevant associations will be carried out, keeping them up to date on any planned works within the area. This will include harbour and quayside visits and information sessions and will be attended by the FLO and the wider CWPL project team. As part of fisheries engagement, CWPL will follow the principles as set out in the Seafood / ORE Engagement Guidelines. This is a best practise summary guide on Seafood / ORE Engagement in Ireland and is intended to provide ORE projects and seafood stakeholders with guidance on how to engage and co-exist in a meaningful and constructive manner throughout the lifecycle of an ORE Project. The content of the guidance is consistent with more detailed information contained in its parent document, Seafood / ORE Engagement in Ireland - A Guide for Good Practice
	In addition, CWPL will carry out engagement through consultation with lead fisheries organisations and with the wider fishing community. Engagement activities will include: face-to-face meetings, online meetings, regular project leaflets, and information sessions.
	Compliance with Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) (IMO, 1972) and International Convention for the Safety of Life at Sea (SOLAS) regulations.

Page **128** of **154**



Section	Mitigation				
	Circulation of information via Marine Notices, Radio Navigational Warnings, NAVTEX, and/or broadcast warnings in advance of and during Proposed Activities. Information will also be circulated to local ports, harbours, and marinas in the area. The notices will include a description of the work being carried out.				
	Pre-scouting surveys will be in place to look for any fishing gear ahead of the survey vessel entering the area.				
	To prevention marine litter and pollution events arising from Proposed Activities and having an adverse effect on aquaculture and shellfish, all vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. This will involve adoption of routine measures and standard best practice in terms of waste management, auditing, pollution prevention measures and implementation of a dropped object protocol. Oil and fuel shall be stored securely in bunded containers. Chemicals will be stored securely, and good housekeeping practices will be adhered to always.				
Air Quality	No impacts expected thus no mitigations proposed.				
Landscape and Seascape	No impacts expected thus no mitigations proposed.				
Marine Traffic & transport	The survey contractors and vessels will be similar to those that are currently used in the market for similar surveys, and that are used to being responsible for complying with international and national statute as appropriate.				
	S.I. No. 507/2012 - Merchant Shipping (Collision Regulations) (Ships and Watercraft on the Water) Order 2012:				
	 Sea Pollution Act 1991 which transposes into Irish statute the requirements of the International Convention for the Prevention of Marine Pollution from Ships (MARPOL 73/78); 				
	Sea Pollution (Amendment) Act, 1999 - which gives effect to the International Convention on;				
	 Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC); 				
	S.I. No. 372/2012 - Sea Pollution (Prevention of Pollution by Garbage from Ships) Regulations 2012; and				
	• S.I. No. 492/2012 - Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) Regulations 2012.				
	Arrangements will be made for the publication of a formal Marine Notices through the Department of Transport and the notice will provide vessel and contact details together with a general description of operations and approximate dates of marine survey commencement and completion, deployment timing, and location of fixed monitoring equipment.				

Page **129** of **154**



Section	Mitigation
	During the survey operations and deployment and recovery of fixed monitoring equipment, other vessels will be requested to maintain a safe distance from the survey vessels due to the restricted manoeuvrability and the layback of survey equipment towed behind the survey vessels.
	Survey Vessel speed will be of the order of 8 knots during surveys.
	Lights, shapes, and other internationally recognised identification or warning signals will be displayed on survey vessels and any fixed monitoring equipment deployed to the surface.
	The vessels will comply fully with all requirements of the International Regulations for Preventing Collisions at Sea.
	There will be close and ongoing liaison with Ports and Harbours where Proposed Activities are taking place within or close to port/harbour limits. Any Proposed Activities will be consulted upon with Dublin Port in advance to mitigate impacts on marine traffic. Similarly, Wicklow County Council and relevant marine stakeholders within Wicklow Harbour will be consulted upon in advance of any Proposed Activities taking place within the harbour.
	The Harbour Master at both Dublin, Dún Laoghaire, and Wicklow ports will be informed of the Proposed Activities and of the planned start and estimated completion dates for the operation. Regular updates shall be provided.
	Statutory Sanction approval for deployment of static equipment will be obtained from Commissioners of Irish Lights. The Statutory Sanction process will be informed by a more detailed NRA once final locations of activities are known (as informed by geophysical surveys where appropriate). Mitigation measures identified as part of the NRA process will be agreed with Commissioner of Irish Lights.
	Lighting and marking requirements will be agreed with the Commissioner of Irish Lights prior to commence of the Proposed Activities/deployment of equipment. Statutory Sanctions will be applied where required and agreed with the Commissioner of Irish Lights.
	Use of a Fisheries Liaison Officer for engagement and communication with fishers
	Charting requirements will be agreed with Department of Transport, Tourism, and Sport and the Marine Survey Office.
Archaeological and Cultural Heritage	Where cultural heritage assets may potentially be subject to direct or indirect impacts, AEZs will be implemented to prevent potential impacts from anchoring of survey vessels, sample retrieval, and moorings.
	Exclusion zones of a least 100 m will be established around sites identified as being of high vulnerability, while an exclusion zone of a minimum 50 m will be established around those of medium vulnerability. For features identified as an 'anomaly of likely anthropogenic origin but of unknown date which may be of archaeological interest or a modern feature' and an 'anomaly of

Page **130** of **154**



Section	Mitigation
	possible anthropogenic origin but interpretation is uncertain which may be anthropogenic or a natural feature', no AEZs are recommended.
	Although no AEZs have been assigned to any of the intertidal heritage assets, avoidance should be ensured to any heritage assets that are likely to be impacted, via further archaeological investigation and / or archaeological excavation.
	All new geophysical survey data will be subject to archaeological analysis and submission to the UAU prior to commencement of intrusive survey works. This will be used to refine and finalise any mitigation measures required. Note – geophysical survey data has already been gathered under previous licences and this data will be used to inform geotechnical locations.
	Should further survey or investigation confirm the nature and characteristics of an identified asset then an AEZ can be maintained or removed as appropriate and in consultation and agreement with National Monuments Service.
	The implementation and monitoring (where appropriate and agreed) of the AEZs will be undertaken.
	In order to mitigate the risk of damage to any previously unrecorded archaeological remains a PAD will be prepared to mitigate impacts in the event of any unexpected archaeological discoveries during the surveys. This protocol will also include appropriate archaeological briefings for all personnel involved in the activities associated with the Proposed Activities.
	Should it not be possible to avoid sites of cultural heritage interest, a full programme of archaeological investigation, which may include diver survey or ROV investigation, will be undertaken to identify the nature and extent of these sites. Subject to these investigations an appropriate mitigation strategy will be agreed with NMS.
	An Underwater Archaeological Impact Assessment (UAIA) report which includes a summary assessment of the geophysical data shall be forwarded to National Monuments Service of the Department of Housing, Local Government and Heritage for review and approval prior to the geotechnical works taking place.
	Device permits to be in place for all geophysical survey equipment.
	Following the completion of all archaeological work on site and any necessary post- excavation specialist analysis, the National Monuments Service shall be furnished with a final archaeological report describing the results of the monitoring and any subsequent required archaeological investigative work/excavation required. All resulting and associated archaeological costs shall be borne by the developer.
	Qualified archaeologists will be used to carry out the surveys.
	Retaining of borehole samples for further analysis. Retention timeframes will be agreed with the UAU.

Page 131 of 154



Section	Mitigation
Population and Human Health (incl. Tourism and	Mitigation measures including Notices to Mariners, appropriate navigation lights, and liaison with marinas and sailing clubs will be in place.
Recreation)	Where investigation activities occur near shore areas used for public recreation, the perimeter of the site will be closed to the public (<12 hrs). Appropriate barriers and signage will be in place to inform the public of the activities for safety purposes and due to the short-term nature of the Proposed Activities.
Major Accidents and Disasters	Strict maritime regulations, normal operating standards and safety precautions, employment of FLOs, issuance of Notices to Mariners alerting the vessels in the area of the Proposed Activities, and a navigation risk assessment will ensure the risk of an accident will be minimal.
	The survey vessels and static equipment will be appropriate for the weather conditions likely to be experienced. The mitigation measures proposed, including adherence to strict maritime regulations and normal vessel operating standards and precautions will ensure the risk from severe weather or fog will not present environmental problems.
Climate	No impacts expected thus no mitigations proposed.
Waste	All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention.
	Adoption of routine measures and standard best practices in terms of waste management, auditing, pollution prevention measures and implementation of a dropped object protocol will prevent the unintentional release of any waste materials.
	All solid wastes will be retained on the vessels, returned to shore, and disposed of at a suitable licensed facility.
	All solid wastes will be retained on the vessels, returned to shore, and disposed of at suitably licensed facilities.
HSEQ	During the course of the Proposed Activities CWPL shall ensure that all necessary precautions are put in place to protect the public in accordance with relevant Health and Safety Legislation.
	CWPL will appoint a competent PSDP and where required a Project Supervisor Construction Stage for the project under the requirements of the Safety, Health, and Welfare at Work (Construction) Regulations 2013 (updated).
	CWPL will provide accurate positional information of the location of test equipment well in advance of the commencement of any deployment. This information will be submitted to the Marine Survey Office, to the Commissioners of Irish Lights, the Irish Coast

Page **132** of **154**



Section	Mitigation
	Guard and local shipping interests including harbour authorities, fishing cooperatives and local sailing clubs. In addition, ferry operators should also be advised of such activity including commencement and completion dates. Navtext and radio broadcast warnings frequency to be agreed in advance with the Irish Coast Guard. All of the above parties will be advised of any variations/amendments throughout the Proposed Activities process.
	All vessels undertaking survey works will adhere to MARPOL requirements, which provide an international standard for the safe management and operation of ships for pollution prevention. All refuse and waste materials will be kept on board vessels and safely disposed of onshore in a suitable licensed waste facility.
	Particular care will be taken when handling or storing hazardous materials, radiation sources or chemicals. These will be stored, handled, used, and documented in accordance with accepted guidelines, assessments and recommendations of the COSHH Regulations 1994. Spill kits shall be available on board all vessels.
	All machinery or vehicles on the intertidal landfall area will be fuelled on the hard-standing surface at least 10 m from a drain or gully. Spill kits will be available on site where machinery is operating, and any fluid leaks or spills will be cleaned up immediately.
	Staff welfare facilities such as a mobile welfare unit may need to be provided on site.
Interactions	A FLO will be in place prior to and during commencement of Proposed Activities, (appointed in April 2020 and working on an ongoing basis).
	The creation of a dedicated Commercial Fisheries Management strategy, ongoing engagement with local stakeholders, issuing of marine notices, and other means to inform stakeholders of upcoming activities
	All of the Proposed Activities will be undertaken in compliance with international convention and best practice including compliance with the COLREGS 1972 (IMO, 1972) and the International Convention for the SOLAS regulations.
	Initial consultations have already commenced with bodies such as the Marine Survey Office of the Department of Transport and the Commissioners of Irish Lights and these consultations will continue with these and other relevant public bodies during the operation of the Proposed Activities. The purpose of these consultations will be to ensure that any potential negative interactions between the Proposed Activities and other maritime users will be managed and controlled to minimise their effects.

Page 133 of 154



7.1 Condition Compliance

Any conditions applied to the Maritime Usage Licence, if granted, will be adhered to by all parties involved in the delivery of the programme of Proposed Activities. Contractors, and their subcontractors, will be made aware of all conditions and project specific requirements and will be required to have briefings on these to ensure all parties are aware of these requirements.

Page 134 of 154



8 CONCLUSION

The EIA Screening exercise described in section 4 of this report concluded that the Proposed Activities are not subject to the EIA Directive. An EIA is therefore not required.

This Assessment of Impacts of Maritime Usage report should be read in conjunction with the following reports submitted in support of the Licence Application:

- Supporting Information for Screening of Appropriate Assessment (SISAA)
- Risk Assessment for Annex IV Species

The purpose of this AIMU is to provide a desktop-based survey to inform the scope of works and provide baseline information on the receiving environment and on environmental aspects such as population and human health, biodiversity, water, air, climate, socio-economic activities (commercial fisheries, aquaculture, marine traffic, tourism and recreation, material assets, and other proposed developments), archaeology and cultural heritage, landscape and seascape, and major accidents and disasters. For the reasons detailed in this AIMU report under the topics described above, in light of the best scientific knowledge available, all aspects of the Proposed Activities which, by itself or in combination with other activities, plans, and projects, may affect the receiving environment have been considered.

The Proposed Activities have been considered with regard to the WFD, EIA Directive, and MSFD. Based on the information set out in this report and in the accompanying documents, this AIMU concludes that, due to the nature, scale and location of the Proposed Activities and proposed mitigation measures, there are no foreseeable significant effects on the environment likely to arise from the Proposed Activities, individually or in combination with other plans and projects.

Page 135 of 154



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Page 141 of 154





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Page 142 of 154



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APPENDICES

Page 143 of 154



APPENDIX A LICENCE AREA COORDINATES

ID	Latitude	Longitude	X (ITM)	Y (ITM)	ID	Latitude	Longitude	X (ITM)	Y (ITM)
1	53.34077	-6.19854	719963.4	733794.9	250	53.341905	-6.196966	720065.0	733923.9
2	53.340711	-6.198601	719959.5	733788.2	251	53.341927	-6.197006	720062.3	733926.2
3	53.340703	-6.198609	719959.0	733787.4	252	53.34194	-6.197024	720061.0	733927.6
4	53.340697	-6.198615	719958.6	733786.7	253	53.341959	-6.19705	720059.2	733929.7
5	53.340693	-6.198619	719958.3	733786.2	254	53.341994	-6.197067	720058.0	733933.5
6	53.340689	-6.198624	719958.0	733785.8	255	53.342012	-6.197092	720056.3	733935.5
7	53.340685	-6.198629	719957.7	733785.3	256	53.342019	-6.197107	720055.3	733936.3
8	53.34068	-6.198635	719957.3	733784.7	257	53.342018	-6.197153	720052.2	733936.1
9	53.340676	-6.19864	719956.9	733784.3	258	53.342009	-6.197176	720050.7	733935.0
10	53.340671	-6.198648	719956.5	733783.7	259	53.341996	-6.197194	720049.5	733933.6
11	53.340667	-6.198654	719956.1	733783.2	260	53.341982	-6.197213	720048.3	733932.0
12	53.340663	-6.19866	719955.6	733782.8	261	53.34197	-6.197226	720047.5	733930.6
13	53.340659	-6.198667	719955.2	733782.3	262	53.341954	-6.197248	720046.0	733928.8
14	53.340653	-6.198677	719954.6	733781.7	263	53.341947	-6.197276	720044.2	733928.0
15	53.340648	-6.198687	719953.9	733781.1	264	53.341944	-6.197297	720042.8	733927.6
16	53.340644	-6.198694	719953.4	733780.7	265	53.341944	-6.197298	720042.8	733927.6
17	53.340641	-6.198701	719953.0	733780.3	266	53.341943	-6.197302	720042.5	733927.5
18	53.340637	-6.198709	719952.5	733779.8	267	53.341941	-6.197349	720039.4	733927.2
19	53.340633	-6.198717	719951.9	733779.4	268	53.341936	-6.197389	720036.7	733926.5
20	53.34063	-6.198725	719951.5	733779.0	269	53.341922	-6.197449	720032.8	733925.0

Table K: Coordinates of Licence Area.

Page 144 of 154


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45 5	53.340577	-6.199458	719902.8	733771.9	294	53.341694	-6.198187	719984.3	733898.3
46 5	53.340583	-6.199572	719895.1	733772.4	295	53.341851	-6.198123	719988.1	733915.9
47 5	53.340587	-6.199622	719891.8	733772.8	296	53.34199	-6.198066	719991.5	733931.4
48 5	53.340592	-6.199691	719887.2	733773.2	297	53.342122	-6.198007	719995.1	733946.2
49 5	53.340589	-6.199692	719887.1	733772.9	298	53.342225	-6.197969	719997.3	733957.7
50 5	53.340592	-6.199713	719885.8	733773.2	299	53.342276	-6.197952	719998.3	733963.4
51 5	53.340599	-6.199763	719882.4	733773.8	300	53.342276	-6.197961	719997.7	733963.5
52 5	53.340635	-6.200003	719866.3	733777.5	301	53.342365	-6.19794	719998.8	733973.4
53 5	53.340678	-6.20028	719847.7	733781.8	302	53.342361	-6.197885	720002.5	733973.0
54 5	53.340702	-6.200443	719836.8	733784.2	303	53.34236	-6.197702	720014.7	733973.2
55 5	53.340745	-6.200739	719817.0	733788.5	304	53.342355	-6.19714	720052.2	733973.6
56 5	53.340791	-6.201061	719795.5	733793.1	305	53.342309	-6.197145	720051.9	733968.5
57 5	53.340796	-6.201095	719793.2	733793.6	306	53.342238	-6.197155	720051.4	733960.5
58 5	53.340889	-6.201053	719795.7	733804.0	307	53.342226	-6.196932	720066.4	733959.6
59 5	53.340884	-6.201014	719798.3	733803.4	308	53.342297	-6.196921	720066.9	733967.5
60 5	53.340849	-6.200781	719813.9	733799.9	309	53.342308	-6.196919	720067.0	733968.8
61 5	53.340823	-6.200617	719824.9	733797.3	310	53.302534	-6.126156	724894.7	729665.0
62 5	53.340791	-6.200397	719839.7	733794.1	311	53.302626	-6.126106	724897.8	729675.3
63 5	53.34077	-6.200254	719849.2	733792.0	312	53.302633	-6.126141	724895.4	729676.1
64 5	53.340752	-6.200136	719857.1	733790.3	313	53.302542	-6.126191	724892.3	729665.8
65 5	53.340734	-6.200012	719865.4	733788.4	314	53.302557	-6.126279	724886.5	729667.4
66 5	53.340722	-6.199925	719871.2	733787.2	315	53.302529	-6.126786	724852.7	729663.3
67	53.340713	-6.199865	719875.3	733786.3	316	53.302607	-6.127014	724837.3	729671.6
68 5	53.340707	-6.199819	719878.4	733785.8	317	53.302625	-6.127201	724824.8	729673.3

Page 146 of 154



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Page 147 of 154

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93	53.340737	-6.198744	719949.8	733790.9	342	53.319529	-6.20585	719536.0	731419.4
94	53.340744	-6.198735	719950.4	733791.6	343	53.320923	-6.205696	719542.3	731574.7
95	53.340748	-6.198729	719950.8	733792.2	344	53.321004	-6.20571	719541.2	731583.8
96	53.340754	-6.198721	719951.3	733792.8	345	53.321614	-6.20582	719532.2	731651.4
97	53.340759	-6.198713	719951.9	733793.4	346	53.322167	-6.205919	719524.0	731712.8
98	53.340773	-6.198699	719952.8	733794.9	347	53.323495	-6.206046	719511.8	731860.4
99	53.340787	-6.198686	719953.6	733796.5	348	53.324996	-6.206412	719483.3	732026.7
100	53.340797	-6.198677	719954.1	733797.7	349	53.327202	-6.207919	719376.7	732269.6
101	53.340801	-6.198673	719954.4	733798.2	350	53.32912	-6.208469	719334.7	732482.1
102	53.34081	-6.198666	719954.9	733799.1	351	53.330332	-6.209005	719295.7	732616.0
103	53.340821	-6.198658	719955.4	733800.3	352	53.332058	-6.210342	719201.8	732805.8
104	53.340828	-6.198652	719955.7	733801.2	353	53.332752	-6.210664	719178.4	732882.6
105	53.340837	-6.198646	719956.1	733802.2	354	53.333398	-6.211441	719124.9	732953.2
106	53.340849	-6.198637	719956.7	733803.6	355	53.334103	-6.212623	719044.2	733029.6
107	53.340856	-6.198632	719957.0	733804.3	356	53.33445	-6.212888	719025.6	733067.7
108	53.340866	-6.198624	719957.5	733805.4	357	53.334452	-6.212882	719026.0	733068.0
109	53.340873	-6.19862	719957.7	733806.2	358	53.334875	-6.212813	719029.4	733115.2
110	53.340882	-6.198615	719958.0	733807.2	359	53.335292	-6.212546	719046.0	733162.0
111	53.340895	-6.198609	719958.4	733808.8	360	53.337177	-6.209731	719228.2	733376.4
112	53.340914	-6.1986	719959.0	733810.9	361	53.336726	-6.208585	719305.8	733328.1
113	53.340938	-6.198586	719959.8	733813.5	362	53.336541	-6.208138	719336.0	733308.4
114	53.340973	-6.198572	719960.7	733817.4	363	53.335826	-6.202388	719721.0	733238.4
115	53.341029	-6.198547	719962.1	733823.7	364	53.335826	-6.202387	719721.0	733238.5
116	53.341052	-6.198536	719962.8	733826.3	365	53.335654	-6.20041	719853.2	733222.6

Page 148 of 154



117	53.341059	-6.198532	719963.1	733827.1	366	53.335649	-6.200353	719857.0	733222.1
118	53.341129	-6.198505	719964.7	733834.9	367	53.335636	-6.200213	719866.4	733220.9
119	53.341238	-6.198461	719967.3	733847.1	368	53.335124	-6.195245	720198.7	733172.3
120	53.341308	-6.198434	719968.9	733855.0	369	53.335043	-6.194753	720231.6	733164.1
121	53.341333	-6.198424	719969.5	733857.7	370	53.33496	-6.19342	720320.6	733157.1
122	53.341365	-6.198367	719973.2	733861.4	371	53.334792	-6.192062	720411.6	733140.7
123	53.341379	-6.198341	719974.9	733863.0	372	53.334249	-6.18767	720705.6	733087.7
124	53.341401	-6.198303	719977.4	733865.5	373	53.333784	-6.183908	720957.4	733042.3
125	53.341401	-6.198301	719977.5	733865.5	374	53.332825	-6.18454	720918.1	732934.6
126	53.341275	-6.198328	719976.1	733851.4	375	53.332809	-6.183393	720994.5	732934.8
127	53.341272	-6.198329	719976.0	733851.2	376	53.333627	-6.18286	721027.6	733026.7
128	53.341265	-6.198243	719981.7	733850.5	377	53.334844	-6.17698	721415.8	733172.1
129	53.341261	-6.198245	719981.6	733850.0	378	53.334953	-6.176455	721450.5	733185.0
130	53.341233	-6.198257	719980.9	733846.9	379	53.336888	-6.167099	722068.0	733416.3
131	53.341204	-6.198269	719980.2	733843.7	380	53.339611	-6.137237	724048.7	733770.7
132	53.341183	-6.198278	719979.7	733841.3	381	53.33074	-6.104195	726275.0	732841.7
133	53.341158	-6.198288	719979.1	733838.5	382	53.285756	-6.028919	731426.5	727972.8
134	53.34113	-6.1983	719978.3	733835.3	383	53.149997	-5.933343	738235.0	713049.7
135	53.341107	-6.198309	719977.8	733832.8	384	53.149999	-5.883338	741579.3	713147.7
136	53.341096	-6.198314	719977.5	733831.5	385	53.159677	-5.883337	741547.5	714224.3
137	53.341093	-6.198315	719977.4	733831.2	386	53.159677	-5.665523	756111.2	714677.3
138	53.341092	-6.198316	719977.4	733831.2	387	52.979544	-5.667927	756602.8	694633.7
139	53.341057	-6.19833	719976.5	733827.2	388	52.979544	-5.922672	739498.5	694107.9
140	53.341012	-6.19835	719975.3	733822.1	389	52.98862	-5.922673	739469.1	695117.6

Page 149 of 154



53.340962 -6.198372 719974.0 733816.5 390 53.062597 -5.938412 738175.9 703316.8 141 142 53.340954 -6.198375719973.8 733815.6 391 53.247141 -6.069822 728815.5 723602.3 143 53.340942 -6.19838 719973.5 733814.3 392 53.247248 -6.069817 728815.5 723614.2 53.340902 -6.198397 719972.5 733809.8 393 728815.6 723623.3 144 53.24733 -6.069813 53.269903 145 53.340882 719972.0 733807.6 394 -6.068647 728825.5 726136.7 -6.198405146 53.340865 -6.198412 719971.6 733805.7 395 53.276792 -6.073785 728462.2 726894.0 147 53.340865 -6.19842 719971.1 733805.7 396 53.2816 -6.081997 727900.2 727414.1 148 53.340864 -6.198428 719970.6 733805.6 397 53.282525 -6.09005 727360.5 727502.7 149 53.340863 -6.198437719970.0 733805.4 398 53.286749 -6.099817726696.8 727955.2 150 53.340862 -6.198441 719969.7 733805.3 399 53.294572 -6.115868 725603.7 728797.3 151 53.34086 -6.198445 719969.4 733805.1 400 53.300024 -6.123567 725074.6 729390.3 152 53.340858 -6.198449 719969.2 733804.9 401 53.300703 -6.123952 725047.0 729465.2 153 53.340856 -6.198452 719969.0 733804.6 402 53.300856 -6.124125 725034.9 729481.8 154 53.340852 -6.198455 719968.8 733804.2 403 53.301008 -6.124287 725023.7 729498.5 155 53.340847 -6.198461 719968.4 733803.6 404 53.301175 -6.124478 725010.5 729516.7 405 156 53.340822 -6.198486 719966.8 733800.8 53.301363 -6.12468 724996.5 729537.3 157 53.340774 -6.198536 719963.6 733795.3 406 53.301543 -6.124879724982.7 729557.0 158 53.34077 -6.19854719963.4 733794.9 407 53.301595 -6.124932 724979.0 729562.6 159 733968.8 53.342308 -6.196919720067.0 408 53.301737 -6.125086 724968.3 729578.2 733968.5 160 53.342305 -6.196857 720071.1 409 53.301797 -6.125151 724963.8 729584.7 161 53.342193 -6.194005 720261.3 733960.9 410 53.301952 -6.125317 724952.3 729601.7 162 53.342143 -6.194002 720261.7 733955.3 411 53.302115 -6.125489 724940.4 729619.6 163 53.34214 -6.194122 720253.7 733954.7 412 53.302224 -6.125602 724932.5 729631.5 164 53.342064 -6.194117 720254.3 733946.3 413 724919.5 53.302401 -6.125789 729650.8

Page 150 of 154



165 53.342067 -6.193989 720262.7 733946.9 414 53.302412 -6.125817 724917.7 729652.1 166 53.341327 -6.193897720271.0 733864.7 415 52.981312 -6.041036 731545.5 694081.0 167 53.341251 -6.193887 720271.8 733856.3 416 52.981358 -6.040848 731558.0 694086.4 53.341225 720272.1 733853.4 417 -6.040081 731610.3 694054.2 168 -6.193884 52.981055 169 53.341178 -6.193883720272.3 733848.1 418 -6.040005 731615.9 694038.9 52,980916 170 53.341178 -6.193897 720271.4 733848.1 419 52.980849 -6.039658 731639.4 694032.1 171 53.341179 -6.193987 720265.4 733848.1 420 52.980801 -6.039669 731638.8 694026.6 172 53.341182 -6.194115 720256.9 733848.2 421 52.980599 -6.037998731751.7 694007.3 173 53.341182 -6.194129720255.9 733848.2 422 52.980703 -6.035459731921.8 694023.6 174 53.341196 -6.194822 720209.8 733848.6 423 52.981038 -6.034915 731957.3 694061.8 175 53.3412 -6.195024720196.3 733848.7 424 52.981324 -6.034597 731977.8 694094.2 425 176 53.341236 -6.195037720195.3 733852.6 52.981357 -6.034564 731979.9 694097.9 177 53.34124 -6.195039 720195.2 733853.1 426 52.981398 -6.034607 731976.9 694102.4 178 53.341277 -6.195059 720193.7 733857.2 427 52.981398 -6.034607 731976.9 694102.4 52.981263 179 53.341304 -6.195079 720192.3 733860.1 428 -6.034952 731954.2 694086.7 429 180 53.341337 -6.195112 720190.0 733863.8 52.981224 -6.035839 731894.7 694080.8 181 53.34134 -6.195119 720189.6 733864.1 430 52.981386 -6.0371 731809.5 694096.5 182 53.341348 -6.195137 720188.3 733864.9 431 52.981693 -6.038228 731732.8 694128.6 183 733866.1 53.341359 -6.195139 720188.2 432 52,982128 -6.038943731683.6 694175.7 184 733870.3 53.341397 -6.195146 720187.6 433 52.982712 -6.039477 731645.9 694239.6 185 53.341418 -6.195162 720186.5 733872.7 434 52.982715 -6.039479 731645.7 694239.9 53.341426 186 -6.195153 720187.0 733873.6 435 52.983219 -6.037281 731791.8 694300.1 187 53.34146 -6.195175 720185.5 733877.3 436 52.983241 -6.037182 731798.4 694302.7 188 53.341476 720185.7 733879.1 437 52.983241 -6.037182 731798.4 694302.7 -6.195171

Page 151 of 154



2.0 5.3 0.2 7.0
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Page 152 of 154



213 53.341905 -6.195293 720176.4 733926.7 462 52.98142 -6.033134 732075.7 694107.5 214 53.341904 -6.195329720174.0 733926.5 463 52,981293 -6.033027 732083.3 694093.6 215 53.341893 -6.195337 720173.5 733925.3 464 52.981054 -6.033061 732081.7 694067.0 216 -6.195373 720171.1 733925.1 -6.033061 732081.8 694064.1 53.341892 465 52.981028 217 -6.195393 720169.8 733924.9 466 52.980815 -6.03352 732051.6 694039.5 53.341891 218 53.341894 -6.19544 720166.6 733925.2 467 52.9808 -6.033685 732040.6 694037.6 219 53.34189 -6.195512 720161.8 733924.6 468 52.980676 -6.033732 732037.8 694023.7 220 53.341895 -6.195574 720157.7 733925.1 469 52.980582 -6.034041 732017.3 694012.6 221 53.341901 -6.195613720155.0 733925.7 470 52.980565 -6.034352731996.5 694010.2 222 53.341909 -6.195662 720151.8 733926.5 471 52.980555 -6.034574 731981.7 694008.7 223 52.98041 53.341913 -6.195749 720146.0 733926.7 472 -6.034544 731984.1 693992.6 224 733926.4 473 53.34191 -6.195785 720143.6 52.980165 -6.034967 731956.5 693964.6 225 53.341894 -6.195834720140.4 733924.6 474 52.980222 -6.035481 731921.8 693970.0 226 53.341894 -6.195877 720137.5 733924.4 475 52.980223 -6.035492 731921.0 693970.1 227 53.341899 -6.195891 720136.6 733925.0 476 52.98023 -6.035493 731921.0 693970.9 733924.8 477 228 53.341898 -6.195899720136.0 52.980234 -6.035527 731918.7 693971.2 229 53.341895 -6.195926720134.3 733924.5 478 52.980256 -6.035715 731906.0 693973.3 230 53.3419 -6.195956 720132.3 733925.0 479 52.980265 -6.035814 731899.3 693974.2 231 733925.2 53.341902 -6.195964 720131.7 480 52,980306 -6.036567731848.6 693977.3 232 720130.4 733924.8 53.341899 -6.195984 481 52.980289 -6.036808 731832.5 693974.9 233 53.341901 -6.196017 720128.2 733925.0 482 52.980285 -6.03748 731787.4 693973.3 234 720126.4 53.341901 -6.196043 733924.9 483 52.980302 -6.037694 731772.9 693974.8 235 53.341895 -6.196061 720125.3 733924.3 484 52,980418 -6.038497 731718.7 693986.3 236 53.341894 -6.196077 720124.2 733924.1 485 52.980531 -6.039604 731644.0 693996.7

Page 153 of 154



237	53.341893	-6.196108	720122.1	733923.9	486	52.980577	-6.040235	731601.5	694000.7
238	53.341893	-6.196116	720121.6	733923.9	487	52.980664	-6.040585	731577.7	694009.8
239	53.341894	-6.196134	720120.4	733924.0	488	52.9807	-6.04073	731567.9	694013.5
240	53.341895	-6.196177	720117.6	733924.1	489	52.980671	-6.040838	731560.7	694010.1
241	53.341904	-6.196229	720114.0	733925.0	490	52.980738	-6.041103	731542.7	694017.1
242	53.341912	-6.196264	720111.7	733925.8	491	52.981007	-6.041551	731511.8	694046.2
243	53.341908	-6.196416	720101.6	733925.0	492	52.981023	-6.041528	731513.3	694047.9
244	53.341901	-6.196431	720100.6	733924.3	493	52.981026	-6.041524	731513.6	694048.3
245	53.34191	-6.196453	720099.1	733925.3	494	52.981045	-6.041557	731511.3	694050.4
246	53.341908	-6.196652	720085.9	733924.7	495	52.981069	-6.041569	731510.4	694053.0
247	53.341901	-6.196749	720079.5	733923.7	496	52.981175	-6.041623	731506.5	694064.7
248	53.341901	-6.196876	720071.0	733923.5	497	52.981303	-6.041074	731542.9	694079.9
249	53.341896	-6.196934	720067.1	733922.9	498	52.981312	-6.041036	731545.5	694081.0

Page 154 of 154