Environmental Impact Assessment Report



Volume 3: Offshore Chapters

Chapter 20 Infrastructure and Other Users









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20. Infrastructure and Other Users

20.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of likely significant effects arising from the North Irish Sea Array (NISA) Offshore Wind Farm (hereafter referred to as the 'proposed development') in relation to offshore Infrastructure and Other Users (hereafter referred to as I&OU) in the vicinity of the proposed development during the construction, operation and decommissioning phases.

This chapter sets out the methodology followed (Section 20.2), describes the baseline environment (Section 20.3) and summarises the main characteristics of the proposed development which are of relevance to I&OU (Section 20.4), including any embedded mitigation. Potential impacts and relevant receptors are identified, and an assessment of likely significant effects on I&OU is undertaken, details of which are provided (Section 20.5).

Additional mitigation measures are proposed to mitigate and monitor these effects if required (Section 20.6) and any residual likely significant effects are then described (Section 20.7). Transboundary effects are considered (Section 20.8) with cumulative effects are considered in Section 20.9 and are summarised in Chapter 38 Cumulative and Inter-Related Effects (hereafter referred to as the 'Cumulative and Inter-Related Effects Chapter'). The chapter then provides a reference section (Section 20.10).

The EIAR also includes the following:

- Detail on the competent experts that have prepared this chapter is provided in Appendix 1.1 in Volume 8;
- Detail on the extensive consultation that has been undertaken with a range of stakeholders during the development of the EIAR is set out in Appendix 1.2; and
- A glossary of terminology, abbreviations and acronyms is provided at the beginning of Volume 2 of the EIAR.

A detailed description of the proposed development including construction, operation and decommissioning is provided in Volume 2, Chapter 6: Description of the Proposed Development – Offshore (hereafter referred to as the 'Offshore Description Chapter') and Volume 2, Chapter 8: Construction Strategy – Offshore (hereafter referred to as the 'Offshore Construction Chapter').

The assessment should be read in conjunction with the following linked EIAR chapters within Volume 3:

- Chapter 10: Marine Geology, Oceanography and Physical Processes (hereafter referred to as the Physical Processes chapter);
- Chapter 11: Marine Water and Sediment Quality (hereafter referred to as the Marine Water and Sediment Quality chapter);
- Chapter 13: Fish and Shellfish Ecology (hereafter referred to as the Fish and Shellfish chapter);
- Chapter 16: Commercial Fisheries (hereafter referred to as the Commercial Fisheries chapter);
- Chapter 17: Shipping and Navigation (hereafter referred to as the Shipping and Navigation chapter);
- Chapter 19: Aviation and Radar (hereafter referred to as the Aviation and Radar chapter);

This chapter should also be read alongside:

- Volume 4, Chapter 22: Water (hereafter referred to as the Water chapter);
- Volume 5, Chapter 29: Seascape, Landscape and Visual (hereafter referred to as the Seascape, Landscape and Visual chapter);
- Volume 5, Chapter 31: Resource and Waste Management (hereafter referred to as the Resource and Waste chapter);

- Volume 5, Chapter 33: Socio-Economic, Tourism and Recreation (hereafter referred to as the Tourism and Recreation chapter); and
- Volume 9, Chapter 17.1: Navigational Risk Assessment (hereafter referred to as the NRA).

All figures within this chapter are presented within Volume 7A.

20.2 Methodology

20.2.1 Introduction

The assessments of I&OU are consistent with the EIA methodology presented in Volume 2, Chapter 2: EIA and Methodology for the preparation of an EIAR (hereafter referred to as the EIAR Methodology Chapter)

The following types of I&OU receptors are considered within this chapter:

- Cables and pipelines;
- Aggregate extraction or resource areas;
- Dredging and dumping at sea (DaS) sites;
- Defence and security;
- Marine recreational activity;
- Wastewater treatment and disposal;
- Oil and gas infrastructure;
- Aquaculture sites;
- Wave and tidal projects;
- Carbon capture, utilisation and storage (CCUS) and natural gas storage;
- Other offshore wind farms (OWFs) and marine renewable energy projects; and
- Nuclear cooling and intake systems

If a receptor is deemed not to occur and/or not have influence within the proposed development study area (based on the premise that there are no relevant or licensed activities), this has been detailed within the baseline environment and the receptor has not been considered further.

The proposed development is considering two project options within the planning application and in the EIAR, as set out in the Offshore Description Chapter. The assessment of potential impacts on I&OU receptors is based on the project option considered to have the greatest magnitude of impact as identified from the parameters described in the Offshore Description Chapter and Offshore Construction Strategy.

Throughout this chapter, only those I&OU receptors (or activities) that are active and operational or those receptors/activities that are licensed and/or under construction, and are within the study area, have been considered as receptors. Other existing and/or approved projects which may interact cumulatively with the proposed development on I&OU receptors/activities have been assessed within the Cumulative Effects Assessment.

Cumulative effects have been assessed by taking into consideration future plans, projects and activities (see the Cumulative and Inter-Related Effects Chapter) that are in the study area which have the potential to affect the same receptors.

20.2.2 Study Area

The I&OU study area was initially identified at the proposed development scoping stage, in line with Department of Communications, Climate Action and Environment (DCCAE) (now the Department of the Environment, Climate and Communications; DECC) Guidance (DCCAE, 2017) (See Appendix 2.1: Scoping Report). The extent of the study area has since been refined to the maximum extents of indirect impacts.

The offshore elements of the proposed development consist of the array area and ECC below the high-water mark (HWM), and are collectively referred to as the offshore development area. The study area for the I&OU assessment is based on the tidal excursion zone and specifically sediment plume pathways and covers the offshore elements of the proposed development plus a 12km buffer around the offshore development area. The buffer is limited to the marine and coastal environment falling below the HWM and is presented in Figure 20.1. Sediment deposition is considered to be the most likely effect to have an impact on I&OU and the defined buffer of 12km is considered precautionary and accounts for all likely significant effects on I&OU receptors. Details of this variability are provided in the Physical Processes chapter and Marine Water and Sediment Quality chapter.

20.2.3 Relevant Guidance and Policy

This section outlines guidance and policy specific to I&OU, including best practice guidelines.

Overarching guidance on EIA is presented in the EIAR Methodology chapter. Furthermore, policy applicable to the proposed development is detailed in Volume 2, Chapter 3: Legal and Policy Framework.

The assessment of likely significant effects upon I&OU and this EIAR chapter has been prepared in reference to the following relevant legislation and guidance:

- The Offshore Renewable Energy Development Plan (OREDP) (DCCAE, 2014);
- Draft Offshore Renewable Energy Development Plan II (OREDP II) (DECC, 2023);
- The Convention on the International Regulations for Preventing Collisions at Sea (1972);
- The Foreshore and Dumping at Sea (Amendment) Act (2009);
- The United Nations Convention on the Law of the Sea (UNCLOS);
- The Submarine Telegraph Act (1885); and
- The Water Pollution Act (1977)

The key National Marine Planning Framework (NMPF) policy that is applicable to the assessment of I&OU is summarised in Table 20.1. NMPF policies are addressed in their entirety in Appendix 3.1: NMPF Compliance Report.

Table 20.1 Key NMPF policies relevant to the assessment

Policy Name	Policy Description	Where addressed
National Marine Planning Framework (2021)	Defence and Security Policy 1 Any proposal that has the potential to interfere with the performance by the Defence Forces of their security and non-security related tasks must be subject to consultation with the Defence Organisation. Proposals should only be supported where, having consulted with the Defence Organisation, they are satisfied that it will not result in unacceptable interference with the performance by the Defence Forces of their security and non-security related tasks.	Defence and security are discussed in Section 20.3.2.5 and in the Aviation and Radar Chapter.
	Petroleum Policy 2 Proposals potentially affecting future potential activity in areas subject to existing petroleum authorisations should avoid sterilisation for future petroleum-related activity consistent with Government policy.	Existing oil and gas infrastructure is discussed in Section 20.3.2.9.

Policy Name	Policy Description	Where addressed
	ORE Policy 8 Proposals for ORE must demonstrate consideration of existing cables passing through or adjacent to areas for development, making sure ability to repair and carry out cable-related remedial work is not significantly compromised. This consideration should be included as part of statutory environmental assessments where such assessments are required.	Existing cables are discussed in Section 20.3.2.3.
	Safety at Sea Policy 1 Proposals for installation, operation, and decommissioning of Offshore Wind Farms must demonstrate how they will minimise navigational risk between commercial vessels arising from an increase in the density of vessels in maritime space as a result of wind farm layout; and allow for recreational vessels within the Offshore Wind Farm (including consideration of turbine height) or redirect recreational vessels, minimising navigational risk arising between recreational and commercial vessels.	Recreational vessels are discussed in Section 20.3.2.7.
	Safety at Sea Policy 3 All proposals for temporary or permanent fixed infrastructure in the maritime area must ensure navigational marking in accordance with appropriate international standards and ensure inclusion in relevant charts where applicable.	Consultation with CIL is discussed in Appendix 1.2. Safety at sea is considered in the Shipping and Navigation Chapter.
	Safety at Sea Policy 4 Establishing, changing or disestablishing Aids to Navigation (AtoN) must be sanctioned, in advance of works, by the Commissioners of Irish Lights (CIL).	Consultation with CIL is discussed in Appendix 1.2. Safety at sea is considered in the Shipping and Navigation
	Safety at Sea Policy 5 Proposals must identify their potential impact, if any, on Maritime Emergency Response (Search and Rescue (SAR), Maritime Casualty and Pollution Response) operations. Where a proposal may have a significant impact on these operations it must demonstrate how it 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, supported by parties responsible for maritime SAR.	Chapter.
	Sport and Recreation Policy 2 Proposals should demonstrate the following in relation to potential impact on recreation and tourism: the extent to which the proposal is likely to adversely impact sports clubs and other recreational users, including the extent to which proposals may interfere with facilities or other physical infrastructure; the extent to which any proposal interferes with access to and along the shore, to the water, use of the resource for recreation or tourism purposes and existing navigational routes or navigational safety; and the extent to which the proposal is likely to adversely impact on the natural environment.	Marine recreational activities are considered in Section 20.3.2.7. Impacts on tourism are considered in the Tourism and Recreation Chapter.

20.2.4 Data Collection and Collation

This assessment of I&OU is based on the data sources that are listed within Table 20.2. This assessment has not required further site-specific survey work, as receptor information and data for this topic can be collected through desk-based study and consultation with relevant stakeholders.

A desk-based review of available data sources was undertaken to identify detail on I&OU within the study area, using existing literature and online resources, including publicly available Geographic Information Systems (GIS) data, found in Table 20.2. Studies have been undertaken in parallel with consultation and meetings with specific stakeholders (as required) to obtain a detailed understanding of the receiving environment and potential impacts. For the identified receptors, impacts have been considered throughout the construction, operational and decommissioning phases of the proposed development. A large amount of contextual information regarding I&OU within the study area is already available and is provided in Table 20.2. This information has been developed into a detailed characterisation of the receiving baseline environment and forms the basis for the assessment for the purposes of the EIAR.

Consultation with operations and licensing bodies has also been undertaken to establish the current status of known and planned I&OU within the study area. Existing and planned licences have been identified and a timeline for future activities associated with the existing or planned infrastructure has been established to support the assessment of likely significant effects and cumulative effects.

The data used is the most up to date publicly available information supported by information provided by the relevant operators during consultation as detailed in Appendix 1.2: Consultation Report. Where consultation has not been undertaken or has been limited, desk-based information has been used. It is considered that data employed are of a robust nature and sufficient for the purposes of describing the baseline of activity in the vicinity of the proposed development.

Baseline data have been prepared to inform the impact assessments using the best available data at the time of writing this chapter. The data and charts are the most up to date information publicly available, and they are, therefore, considered appropriate and sufficient for the purposes of the EIA.

Table 20.2 Existing data sources relevant to I&OU that have been collected through desk-based studies and reviews

Data name and source	Data type, description, and link	
Subsurface structures		•
Offshore Energy Exploration Wells – Petroleum Affairs Division (PAD) of the DCCAE (now the Geoscience Regulation Office of the DECC) accessed through Ireland's Marine Atlas.	These data contain details of offshore wells that have been drilled into the seas surrounding Ireland, including the study area. https://data.gov.ie/en_GB/dataset/exploration-wells-in-the-irish-offshore Data from Ireland's Marine Atlas. https://atlas.marine.ie/#?c=54.1496:-8.6902:7	Full coverage of the study area
The Integrated Petroleum Affairs System (Department of Communications, Energy and Natural Resources, DCENR; now DECC)	Location and status of offshore wells and authorisations from the Petroleum Affairs Division of the Department of Communication, Energy and Natural Resources. http://gis.dcenr.gov.ie/internetIPAS/servlet/internet/IPAS2IHome	
Buoys and moorings (non-navigational	D	
The Irish Marine Data Buoy Observation Network accessed through Marine Institute.	The locations of buoys associated with the Irish Marine Data Buoy Observation Network are available through the Marine Institute. <u>https://www.marine.ie/site-area/data-services/real-time-observations/irish-marine-data-buoy-observation-network</u>	Full coverage of the study area
Marine Plan Ireland	Locations of offshore energy and buoy infrastructure. https://www.marineplan.ie/?page=Activities-Map-%28BETA%29	Full coverage of the study area
Subsea cables and pipelines		
The Kingfisher Cable Awareness Chart (Irish Sea) – Offshore Renewable & Cable Awareness (KIS-ORCA)	Location of telecoms, power, out of service and renewable line cables as well as some other infrastructure across the Irish Sea. https://kis-orca.org/map/	Full coverage of the study area
The Submarine Cable Map from TeleGeography	Location and status of active and planned submarine cables. https://www.submarinecablemap.com/	Full coverage of the study area
North Sea Transition Authority (NSTA) – United Kingdom Continental Shelf (UKCS) Lease Agreements (2022)	NSTA Offshore Infrastructure Pipelines and Offshore Wind Farm (OWF) cables with connection to the UK. <u>https://www</u> .nstauthority.co.uk/the-move-to-net-zero/interactive-energy-map-for-the-ukcs/ Map:	Partial coverage of the study area

Data name and source	Data type, description, and link		
	https://www.arcgis.com/apps/webappviewer/index.html?id=cb3474a78df24139b1651908ff8c8975		
Gas Networks Ireland Pipeline Map (formerly known as Bord Gáis Éireann)	Map of gas pipelines and connections throughout Ireland and relevant Interconnector pipelines. This map includes details of existing pipelines, pipelines owned by other companies, interconnection points, entry point, renewable gas entry points and decommissioned entry points.		
	https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/		
Dredging and Dumping at Sea (DaS)			
Foreshore Licence Applications. Department of Housing, Local Government and Heritage	Foreshore application documents https://www.gov.ie/en/collection/f2196-foreshore-applications-and-determinations/	Full coverage of the study area	
Dumping at Sea (DaS) locations. The Environment Protection Agency (EPA) accessed through Ireland's Marine Atlas.	The responsibility of DaS permitting is with EPA who regulate what and how much material can be dumped at sea. Location data: https://atlas.marine.ie/#?c=53.8460:-13.3594:6	Full coverage of the study area	
	Metadata: https://epawebapp.epa.ie/terminalfour/DaS/index.jsp		
Defence and security			
Irish Aviation Authority	Data on the military practice and danger areas in and around Ireland. Location: https://www.iaa.ie/	Full coverage of the study area	
Other marine renewable energy	•	1	
Global Offshore Wind Farms Map and Database	The most significant database and accompanying map of the locations and status of OWF globally. The most recent project status is listed including if the project is at planning, construction, operational or decommissioning stage as well as when surveys have been undertaken/will be undertaken.	Full coverage of the study area	
	https://map.4coffshore.com/offshorewind/		
Tethys	Website on the environmental effects of wind and marine renewable energy.	Full coverage of the study area	
	nttps://tetnys.pnni.gov/		

Data name and source	Data type, description, and link		
Marine recreational activities			
Sailing Irish Sailing	Irish sailing clubs.	Full coverage of the study area	
	https://www.sailing.ie/Cruising/Cruising-Clubs-and-Associations		
SCUBA diving Diving Ireland	Archive of dive sites around Ireland.	Full coverage of the study area	
	https://diving.ie/dive-sites/		
Surfing Surfline	Website of surf forecasting and reports.	Full coverage of the study area	
	https://www.surfline.com/surf-reports-forecasts-cams-map		
Recreational boating	Ports and harbours for recreational boating.	Full coverage of the study area	
Eoceanic	https://eoceanic.com/sailing/harbours/europe/ireland/dublin/		
Kitesurfing Kiteforum	Kitesurf locations.	Full coverage of the study area	
	https://se.kiteforum.com/kitesurf/country/Ireland		
Kitesurfing Extreme Nomads	Information about kitesurf locations in Ireland, directed from <u>https://kitesurfingireland.ie/</u> .	Full coverage of the study area	
	https://extremenomads.life/kitesurfing-in-ireland-best-spots/		
Angling Angling Ireland	Dublin sea fishing map https://fishinginireland.info/sea/east/dublin/	Partial coverage of the study area	
	Boyne Valley coastal area map		
	https://fishinginireland.info/sea/east/drogheda/		
Wildlife boat trips Boattrips.ie	List of boat trips, tours, cruises and sea safaris in Ireland	Full coverage of the study area	
L L	https://boattrips.ie/list-of-all-boat-tours-trips-in-ireland/		
Wastewater treatment and disposal		I	
Licensed waste facility locations. EPA accessed through Ireland's Marine	Waste licences are the responsibility of the EPA, and these licences integrate all environmental media associated with the waste management site.	Full coverage of the study area	
Auas.	Location data:		

Data name and source Data type, description, and link		Spatial coverage
	https://atlas.marine.ie/#?c=53.8460:-13.3594:6	
	Metadata:	
	https://www.epa.ie/our-services/licensing/waste/	
Urban wastewater agglomeration area accessed through Ireland's Marine	These data cover the wastewater treatment plants catchment areas in agglomerations. This is liquid waste from urban industrial, commercial and domestic activities.	Full coverage of the study area
Atlas.	Location data:	
	https://atlas.marine.ie/#?c=53.5811:-7.3499:8	
	Agglomeration boundaries:	
	https://gis.epa.ie/geonetwork/srv/api/records/1c66dc3c-12c5-4552-9407-ad5ef7d114c8	
Foreshore Licence Applications.	Foreshore application documents	Full coverage of
Department of Housing, Local		the study area
Government and Heritage	https://www.gov.ie/en/collection/f2196-foreshore-applications-and-determinations/	

Consultation relating to the potential impacts of the proposed development on I&OU has been ongoing throughout the preparation of the EIAR and has been undertaken with both statutory and non-statutory authorities, including those with an interest in adjacent offshore wind projects and the operators of cables and pipelines in the vicinity, in order to identify relevant data sources or gaps, as well as potential issues that will likely arise from the construction, operational and decommissioning of the proposed development.

A number of other topics within the EIAR have undertaken consultation which is also relevant to I&OU receptors, most notably Physical Processes, Marine Water and Sediment Quality, Fish and Shellfish, Commercial Fisheries, Shipping and Navigation, Aviation and Radar and Tourism and Recreation. A summary of the consultation points relating to I&OU for the proposed development is provided in Appendix 1.2.

20.2.5 Methodology for Assessment of Effects

EIA significance criteria for I&OU follows Environmental Protection Agency (EPA) guidance:

• EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports.

The criteria for determining the sensitivity of the receiving environment and the magnitude of impacts for the I&OU assessment are defined in Table 20.3 and Table 20.4 respectively. A matrix was used for the determination of significance in EIA terms (Table 20.5). The combination of the magnitude of the predicted impact with the sensitivity of the receptor determines the assessment of the significance of effect.

20.2.5.1 Sensitivity criteria

Sensitivity is the capacity for an asset to accommodate change and recover if affected. Quantifying sensitivity involves consideration of its context, including its adaptability, tolerance and recoverability, and its value. However, given the anthropogenic nature of this topic, not all of these quantifiers are relevant for the I&OU assessment. Recoverability as used within this chapter assumes a degree of anthropogenic input, such as maintenance or repair activity, as the assets cannot recover independently as they are not part of a natural system. The I&OU assessment does not consider adaptability as the assets in question are not part of a natural system. As such, they are unable to adapt in response to change.

Sensitivity of the environment is defined in Table 20.3. The sensitivities of I&OU receptors are defined by their potential vulnerability to an impact from the proposed development, their recoverability, and the value or importance of the receptor. Where a receptor could reasonably be assigned more than one level of sensitivity, professional judgement has been used to determine which level is applicable.

Receptor sensitivity	Definition		
	Vulnerability: Receptor is highly vulnerable to impacts that may arise from the proposed development.		
High	Recoverability: Recoverability is long-term or not possible.		
111511	Value: Receptor is of high value or importance, with critical importance to the local, regional or national economy.		
	Vulnerability : Receptor is moderately vulnerable to impacts that may arise from the proposed development.		
Medium	Recoverability: Receptor has moderate to high levels of recoverability.		
	Value : Receptor is of medium value or importance, with reasonable contribution to the value of the local, regional or national economy.		
	Vulnerability : Receptor is not generally vulnerable to impacts that may arise from the proposed development.		
Low	Recoverability: Receptor has high recoverability.		
	Value : Receptor is of minor value or importance with small levels of contribution to the value of the local, regional or national economy.		
N ₂ -1:-:h1-	Vulnerability: Receptor is not vulnerable to impacts that may arise from the proposed development.		
INEGIIGIDIE	Recoverability: Receptor has high recoverability.		

Table 20.3 Sensitivity of the receiving environment

Receptor sensitivity	Definition
	Value: Receptor is of very low value or importance, with negligible contribution to the value of the local, regional or national economy.

20.2.5.2 Magnitude of Impact Criteria

The magnitude of potential impacts is defined by a series of factors, including the spatial extent, duration, frequency, likelihood, consequences or reversibility of the impact on I&OU receptors. This assessment considers potential impacts (and any resultant effects) in terms of whether they are adverse or beneficial.

The magnitude of identified impacts is defined in Table 20.4.

If more than one level of magnitude could reasonably be assigned to an impact, professional judgement is used to establish the most applicable rating, with primary judgement relating to the potential consequences of the impact. Levels are assigned based on the most appropriate potential consequence as defined for each level of magnitude.

Magnitude	Description / Reason
	Spatial extent: The impact is of extended physical extent.
	Likelihood: The impact is likely to occur.
High	Duration : The impact is of extended temporal extent and of long-term duration, i.e. total life of the proposed development.
	Frequency: The frequency of the impact will be continuous.
	Reversibility : The impact is not reversible.
	Total loss of ability to continue activities.
	Spatial extent: The physical extent of impact is moderate.
	Likelihood: The impact is reasonably likely to occur.
	Duration: The duration of the impact is likely to be medium term, i.e. less than 12 years.
Medium	Frequency: The frequency of the impact will be medium to continuous.
	Reversibility: The impact is not reversible for the proposed development phase.
	Loss or alteration to significant portions of key components of current activity leading to a reduction in the level of activity that may be undertaken.
	Spatial extent : The physical extent of the impact is local, extending to the area just beyond the offshore development area but not as far as the study area boundary.
	Likelihood: The impact is unlikely to occur.
Low	Duration: The duration of the impact is likely to be short-term, i.e. less than 5 years.
	Frequency: Frequency of repetition is negligible to continuous.
	Reversibility: The impact is reversible.
	Very slight change from baseline condition.
	Spatial extent : The physical extent of the impact is local – it does not extend beyond the offshore development area and their immediately adjacent areas.
Negligible	Likelihood: The impact is not anticipated to occur.
	Duration : The duration of the impact is likely to be momentary, lasting from seconds to minutes, to brief, not exceeding one day.
	Frequency : The frequency of the impact will be once or infrequently throughout a proposed development phase.
	Reversibility : The impact is reversible.
	No change from baseline conditions.

Table 20.4 Magnitude of the impact

20.2.5.3 Determining the Significance of Effect

The significance of effect will be dependent upon the sensitivity of the receptor and the magnitude of the impact. The assessment methodology for determining the significance of likely significant effects is described in Table 20.5.

Effects defined as significant, very significant or profound are considered significant in EIA terms. An effect that has a significance of moderate, slight, not significant or imperceptible is not considered to be significant in EIA terms.

	O ¹ 10					
Table 20.5	Significance	of likely	significant	effects	upon	I&OU

		Existing Environment – Sensitivity				
			High	Medium	Low	Negligible
jnitude	Adverse impact	High	Profound or very significant	Significant	Moderate	Imperceptible
pact Mag		Medium	Significant	Moderate	Slight	Imperceptible
on of Im		Low	Moderate	Slight	Slight	Imperceptible
Descripti		Negligible	Not significant	Not significant	Not significant	Imperceptible

Where relevant, mitigation measures that are incorporated as part of the proposed development design process and/ or can be considered to be industry standard practice (referred to as 'embedded mitigation') are considered throughout the chapter and are reflected in the outcome of the assessment of effects, described in Section 20.4.2. Additional mitigation measures that are not embedded and are considered as part of the residual effects assessment are described separately (Section 20.7).

20.3 Baseline Environment

20.3.1 Introduction

The baseline environment section of this chapter describes potential infrastructure and users of the coastal and offshore environment within the study area.

Exclusions to this include vessel traffic (which is captured within the Shipping and Navigation chapter), use by commercial fisheries receptors (captured in the Commercial Fisheries chapter), use of the airspace above the marine environment (captured in the Aviation and Radar chapter), and beaches and bathing waters (captured by the Tourism and Recreation chapter and Marine Water and Sediment Quality chapter).

There is no nuclear power infrastructure within the study area.

20.3.2 Receiving Environment

20.3.2.1 Subsurface Structures

Subsurface structures include:

- Wellheads When a well is drilled the structure placed on the seabed is called a wellhead. There may be a single wellhead, though often there may be several units grouped together to form a block;
- Protective structures These can be fully enclosed structures which provide a suspended subsea wellhead protection from dropped objects and can help deflect fishing activity;
- Manifolds A subsea manifold is a large metal piece of equipment, made up of pipes and valves which is designed to transfer oil / gas from wellheads into a pipeline; and

• Trees and valves – Subsea trees are structures attached to the top of subsea wells to control the flow of oil/gas to or from a well. When attached to a subsea well the combined structures can extend to 7m above the seabed in height.

The closest protective structure is 91km from the proposed development at the nearest point and the closest manifold and wellhead are 134km from the proposed development at the nearest point. As such, there are no active subsurface structures within the study area. Given the lack of any spatial overlap, it is not anticipated that the construction, operational or decommissioning phases of the proposed development would impact any subsurface structures. As such, any potential impacts on this receptor have not been considered further in this assessment.

20.3.2.2 Buoys and Moorings (Non-Navigational)

A non-navigational buoy may be placed to mark the area for use other than navigational purposes e.g. location of fishing equipment or data collecting equipment. A mooring buoy provides an alternative to anchors for vessels, looking to undertaken activities within the area.

Baseline information on navigational buoys and other navigational infrastructure are captured within the Shipping and Navigation chapter.

A search of databases (Table 20.2) has not identified any mapped buoys within the study area; however, as the placement of non-navigational infrastructure is not an activity that requires a permit or licence, they are not easily identified and can be transient. They are also limited in their spatial overlap with the proposed development (due to their size being typically very small) and it is not anticipated that the construction, operational or decommissioning phases of the proposed development would impact any buoys and moorings. As such, any potential impacts on this receptor have not been considered further within this assessment.

20.3.2.3 Subsea Cables and Pipelines

'Subsea cables' is a broad term for a range of cables that are beneath the sea surface. These cables are typically, but not exclusively, subsea telecoms, power cables and inter-connector cables. Inter-connector cables typically connect one country with another. Ireland is connected by existing submarine power and telecommunications cables and gas pipelines to the UK, continental Europe and the USA.

There are a total of seven active cables and pipelines that transect the study area but none intersect the offshore development area. These have been identified through GIS analysis of publicly available data sources, each connecting Ireland to the UK, and can be seen in Figure 20.2 and are listed in Table 20.6.

There are two gas pipelines that intersect with the study area. Interconnector 1 Scotland to Ireland (IC1) makes landfall south of the ECC on the Meath coast. It travels north-east from its landfall, north of the array area. Interconnector 2 Scotland to Ireland (IC2) is the closest receptor to the proposed development and it makes landfall north of the ECC and travels north-east.

There are four active submarine telecommunications cables that intersect with the study area; Havhingsten, Rockabill Cable; Hibernia-C, and Sirius South, each of their landfall locations are outside of the study area.

There is one active power cable that intersects with the study area to the south; the Eirgrid East-West Interconnector (which connects Rush North Beach within county Dublin in Ireland to Prestatyn in Wales) and has its landfall location outside of the study area. Details on interactions between onshore elements of the proposed development and the Eirgrid East-West Interconnector infrastructure are provided in Volume 4, Chapter 26: Material Assets.

Immediately south of the study area are a further three active telecommunication cables and one disused telecommunication cable.

Table 20.6 Subsea cables and pipelines within the study area

Name	Туре	Status	Distance to array area (km)	Distance to ECC (km)
Havhingsten Telecoms Cable	Telecommunication	Operational	0.7	9.7
Interconnector 2 Scotland to Ireland IC2	Pipeline (gas)	Active	0.5	2.7
Interconnector 1 Scotland to Ireland IC1	Pipeline (gas)	Active	4.2	10.6
Rockabill Cable	Telecommunication	Active	4.9	13.0
The Eirgrid East-West Interconnector	Power	Active	5.0	11.4
Hibernia C	Telecommunication	Active	7.7	17.0
Sirius South	Telecommunication	Active	9.4	18.7

20.3.2.4 Dredging and DaS Sites

Existing dredging activities (for navigational and maintenance dredging) were, prior to 17 July 2023, licensed under a foreshore consent from the Department of Agriculture, Food and the Marine and the Department of Housing, Planning and Local Government (DHPLG), under the Foreshore Act 1933, as amended (Irish Statute Book, 1933). Dredging activities post this date are licensed by the Maritime Area Regulatory Authority (MARA).

A review of available foreshore licence applications indicates that there is one foreshore licence for dredging that currently exists on the western boundary of the study area. This enables maintenance dredging of the estuary of the River Boyne and seaward approaches to Drogheda Port (approximately 10km from the nearest point of the offshore development area) by Drogheda Port Company between 2021 and 2029 (foreshore licence reference number FS007028) see (Figure 20.4, mapped in proximity to Drogheda).

For the dumping of material at sea, it is the responsibility of the EPA to issue Dumping at Sea (DaS) Permits in accordance with the Foreshore and Dumping at Sea (Amendment) Act 2009. Dredged material is at present the major material disposed of in the Irish Sea. The EPA provides a register of granted DaS permits, which indicate two dump sites located within the study area and four dump sites on the boundary of the study area one of which is partially within the study area, all to the west of the array area and north of the ECC (EPA, 2023; refer to Figure 20.4). The dump site that is partially within the study area to the west, is an active site offshore from Drogheda port entrance northern breakwater and the method of dumping is release of material through the hull of the dredger while the vessel is in motion. A DaS permit was granted to Drogheda Port Company in 2021 to dump material from dredging activities (permit registration number S0015-03). Previous inactive dump sites exist over the same location.

Within the study area, there are only inactive dump sites found offshore of Laytown, and over 2km from the nearest point of the offshore development area.

Due to the lack of direct physical overlap between the offshore development area with any of the known active dredging and DaS sites, it is not anticipated that a pathway exists for impacts from the proposed development to these users during construction, operation and decommissioning. It is expected that these users will be able to continue their operations as normal. As such, any potential impacts on these receptors are not considered further in this assessment.

20.3.2.5 Defence and Security

A summary of military users and activities is presented in this section, with further information provided in the Aviation and Radar Chapter which assess the potential impacts on radar and aviation operations.

The nearest defence user considered within this chapter is Gormanston Camp in County Meath, which is approximately 7km north of the landfall site at Bremore Beach, Balbriggan. Gormanston Camp is used for air-ground and air-defence training, has radar installations, and has a designated Danger Area (EID1).

Danger Area EID1 lies to the west of the array area and comprises of the lands of Gormanston Aerodrome and the air and sea areas contained within a radius of 3nm centred on the aerodrome, and it is a military firing range.

The array area of the proposed development is not located in a restricted military area; however, the array area boundary is adjacent to Danger Area EID1 and the ECC is almost entirely within it (refer to Figure 20.5). Live firing is unlikely to affect activities within the array however, firing from the military base may affect construction activities in the ECC. Military firing ranges operate under a set of range orders, which outline precautions to be observed during a training event. All vessels are required to remain outside the firing range exclusion zone whilst the range is active. There are no known marine vessel practices/activities (i.e. safety /patrol vessels) associated with Gormanston in this area outside live firing activity times (it is likely that the Department of Defence may operate a safety or patrol vessel to enforce the danger area exclusion zone during firing activities). Notice to Mariners (NtMs) and/or Marine Notices will be followed when issued in relation to Danger Area EID1.

Additional military danger areas (EIR23, EIP11 and EIP18) have been identified on Figure 20.5 but these are over 20km south-east from the closest point of the offshore development area and are not considered further in this assessment.

20.3.2.6 Other Marine Renewable Energy Projects

Opportunities to develop more renewable energy in Ireland have been identified by the Offshore Renewable Energy Development Plan (OREDP; DCCAE, 2018). There is one existing OWF 88.3km south of the array area; Arklow Bank Wind Park, as presented in Figure 20.6 and Table 20.7. There is no spatial overlap of any OWFs within the proposed development I&OU study area.

Table 20.7 Offshore wind projects in proximity to the proposed development

Project	Owner	Capacity	Status
Arklow Bank Wind Park	GE Energy	25.2MW	In operation

No other types of renewable energy project have been identified in the study area. The closest tidal turbine is located at Strangford Lough, 67.1km north of the array area.

Due to the lack of spatial overlap, other planned marine renewable energy projects have been screened out from further assessment in the project-alone assessment for I&OU, but their potential for cumulative effects with the proposed development on common receptors are considered in Cumulative and Inter-Related Effects Chapter

20.3.2.7 Marine Recreational Activities

This section considers marine recreational activities in both offshore and coastal areas within the 12km study area.

Recreational Sailing

Safety aspects relating to recreational sailing and motor cruising are considered in the NRA and the Shipping and Navigation Chapter of the EIAR. This chapter considers receptors undertaking recreational sailing and motor cruising as an activity only, i.e., not from a safety perspective.

Recreational sailing is generally divided into two categories: offshore and inshore. Offshore sailing is usually undertaken by yachts in the form of either cruising or organised offshore racing. Cruising may include day trips between local ports and often includes a return journey to the home port on the same day.

Inshore sailing is typically undertaken by smaller vessels including dinghies and recreational vessels that are used for either cruising at leisure or racing. Inshore racing takes place around racing marks and navigational buoyage.

The inshore and coastal locations adjacent to the offshore development area are recognised as popular for sailing, with several sailing clubs along the coastline County Dublin. There is low to medium recreational vessel activity in the nearshore area of the ECC. The ECC does not cross any designated boating areas.

Recreational sailing usually takes place in the vicinity of established sailing clubs. However, boats can also be launched and sailed wherever access to launch is permitted and therefore the activity is not always associated with a specific club. There are a number of ports and harbours for recreation within the study area (Figure 20.6).

The only sailing club within the study area is the Skerries sailing club, located 9.5km from the array area and 4.7km from the ECC (Figure 20.6). The closest marina is Malahide Marina, which is located outside the study area, at 13.4km from the array area and 18.6km from the ECC. Sailing activity within the study area is generally low, particularly further offshore, as shown in Ireland's Marine Atlas (Marine Institute, 2014-2020).

It is anticipated that there will be a higher number of recreational vessels in summer than winter due to the seasonal nature of the activity (Volume 9, Appendix 17.1: NRA).

Recreational sailing is considered further in this assessment.

Diving

The waters around Meath, Louth and Dublin have various reefs and wrecks that can be used as dive sites, including battleships and Royal Mail ships. These wrecks, in addition to the marine habitats present, support a variety of marine life and provide areas of interest for divers.

No dive sites have been identified within the study area. The closest dive site, Lambay Island, has been identified through Diving Ireland, the national governing body for recreational underwater sports, as the closest dive site, and is located 15km from the offshore development area at its closest point. The closest dive club is Portmarnock Sub Aqua Club (PSAC). PSAC is a local organisation engaged in recreational diving activity which is based in Portmarnock, 19km south of the offshore development area at its closet point (Figure 20.7). PSAC operates dives from March to October in the Dublin area on a weekly basis and snorkelling trips throughout the year. Locations include sites around Lambay Island, Malahide/Portmarnock, Loughshinny and the Skerries, as well as varied wrecks off the coast of Dublin (PSAC, 2018). Local and visiting dive clubs may also use these sites.

Due to the lack of dive sites within the study area for I&OU, diving is not considered further in this assessment.

Other Water Sports

Water sport activities are operated from local towns and communities (i.e. these are of local interest and serve local demand and so represent receptors of local value). Surfing and wind sports, including kitesurfing and windsurfing, all occur almost entirely in coastal waters, usually within 1nm of the shore.

There are no surf clubs within the study area, the closest is over 40km to the south. Surf spots which are within the study area, identified using Surfline, include Clogherhead, Balbriggan and Barnageara (Figure 20.6).

Kitesurfing Ireland is a representative group for kitesurfers, working to ensure access to kitesurfing locations and maintaining relations with relevant bodies. There are no known kitesurfing or wind surfing clubs within the offshore development boundary, but several sites along the coast of the study area. Wind sport areas within the study area have been identified at Bettystown beach, Laytown beach, Gormanston beach and Skerries north and south beaches (Figure 20.6). The closest identified club to the proposed development is Kitesurfing Dublin which is over 21km south of the offshore development area.

There is no physical restriction on the offshore range of paddle sport activities, including kayaking, paddleboarding and canoeing, however for logistical and safety reasons most stay relatively close to the shore, undertaking inshore rather than seaward trips. Paddle sports have the potential to occur within the nearshore and inshore sections of the ECC.

Water sports within the study area are considered further in this assessment due to the potential for activity within the study area. Further commentary on water sports receptors is provided in the Tourism and Recreation Chapter and recreational sailing is also considered in the Shipping and Navigation Chapter from a safety perspective.

Angling

Recreational angling (i.e. for pleasure rather than commercial reasons) is more common in nearshore areas. Angling Ireland identifies activities that may occur in the offshore waters to include wreck fishing and deep-sea angling.

Angling Ireland recognise that recreational angling in North County Dublin is popular, with shore-based sea fishing popular around Balbriggan, Skerries and Loughshinny and boat-based fishing carried out around over Rockabill grounds (Angling Ireland, n.d.). Recreational fishing vessels primarily operate out of Loughshinny and Rush harbours (Figure 20.6).

Key target species for recreational anglers are Atlantic mackerel (*Scomber scombrus*), sandeel (*Ammodytes tobianus*), Atlantic herring (*Clupea harengus*) and European sprat (*Sprattus sprattus*).

Recreational angling is considered further in this assessment due to the potential for activity within the study area.

Wildlife Boat Trips

No offshore wildlife boat trips or tours have been identified as originating from coastal locations in the study area. Around 10 wildlife boat tours operate from County Dublin, with popular locations for wildlife watching including waters around Dublin Bay, Ireland's Eye, Lambay Island, Howth and the Skerries.

No wildlife watching areas have been identified within the offshore development area. Given the operation of businesses from land above the HWM, the impact on maritime tourism has been assessed in the Tourism and Recreation chapter. Therefore, wildlife boat trips are not considered further in this chapter.

Beach Users

The landfall site is located on Bremore Beach, north of Ballybriggan and south of Bremore Point. The site consists of a mixture of sandy and rocky beach with undulating agricultural fields behind sea hills and cliffs. The surrounding area consists of agricultural land with relatively few dwellings in the vicinity. The beach may be used by the public for recreation (i.e. walking or swimming). Other beaches along the coastline are outside the I&OU study area.

Any impacts on marine bathing water quality from activities associated with the proposed development are assessed in the Marine Water and Sediment Quality chapter.

An assessment of impacts on beach users above the HWM is provided in the Seascape, Landscape and Visual Chapter and the Tourism and Recreation Chapter. Therefore, beach users are not considered further in this chapter.

20.3.2.8 Wastewater Treatment and Disposal

Wastewater treatment plants are situated onshore and are covered within the Water Chapter. The Balbriggan wastewater treatment plant (Licence Register Number: D0023-01), has a discharge location within the study area, approximately 3.5km south of the ECC (Discharge Point Reference: TPEFF0900D0023SW001).

There are also stormwater overflows mapped within the study area, directly at the coast at Balbriggan and Skerries and one on Shenick Island (Figure 20.3).

Due to the lack of physical direct overlap between the offshore development area and the discharge locations and stormwater overflows within the study area, it is not anticipated that a pathway exits for impacts from the proposed development during construction, operation and decommissioning. As such, any potential impacts on these receptors have not been considered further.

20.3.2.9 Other Resource Activities

Oil and Gas (Existing Infrastructure)

There is no existing oil and gas exploration or production infrastructure within the study area. Oil and gas activity in proximity to the study area is limited to four exploratory wells to the south-east of Dublin and within the Kish Bank Basin:

- Arch Rowan operated by Enterprise Oil;
- Penrod 81 operated by Shell;
- Western Apollo I operated by Charterhouse; and
- Zephyr 1 operated by Amoco

All four of these wells have been described as dry wells meaning no significant reserves of oil were found and have all been plugged and abandoned (Ireland's Marine Atlas, 2021).

There will be no new applications for oil and gas exploration licences or further licensing rounds considered in Ireland since the Irish Government approved a ban on new exploration licences in February 2021. The ban has been passed by the Oireachtas through legislation in the Climate Action and Low Carbon Development (Amendment) Act 2021. Therefore, exploration licence applications will not be considered in the future.

As such, impacts to oil and gas exploration and production infrastructure receptors have not been considered further in this assessment.

Oil and Gas (Historic Licences)

No historic oil and gas licences have been identified within the study area.

The closest historic Licensing Option (LO) to the proposed development is the LO 08/2 in the Kish Bank Basin off the coast from Dublin. LO 08/2 was awarded to Providence Resources PLC in 2008. In 2011, the LO 08/2 was converted to an exploration licence (EL) 2/1. In 2016, Providence applied for an extension of the Licence from the Irish government which allowed an additional two years of the first phase (until August 2018) and an overall one-year extension of licence term (until 2018). Since then, the Kish Bank Basin has not been licensed for oil exploration and so the EL 2/1 is not being considered further in this assessment.

Aggregates

No aggregate resource types have been identified within the study area (Figure 20.7). There are several relevant identified aggregate resource sites located further south, to the east of Dublin Bay, as can be seen in Figure 20.3. This includes Irish Sea Marine Aggregate Resource Area and Irish Sea Marine Aggregate Resource Study Areas which have been identified for potential future exploitation, but these are not currently licensed. As these sites are beyond the study area and no source-receptor-pathway exists to enable interaction with the proposed development, aggregates are not considered further in this assessment.

CCUS and Natural Gas Storage

The use of geological formations for the capture and storage of carbon is currently prohibited under S.I. No. 575/2011 – European Communities (Geological Storage of CO2) Regulations 2011 (Government of Ireland, 2011).

There are no active consents or licences for CCUS within Ireland. The Kinsale Head Gas Field is subject to a feasibility assessment to develop Ireland's first CCUS, the Ervia Cork CCUS project (Ervia, 2021). The Ervia CCUS site is outside of the study area, located over 250km to the south west of the proposed development in proximity to Cork. This is considered within the cumulative effects section (Section 20.9).

In 2023, the London and Dublin-based geo-energy resource company dCarbonX was awarded a gas storage licence for CCUS activities in East Irish Sea Area 1. This has been identified as the closest active site, at 141.1km east of the offshore development area, within the UK.

As no existing CCUS and natural gas storage are found within the study area, any potential impacts on this type of receptor is not considered further in this assessment.

Aquaculture

There are no aquaculture sites within the study area, with the closest site belonging to the Carlingford Oyster Company Ltd (Site ID T01/101A) 29.3km from the proposed development. Therefore, no impacts are anticipated, and aquaculture is not considered further in this assessment.

Wave and Tidal Projects

There are no wave or tidal projects within the study area, with the closest site being Strangford Lough, around 67km from the proposed development. Therefore, wave and tidal developments are not considered further in this assessment.

20.4 Characteristics of the Proposed Development

This section outlines the characteristics of the proposed development that are relevant to the identification and assessment of effects on I&OU during each phase of the proposed development. This chapter considers both Project Option 1 and Project Option 2 (the key characteristics of which are provided in Table 20.8 and are detailed in full in the Offshore Description Chapter).

Key Offshore Characteristics	Project Option 1	Project Option 2
Array area	88.5km ²	88.5km ²
ECC	36.45km ²	36.45km ²
Landfall	One landfall site, immediately south of Bremore Point, which includes two subtidal exit pits within the ECC	One landfall site, immediately south of Bremore Point, which includes two subtidal exit pits within the ECC
Wind Turbine Generator (WTG)	49 WTGs with 250m rotor diameter	35 WTGs with 276m rotor diameter
WTG Foundations	49 monopiles of 12.5m diameter requiring seabed preparation	35 monopiles of 12.5m diameter or jacket foundations (three or four leg configurations, with 6m diameter pin piles) requiring seabed preparation
Offshore Substation Platform (OSP) Foundations (array area)	One OSP, with either a four-legged jacket foundation with pin piles, or one monopile; or two monopiles	One OSP, with either a four-legged jacket foundation with pin piles, or one monopile; or two monopiles
Cables	Installation of 111km of array cables within the array area and installation of two 18km export cables within the ECC	Installation of 91km of array cables within the array area and installation of two 18km export cables within the ECC

Table 20.8 Key Characteristics of Project Option 1 and Project Option 2

A presentation of the potential impacts in relation to Project Option 1 and Project Option 2 (as described in the Offshore Description Chapter), and the magnitude of those impacts in relation to the size and scale of the proposed development parameters, are provided. This enables the identification of the project option that will result in the greatest magnitude of impact on receptors and will therefore present the greatest potential for a likely significant effect (Table 20.5).

To determine the magnitude of the impact level, modelling, calculations and mapping have been undertaken for the Project Option with the greatest magnitude of impact, for all impacts for the relevant receptor/s.

The significance of effect assessment has then been undertaken for both project options, which considers both receptor sensitivity and the magnitude of the impact and is detailed in Section 20.5. Given the similarity of the project options, in most instances the conclusions are the same. In some instances, the difference in magnitude of impact between project options results in a different categorisation of significance.

20.4.1 Parameters for Assessment

The below activities and infrastructure and key design parameters have been considered within this chapter when determining the potential impacts. Further detail on the offshore elements of the proposed development is provided in the Offshore Description Chapter and the Offshore Construction Chapter. These parameters apply to both project options and any differences in values that may require consideration have been identified in Table 20.10.

20.4.1.1 Construction

During construction the following activities and infrastructure have the potential to impact on I&OU:

- Pre-construction surveys within the ECC and array area;
- Construction of the ECC, including export cable pre-sweeping and the installation of cable;
- Construction of the array including foundation installation, seabed preparation, deployment of jack up vessels, anchor placement, inter-array cable pre-sweeping and the installation of cables;
- Restricted access to offshore areas; and
- Construction of the HDD exit pit

20.4.1.2 Operational Phase

During operation, the following activities and infrastructure have the potential to impact on I&OU:

- Vessel use during array area repair maintenance activities, including jack up vessels and anchor placement;
- Cable repair, reburial and maintenance activities;
- Restricted access to offshore areas;
- Disturbance to operations or activity from the physical presence of infrastructure; and
- Indirect disturbance caused by changes in physical processes

20.4.1.3 Decommissioning Phase

During decommissioning, the following activities and infrastructure have the potential to impact on I&OU:

- Removal of WTG infrastructure including deployment of jack up vessels and anchor placement;
- Potential removal of cables within the ECC and array area; and
- Restricted access to offshore areas

20.4.2 Embedded Mitigation

The following embedded mitigation measures in Table 20.9 have been identified through the design and consultation process and are incorporated as part of the proposed development. The embedded mitigation measures will not be considered again at the residual effect stage.

Embedded mitigation measures that are required to manage the impacts to marine water and sediment quality, fish and shellfish, commercial fisheries, shipping and navigation, and aviation and radar may also be indirectly beneficial to the receptors identified within this chapter however they are not repeated here in full. Only those that are key to managing impacts to infrastructure and other users are captured in Table 20.9.

Table 20.9 Embedded mitigation measures relating to I&OU

Measure	Mitigation detail
Construction	
Pre-construction surveys	Pre-construction surveys will be carried out that involve geophysical and magnetometer surveys used to identify existing assets. This may include out of service cables located in a different area to their chartered location due to outdated location techniques, which will reduce the risk of direct impacts or damage to subsea cables and pipelines during construction.
Structure Exclusion Zone	As part of managing potential impacts to shipping and navigation, the proposed development has incorporated a Structure Exclusion Zone, into the design. This is an area within the array which excludes all surface infrastructure (inclusive of blade overfly) and enables a 3nm separation between surface infrastructure and the Rockabill islands to be maintained. This gap between the array area and the Rockabill islands is referred to as the Rockabill gap and provides sea room to facilitate the safe passage of vessels. Additionally, it is anticipated that potential other users of the Rockabill gap will be able to safely navigate in the presence of other activities.
Advisory safety zones	Advisory safety zones of up to 500m around infrastructure under construction will be communicated during construction. Where appropriate, guard vessels and/or guard buoys will also be used to ensure adherence to advisory safety zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction. An advisory safety zone of 50m will be implemented for incomplete structures at which construction activity may be temporarily paused.
Advanced vessel warnings	Details of the proposed development will be promulgated in advance of construction, via Notice to Mariners (NtM) to ensure mariners are aware of the planned works. This information will include associated advisory safety zones and advisory passing distances.
Updated nautical charts	The provision of relevant data and information will be provided to the relevant authorities/charting bodies for the updating of nautical and electronic charts.
Consultation with the DoD Adherence to DoD NtMs and/or Marine Notices	Prior to installation of the export cable, engagement will be undertaken with the DoD and the following of, NtMs (and/or Marine Notices) relating to Gormanston Danger Area EID1 will ensure that installation schedules do not conflict with Irish Air Corps (IAC) firing range activities.
Cable burial and cable protection	Exposed and/or inappropriately managed cables may potential impact on vessels looking to anchor within proximity to the offshore development area.
measures	Export and inter-array cables will be buried where practicable to ensure they are not exposed by sediment movements (Section 8.3.10 in the Offshore Construction Strategy). Where cables cannot be buried, additional cable protection measures such as rock placement or mattressing will be applied to achieve adequate cable protection. Up to 20% of cable length is expected to need protection either during initial installation, or throughout the operational phase of the proposed development (see the Offshore Construction Strategy).
	Cable specification and installation measures are determined within the offshore Environmental Management Plan (EMP) and include a detailed Cable Burial Risk Assessment (CBRA) to enable informed judgements regarding burial depth to increase the likelihood of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. This sets out appropriate cable burial depth in accordance with industry good practice, reducing the risk of cable exposure.

Measure	Mitigation detail
	A cable burial risk assessment (CBRA) will be developed that will set out the appropriate installation methods to be used during the construction phase. During construction, sections of export cable might be left exposed whilst awaiting a suitable method of installation. A temporary exclusion zone may therefore be required until the cable can be buried.
Vessel route management	Indicative transit corridors (vessel routing to and from construction sites and ports) will be define in advance of the construction phase, in consultation with the Marine Survey Office (MSO). A vessel management plan (VMP) will be implemented and will include a code of conduct for vessel operators. These measures will reduce the risk of disturbance and displacement of with infrastructure and other users.
	The VMP is provided in Appendix 17.2 and will be updated through the phases of the proposed development.
Marine pollution contingency measures – chemical risk review	Marine pollution contingency measures will be implemented as part of Appendix 6.1: Offshore Environmental Management Plan (EMP; hereafter Offshore EMP) to manage the risk of accidental spillages from construction equipment or collision incidents. This includes a chemical risk review with information regarding how and when chemicals are to be used, stored and transported in accordance with recognised best practice guidance. This measure will reduce the likelihood of potentially harmful pollutants to be released into the marine environment which may then impact on fish and shellfish receptors.
Operation	
Structure Exclusion Zone	The proposed development design has incorporated a Structure Exclusion Zone, an area within the array which excludes all surface infrastructure (inclusive of blade overfly) and enables a 3nm separation between surface infrastructure and the Rockabill islands to be maintained. This gap between the array area and the Rockabill islands is referred to as the Rockabill gap and provides sea room to facilitate the safe passage of vessels. Additionally, it is anticipated that potential other users of the Rockabill gap will be able to safely navigate in the presence of other activities.
Advanced vessel warnings	Details of the proposed development will be promulgated in advance of any work that is not routine during operation via NtM to ensure mariners are aware of the planned works.
	This information will include associated advisory safety zones and advisory passing distances.
Advisory safety zones	Advisory safety zones of up to 500m around the relevant infrastructure will be communicated during substantial maintenance activities (such as major component replacement). Where appropriate, guard vessels and/or guard buoys will also be used to ensure adherence with advisory safety zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such risks may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.
	An advisory safety zone of 50m will be implemented for incomplete structures at which construction activity may be temporarily paused.
Updated nautical charts	The provision of relevant data and information will be provided to the relevant authorities/charting bodies as/if required for the updating of nautical and electronic charts.
Consultation with the DoD Adherence to DoD issued NtMs and/or Marine Notices	Prior to management or repair of the offshore export cable, engagement will be undertaken with the DoD and the following of NtMs (and/or Marine Notices) relating to Gormanston Danger Area EID1 will ensure that installation schedules do not conflict with IAC firing range activities.
Decommissioning	
Structure Exclusion Zone	The proposed development incorporated a Structure Exclusion Zone, an area within the array which excludes all surface infrastructure (inclusive of blade overfly) and enables a 3nm separation between surface infrastructure and the Rockabill islands to be maintained. This gap between the array area and the Rockabill islands is referred to as the Rockabill gap and provides sea room to facilitate the safe passage of vessels. Additionally, it is anticipated that potential other users of the Rockabill gap will be able to safely navigate in the presence of other activities.
Advanced vessel warnings	Details of the proposed development will be promulgated in advance of decommissioning via NtM to ensure mariners are aware of the planned works.
	This information will include associated advisory safety zones and advisory passing distances.

Measure	Mitigation detail
Advisory safety zones	Advisory safety zones of up to 500m around the relevant infrastructure will be communicated during decommissioning. Where appropriate, guard vessels and/or guard buoys will also be used to ensure adherence with advisory safety zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during decommissioning. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards. An advisory safety zone of 50m will be implemented for incomplete structures at which construction activity may be temporarily paused.
Updated nautical charts	The provision of relevant data and information will be provided to the relevant authorities/charting bodies for the updating of nautical and electronic charts.
Consultation with the DoD Adherence to DoD issued NtMs and/or Marine Notices	Prior to decommissioning of the offshore export cable, engagement will be undertaken with the DoD and the following of NtMs (and/or Marine Notices) relating to Gormanston Danger Area EID1 will ensure that installation schedules do not conflict with IAC firing range activities.
Assessment of impacts and best practice environmental management	Prior to decommissioning a study of the potential environmental impacts to infrastructure and other users from the proposed decommissioning activities should be undertaken, taking into account the baseline environment at the pre-decommissioning stage. All mitigation measures to be captured would be captured within the decommissioning strategy within the Offshore EMP. Any licences or authorisations that might be required would be identified and obtained prior to decommissioning, including any validation, updating or new submission of an EIAR, as required.

20.4.3 Potential Impacts

The identification of potential impacts has been undertaken by considering the relevant characteristics of both project options (refer to Section 20.4.1) and the potential for a pathway for direct and indirect effects on known receptors (as identified in Section 20.3). Each identified impact relevant to I&OU is presented in Table 20.10.

For each impact, the relevant characteristics of Project Option 1 and Project Option 2 are presented to determine the magnitude (size or extent) of the potential impact, defined by the proposed development parameters in the Offshore Description Chapter and in consideration of the WTG Limits of Deviation (LoD¹), in line with the approach detailed in the EIAR Methodology chapter. A comparison of the project options has then been undertaken to determine which project option has the greatest magnitude of impact.

As outlined above, due to the absence of a source-receptor-pathway for impacts to occur, the following I&OU receptor types have not been considered any further:

- Subsurface structures;
- Buoys and moorings (non-navigational);
- Dredging and DaS sites;
- Other marine renewable energy projects;
- The following marine recreational activities:
 - Diving;
 - Wildlife boat trips; and
 - Beach users
- Wastewater treatment and disposal;

¹ Both Project Option 1 and Project Option 2 layouts have a 500m Limit of Deviation (LoD)

- Other resource activities, including:
 - Oil and gas production infrastructure;
 - Marine aggregates;
 - CCUS and natural gas storage;
 - Aquaculture; and
 - Wave and tidal projects

Table 20.10 Potential impact and magnitude of impact per project option. The project option that has the greatest magnitude of impact is identified in blue

Potential Impacts	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest magnitude of impact
Construction			
Impact 1: Direct displacement or access impacts on subsea cables and pipelines associated with increased vessel movements and the use of advisory safety zones Impact 2: Disturbance and damage impacts on subsea cables and pipelines assets and infrastructure from construction activities and vessels	No. of WTG: 49 Advisory construction safety zones: 500m Number of export cable circuits: 2 Cable crossing technique: Rock berms/mattressing Cable burial depth: 1-3m	No. of WTG: 35 Advisory construction safety zones: 500m Number of export cable circuits: 2 Cable crossing technique: Rock berms/mattressing Cable burial depth: 1-3m	 Project Option 1 represents the greatest magnitude of impact Project Option 1 represents the largest duration and extent of exclusion throughout the construction phase due to the larger number of WTGs and hence the greatest potential for displacement of activities associated with subsea cables and pipelines and is therefore the project option with the greatest magnitude of impact.
Impact 3: Direct displacement or access impacts on marine recreational activities from increased vessel movements and the use of advisory safety zones	No. of WTG: 49 Maximum number of vessels simultaneously onsite during construction: 49	No. of WTG: 35 Maximum number of vessels simultaneously onsite during construction: 47	Project Option 1 is the project option with the greatest magnitude of impact. Project Option 1 represents the largest duration for underwater noise impacts and extent of exclusion
Impact 4: Indirect disturbance or displacement impacts on marine recreational activities from construction activities (causing increased sediment dispersion and/or noise impacts, and/or impacts to fish species)	Return trips: 3,056 Offshore construction duration: 3 years Advisory construction safety zones: 500m Advisory safety zone of 500m around infrastructure and construction areas Noise impacts (e.g. piling) Construction buoys: 12	Return trips: 2,569 Offshore construction duration: 3 years Advisory construction safety zones: 500m Advisory safety zone of 500m around infrastructure and construction areas Noise impacts (e.g. piling) Construction buoys: 12	throughout the construction phase due to the larger number of turbines and hence the greatest potential for displacement and/or disturbance to recreational activities.
Impact 5: Indirect disturbance impacts on defence and security from construction activities within the ECC	Maximum number of vessels simultaneously onsite during construction: 49 Offshore export cable installation period: 4.5 months Advisory construction safety zones: 500m	Maximum number of vessels simultaneously onsite during construction: 47 Offshore export cable installation period: 4.5 months Advisory construction safety zones: 500m	 Project Option 1 is the project option with the greatest magnitude of impact. Project Option 1 represents the largest and extent of exclusion within the ECC throughout the construction phase and hence the greatest potential for displacement and/or disturbance to defence activities.
Operation			
Impact 6: Direct displacement or access impacts on subsea cables and pipelines from increased vessel movements and the use of advisory safety zones	Advisory safety zones: 50m advisory safety zones around manned offshore platforms and temporary 500m advisory safety zones around turbines and offshore	Advisory safety zones: 50m advisory safety zones around manned offshore platforms and temporary 500m advisory safety zones around turbines and offshore	Project Option 1 is the project option with the greatest magnitude of impact.Project Option 1 represents the largest physical presence and the option with greater maintenance requirements that
Impact 7: Direct disturbance and damage impacts on subsea cables and pipelines	Operational duration: 35 years	Operational duration: 35 years	may restrict activities associated with existing cables.

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Potential Impacts	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest magnitude of impact
assets and infrastructure from operational activities and vessels	Cable burial depth: 1-3m	Cable burial depth: 1-3m	
Impact 8: Direct displacement or access impacts on marine recreational activities from increased vessel movements, infrastructure (e.g. WTGs) and the use of advisory safety zones Impact 9: Indirect activity impacts on marine recreational activities from the physical presence of infrastructure (e.g. WTGs)	No. of WTG: 49 No. of OSPs: 1 Advisory Safety Zones: 50m advisory safety zones around manned offshore platforms and temporary 500m advisory safety zones around turbines and offshore platforms undergoing major maintenance. Operational duration: 35 years	No. of WTGs: 35 No. of OSPs: 1 Advisory Safety Zones: 50m advisory safety zones around manned offshore platforms and temporary 500m advisory safety zones around turbines and offshore platforms undergoing major maintenance. Operational duration: 35 years	Project Option 1 is the project option with the greatest magnitude of impact. Project Option 1 represents the largest physical presence and the option with greater maintenance requirements that may restrict activities associated with recreational activities.
Impact 10: Indirect disturbance impact on defence and security from repair and maintenance activities within the ECC	No. of WTGs: 49 No. of OSPs: 1 Rotor diameter: 250m Tip height at LAT: 290m Advisory Safety Zones: 50m advisory safety zones around manned offshore platforms and temporary 500m advisory safety zones around turbines and offshore platforms undergoing major maintenance. Operational duration: 35 years	No. of WTGs: 35 No. of OSPs: 1 Rotor diameter: 276m Tip height at LAT: 316m Advisory Safety Zones: 50m advisory safety zones around manned offshore platforms and temporary 500m advisory safety zones around turbines and offshore platforms undergoing major maintenance. Operational duration: 35 years	Project Option 1 is the project option with the greatest magnitude of impact. Project Option 1 represents the largest physical presence and the option with greater maintenance requirements that may restrict defence activities.
Decommissioning			
Impact 11: Direct displacement or access impacts on subsea cables and pipelines from increased vessel movements and the use of advisory safety zones Impact 12: Direct disturbance and damage impacts on subsea cables and pipelines assets and infrastructure from decommissioning activities and vessels	The decommissioning policy for the proposed development infrastructure is not yet defined however it is anticipated that structures above the seabed would be removed. The following infrastructure is likely be removed reused, or recycled where practicable:	The decommissioning policy for the proposed development infrastructure is not yet defined however it is anticipated that structures above the seabed would be removed. The following infrastructure is likely be removed reused, or recycled where practicable:	Project Option 1 is the project option with the greatest magnitude of impact.Project Option 1 represents the largest duration and extent of exclusion throughout the decommissioning phase and hence the greatest potential for displacement.The removal of cables is considered, however the necessity to remove cables will be reviewed at the time of decommissioning.
Impact 13: Direct displacement or access impacts on marine recreational activities from increased vessel movements and the use of advisory safety zones	WTG s and foundations (cut at 1m to 2m below the seabed); and OSP including topsides and foundations (above or up to just under the seabed). The following infrastructure is likely to be	WTGs and foundations (cut at 1m to 2m below the seabed); and OSP including topsides and foundations (above or up to just under the seabed). The following infrastructure is likely to be	Project Option 1 is the project option with the greatest magnitude of impact. Project Option 1 represents the largest duration for underwater noise impacts and extent of exclusion throughout the construction phase and hence the greatest
displacement impacts on marine	decommissioned and could be left in situ	decommissioned and could be left in situ	

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Potential Impacts	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest magnitude of impact
recreational activities from decommissioning activities (causing increased sediment dispersion and/or noise impacts and/or impacts to fish species)	 depending on available information at the time of decommissioning: Inter-array cables; 	 depending on available information at the time of decommissioning: Inter-array cables; 	potential for displacement and/or disturbance to recreational activities.
Impacts and of impacts to her species) Impact 15: Indirect disturbance impacts on defence and security from decommissioning within the ECC	 Scour protection; Cable protection; and Part of the foundations (e.g. some foundation material below the seabed may be left in situ). In the absence of detailed methodologies and schedules, decommissioning works and associated implications for I&OU are considered analogous with those assessed for the construction phase. 	 Scour protection; Cable protection; and Part of the foundations (e.g. some foundation material below the seabed may be left in situ). In the absence of detailed methodologies and schedules, decommissioning works and associated implications for I&OU are considered analogous with those assessed for the construction phase. 	Project Option 1 is the project option with the greatest magnitude of impact. Project Option 1 represents the largest duration and extent of exclusion throughout the decommissioning phase and hence the greatest potential for displacement and/or disturbance to defence activities.

20.5 Potential Effects

The likely significant effects, both beneficial and adverse, on I&OU for each stage of proposed development are considered specifically, the likely significant effects of the proposed development during its construction, operational, and decommissioning phases associated with the offshore development area. The environment in the vicinity of the proposed development is naturally dynamic, and as such will exhibit some level of natural variation and change over time, whether the proposed development proceeds or not. Consequently, the identification and assessment of likely significant effects must be done in the context of natural change, both spatial and temporal.

Section 20.4.3 outlines that Project Option 1 is the project option with the greatest likelihood for significant effects for each of the impacts identified. However, the sensitivity of the receptors and magnitude of the impact have been assessed as identical for each. The likely significant effects section therefore addresses both options for each impact and provides a significance of effect for both options.

20.5.1 Do-Nothing Scenario

Should the proposed development not be constructed, the baseline environment is unlikely to show future natural variations outside of that presented in the future receiving environment.

The future baseline scenario for recreational sailing, angling and water sports and other recreational activities is likely to increase gradually in line with population growth in Ireland. However, this is unlikely to represent a substantial change during the proposed development.

There is potential for significant growth in offshore wind energy in Ireland over the lifetime of the proposed development, with the Irish Government setting out plans for 5GW of offshore wind by 2030 (DECC, 2022). Other renewable energy sources, such as wave and tidal energy devices, are considered to be emerging technologies, and are in their early research and development stage.

As a result of the Climate Action and Low Carbon Development (Amendment) Act 2021, the Oireachtas have approved a ban on new oil and gas exploration and extraction in Ireland. Therefore, the baseline environment for oil and gas activity in the study area is unlikely to change.

There is potential for marine aggregate extraction to increase in line with increased demand for aggregates in the construction industry (DHPLG, 2019). A number of areas along the east, southeast and southwest coasts of Ireland have been identified as having potential to support marine aggregate extraction, with an estimate resource between 5 and 7 billion m³ (DHPLG, 2019).

If the proposed development were not to be constructed, the characterisation of the baseline study area described in Section 20.3 would still be considered to be accurate. This means that no other changes to the offshore environment would be anticipated over the lifetime of the proposed development beyond those listed within this chapter.

20.5.2 Construction Phase

This section presents the assessment of impacts arising from the construction phase of the proposed development.

20.5.2.1 Impact 1 – Direct Displacement or Access Impacts on Subsea Cables and Pipelines Associated with Increased Vessel Movements and the use of Advisory Safety Zones

Sensitivity of the Receptor

Although there are a total of six cables and pipelines within the study area, including the Scotland-Ireland Interconnector IC2 (which is within 0.5km of the closest point of the offshore development area), there will be no physical overlap of the proposed development with any cables or pipelines belonging to other users (Figure 20.2).

These subsea cables and pipelines provide essential power, telecommunication and gas supplies to Ireland. Subsea cables and pipelines are deemed to be of low vulnerability, high recoverability, and high value. The sensitivity of the receptor is therefore deemed to be medium.

Magnitude of Impact

There are no expected impacts to subsea cables and pipelines from vessels associated with the construction of the proposed development. Vessels will be transiting backwards and forwards between ports, the Operation and Maintenance Facility (OMF) and the offshore development area. Due to the closest assets (subsea cables) being located at least 0.5km from the offshore development area and the transient nature of the majority of vessels journeying between the ports and offshore development area, there will be little risk of impact to subsea cables and pipelines. Any vessels requiring to undertake construction works within the advisory safety zones will have provided advance notice to other mariners of their intentions and maintenance duration / activities.

Impacts are considered to be of low spatial extent and likelihood of occurrence, short-term duration, intermittent frequency and any impact is reversible.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the subsea cable and pipeline receptors for Project Option 1 and Project Option 2 is medium and the magnitude of the impact is low. The medium sensitivity and low magnitude of the impact on cable and pipeline receptors could result in a slight effect, which is not significant in EIA terms.

20.5.2.2 Impact 2 – Disturbance and Damage Impacts on Subsea Cable and Pipeline Assets and Infrastructure from Construction Activities And Vessels

The construction of the proposed development presents a risk to existing cables and pipelines through the deployment of JUVs, anchor placement, Pre-Lay Grapnel Run (PLGR) and cable and foundation installation. There is a risk that these activities can potentially damage subsea cables and pipelines when there are in proximity to the proposed development. This may result in damage causing a reduction in efficiency, cable de-burial or potential failure of the assets.

Sensitivity of the Receptor

As per Impact 1 above, subsea cables and pipelines, are being located outside of the offshore development area and are only present within the wider study area. While providing essential power, telecommunications and gas supplies to Ireland, where failure of the supply would have a significant economic effect, the subsea cables and pipelines are deemed to be of low vulnerability, high recoverability, and high value. The sensitivity of the receptor is therefore deemed to be medium.

Magnitude of Impact

The impact of damage to a subsea cable or pipeline could potentially extend beyond the study area given the consequences arising from a power or gas supply failure, however since the subsea cables and pipelines are located outside of the offshore development area and only within the wider study area, the risk of any direct damage is negligible in terms of spatial effect. The risk of any indirect impacts occurring would also be negligible. This is because indirect damage would be from increased suspended sediment concentration (SSC) and subsequent sedimentation, but given that cables will be either buried or protected, no impacts are expected from deposition of sediment. Construction works would have no connectivity to these assets, so there would be a low spatial extent and likelihood of occurrence, short-term duration and intermittent frequency. The likelihood of failure is extremely low and any damage is likely to be reversible.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct disturbance and damage to existing assets and infrastructure from construction activities and vessels would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the subsea cable and pipeline receptors for Project Option 1 and Project Option 2 is medium and the magnitude of the impact is low. The medium sensitivity and low magnitude of the impact on subsea cable and pipeline receptors could result in a slight effect, which is not significant in EIA terms.

20.5.2.3 Impact 3 – Direct Displacement or Access Impacts on Marine Recreational Activities from Increased Vessel Movements and the use of Advisory Safety Zones

Recreational Sailing

Sensitivity of the Receptor

There are no sailing clubs or marinas within the study area. However, sailing does occur off the east coast of Ireland more broadly. Additionally, data presented in Ireland's Marine Atlas indicates that there is little sailing activity within the array area or ECC. As such, the sensitivity of the receptor has been assessed as low.

Magnitude of Impact

The safety and practical use of recreational sailing craft has been considered in the Shipping and Navigation chapter. Impacts from construction activities could restrict access to the inshore and offshore environment for recreational sailing activities. Restricted access to locations will be temporary in nature. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the recreational sailing receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on recreational sailing receptors could result in a slight effect, which is not significant in EIA terms.

Other Water Sports

Sensitivity of the Receptor

There are no wind, kite or wave surf clubs within the study area. However, wind sports and surfing occur within the nearshore areas of the study area.

Due to lack of spatial overlap with the offshore development area, it is assumed that there will be a very low number of water sports users that would be affected by any displacement or access impacts associated with increased vessel movements and the use of advisory safety zones. Any potential displacement would be limited to access during construction on Bremore Beach, and there would be high recoverability once construction was complete.

The sensitivity of wind, wave and paddle sport users to displacement or access impacts is considered to be low for both Project Option 1 and Project Option 2, as users are typically limited to the nearshore areas of the study area, and the offshore development boundary does not overlap with any known sites or water sports centres.

Magnitude of Impact

Vessel movements and advisory safety zones will mostly affect areas further offshore and water sports mostly take place in nearshore waters. It is assumed that there will be a very low number of water sports users that would be sensitive to any displacement or access impacts associated with increased vessel movements and the use of advisory safety zones.

It is considered that there is availability of alternative sites for these activities in the immediate area but at sufficient distance from the construction activities to avoid an impact.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones would be low.

Sensitivity of the Effect

Overall, it is predicted that the sensitivity of other water sport receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on other water sport receptors could result in a slight effect, which is not significant in EIA terms.

Angling

Sensitivity of the Receptor

The majority of recreational and charter angling takes place in nearshore and coastal waters. Although angling may occur in the study area, sites within the array area have not been identified as sites for offshore angling activities. Therefore, the sensitivity of the receptor to displacement or access impacts from the construction of the proposed development is considered to be low.

Magnitude of Impact

Potential impacts on recreational and charter angling from construction activities may result from reduction in access and displacement from construction vessels and advisory construction safety zones. Given the proximity of most recreational and charter angling to the coast and the spatial extent of the impact is limited, and it is assumed that very few angling receptor would be sensitive to any displacement or access impacts associated with increased vessel movements and the use of advisory safety zones. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of other water sport receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on angling receptors could result in a slight effect, which is not significant in EIA terms.

20.5.2.4 Impact 4 - Indirect Disturbance or Displacement Impacts on Marine Recreational Activities from Construction Activities (Causing Increased Sediment Dispersion and/or Noise Impacts, and/or Impacts to Fish Species)

Recreational Sailing

Sensitivity of the Receptor

There are no sailing clubs or marinas within the study area however, sailing does occur off the east coast of Ireland more broadly. Additionally, data presented in Ireland's Marine Atlas indicates that there is little sailing activity within the array area or ECC.

An increase in SSC can reduce water clarity and noise increase can create disturbance, which may deter recreational sailors from using the area. The sensitivity of the receptor is low.

Magnitude of the Impact

Potential impacts on recreational sailing from construction activities may result from indirect disturbance or displacement impacts, due to increase in sediment dispersion and or noise impacts, this is likely to be limited to a low number of recreational sailors due to the limited sailing within the area. Impacts are likely to be of moderate spatial extent, extending as far as the study area boundary, but of momentary duration, with very slight change from baseline conditions. As such, the magnitude of impact from Project Option 1 and Project Option 2 would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of recreational sailing receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on recreational sailing receptors could result in a slight effect, which is not significant in EIA terms.

Other Water Sports

Sensitivity of the Receptor

There are no wind, kite or wave surf clubs within the study area; however, wind sports and surfing occur within the nearshore areas of the study area.

Due to lack of spatial overlap with the offshore development area, it is assumed that there will be a very low number of water sports users that would be affected by indirect disturbance or displacement impacts due to increase in sediment dispersion and or noise impacts. Any potential displacement would be limited to access during construction on Bremore Beach, and there would be high recoverability once construction was complete.

The sensitivity of wave, wind and paddle sports to noise and SSC impacts is low, as water clarity and noise propagation may create disturbance but will not affect the ability of users to operate.

Magnitude of the Impact

Potential impacts on other water sports from construction activities may result from indirect disturbance or displacement impacts, due to increase in sediment dispersion and or noise impacts. Impacts are likely to be of moderate spatial extent, extending as far as the study area boundary. However, indirect disturbance or displacement due to increased suspended sediment or noise will have fewer effects on nearshore activities, and alternative sites are available. The duration of the impact is likely to be momentary, causing very slight change from baseline conditions. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 would be low.

Significant of the Effect

Overall, it is predicted that the sensitivity of other water sports receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on other water sports receptors could result in a slight effect, which is not significant in EIA terms.

Angling

Sensitivity of the Receptor

The majority of recreational and charter angling takes place in nearshore and coastal waters. Although angling may occur anywhere within the study area, no designated angling sites have been identified within the offshore development area during data collection and collation (Section 20.2.4, Table 20.2).

Due to the proximity of most recreational and charter angling to the coast, the sensitivity of the receptor to impacts from the proposed development is considered to be low.

Magnitude of the Impact

There is potential for indirect impacts on recreational and charter angling target species through SSC increase and potential noise. Impacts may extend to angling grounds beyond the immediate footprint of construction activities. Disturbed fish species will return immediately following the construction phase, as shown in the Fish and Shellfish Chapter, so recoverability will be high.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from indirect disturbance or displacement from construction activities causing increased sediment dispersion and/or noise impacts, and/or noise impacts to fish species will be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of angling receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on angling receptors could result in a slight effect, which is not significant in EIA terms.

20.5.2.5 Impact 5 - Indirect Disturbance Impacts on Defence and Security from Construction Activities Within the ECC

Sensitivity of the Receptor

The ECC is aligned through Danger Area EID1. This is an active area within with the DoD undertake firing activities and there may also be military vessels undertaking practice operations in the area (which may be limited to safety or patrol vessels).

Vulnerability and value of the receptor are high, with high recoverability. The sensitivity of the receptor is considered to be high for both Project Option 1 and Project Option 2, given the location of the ECC within the military danger area.

Magnitude of Impact

The proposed development will require access within the Danger Area EID1 over several months including increased vessel traffic and construction activities (including the HDD exit pit, pre-cabling laying preparation and cable laying of the ECC).

The proposed development will adhere to marine notices issued in relation to Danger Area EID1 and undertake consultation with the DoD prior to any construction works within the ECC (as per the embedded mitigation outlined in Table 20.9) to ensure the risk of disturbance and disruption to military activities and practices will be minimised as far as practicable. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from indirect disturbance from construction activities within the ECC will be negligible.

Significance of the Effect

Overall, it is predicted that the sensitivity of defence and security receptors for Project Option 1 and Project Option 2 is high and the magnitude of the impact is negligible. The high sensitivity and negligible magnitude of the impact on defence and security receptors result in a not significant level of effect, which is not significant in EIA terms.

20.5.3 Operational Phase

20.5.3.1 Impact 6 - Direct Displacement or Access Impacts on Subsea Cables and Pipelines from Increased Vessel Movements and the use of Advisory Safety Zones

Sensitivity of the Receptor

During the operational phase there will be a requirement to have repair and maintenance activities undertaken regularly which will result in an increased number of vessels within the offshore development area.

Increased vessel movements and the use of advisory safety zones can restrict the access to subsea cables and pipelines, which could cause obstruction or delay to operators if the existing infrastructure requires maintenance or repair. Although there are a total of six cables and pipelines within the study area including the Scotland-Ireland Interconnector IC2 (which is within 0.5km of the closest point of the proposed development), there will be no physical overlap of the proposed development with any cables or pipelines belonging to other users. The subsea cables and pipelines are deemed to be of low vulnerability, high recoverability, and high value and therefore the sensitivity of the receptor is therefore deemed to be medium.

Magnitude of Impact

Due to the closest assets (subsea cables) being located at least 0.5km from the offshore development area and the transient nature of the majority of vessels journeying between the ports and offshore development area there will be little risk of impact to subsea cables and pipelines. Any vessels requiring to undertake maintenance works within the advisory safety zones will have provided advance notice to other mariners of their intentions and maintenance duration / activities. The magnitude of the impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones is assessed as low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the subsea cable and pipeline receptors for Project Option 1 and Project Option 2 is medium and the magnitude of the impact is low. The medium sensitivity and low magnitude of the impact on subsea cable and pipeline receptors could result in a slight effect, which is not significant in EIA terms.

20.5.3.2 Impact 7 - Direct Disturbance and Damage Impacts on Subsea Cable and Pipeline Assets and Infrastructure from Operational Activities and Vessels

Sensitivity of the Receptor

Operational activities associated with the proposed development present a risk to existing cables and pipelines through the deployment of JUVs and anchor placement. There is potential for these activities to damage, reduce efficiency, de-bury or cause failure of subsea cables and pipelines if they are in close proximity to the proposed development.

As per for Impact 6 above, subsea cables and pipelines, are being located outside of the offshore development area and are only present within the study area. While providing essential power, telecommunications and gas supplies to Ireland, where failure of the supply would have a significant economic effect, the subsea cables and pipelines are deemed to be of low vulnerability, high recoverability, and high value. The sensitivity of the receptor is therefore deemed to be medium.

Magnitude of the Effect

Spatial extent is low and there is a low likelihood of occurrence, short-term duration, intermittent frequency and high reversibility during operational activities. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct disturbance and damage to existing assets and infrastructure from operational activities and vessels is considered to be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of subsea cables and pipeline receptors for Project Option 1 and Project Option 2 is medium and the magnitude of the impact is low. The medium sensitivity and low magnitude of the impact on subsea cable and pipelines receptors could result in a slight effect, which is not significant in EIA terms.

20.5.3.3 Impact 8 - Direct Displacement or Access Impacts on Marine Recreational Activities from Increased Vessel Movements, Infrastructure (E.G. WTGs) and the use of Advisory Safety Zones

Allision risk and obstruction implications for recreational vessels has been considered in the Shipping and Navigation Chapter. The presence of infrastructure is not considered likely to affect the majority of inshore and coastal marine recreational activity given its location offshore and the continued access to the development area for recreational use once fully operational.

Recreational Sailing

Sensitivity of the Receptor

Impacts from operations and maintenance activities could restrict access to the inshore and offshore environment for recreational activities. There are no sailing clubs or marinas within the study area and data presented in Ireland's Marine Atlas indicates that there is little sailing activity within the array area or ECC. Therefore, the sensitivity of the receptor has been assessed as low.

Magnitude of Impact

The operational phase of the proposed development could cause obstructions for recreational vessel users. Sailing activity within the array area is low and alternative locations are available.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements, infrastructure (e.g. WTG) and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the marine recreational activity receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on recreational sailing receptors could result in a slight effect, which is not significant in EIA terms.

Angling

Sensitivity of the Receptor

Given the range of alternative areas throughout the Irish Sea, recreational anglers are considered to be of low vulnerability and high recoverability. The sensitivity of the receptor is therefore considered to be low.

Magnitude of Impacts

During the operational phase, there is potential for vessel movements, infrastructure and the use of advisory safety zones to cause displacement or access impacts to angling activities. Given the proximity of most recreational and charter angling to the coast and the limited spatial extent of the impact, it is assumed that few angling receptors would be impacted by direct displacement or access impacts.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements, infrastructure (e.g. WTGs) and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the angling receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on angling receptors could result in a slight effect, which is not significant in EIA terms.

20.5.3.4 Impact 9 - Indirect Activity Impacts on Marine Recreational Activities from the Physical Presence of Infrastructure (e.g. WTGs)

Other Water Sports

Sensitivity of the Receptor

The sensitivity of water sports to impacts from the physical presence of infrastructure is considered to be low, given the nearshore nature of activities and availability of alternative locations.

Magnitude of Impacts

Due to the distance offshore, the array area is not likely to cause disturbance through obstruction of activities. There is potential for offshore infrastructure to affect wind and wave conditions by reducing and redirecting energy in the air and water passing through. This could have an impact on relevant wave- and wind-based surfing activities (Surfers against Sewage; SAS, 2009). However, the scale of wave height reductions has been assessed as imperceptible in the Physical Processes chapter; therefore, no physical impacts are anticipated on wave sports. Additionally, any impacts on onshore wind speeds, which are used by kitesurfers and windsurfers, are anticipated to be minimal.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements, infrastructure (e.g. WTGs) and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the other water sport receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on other water sport receptors could result in a slight effect, which is not significant in EIA terms.

Angling

Sensitivity of the Receptor

Given the distribution of target species throughout the Irish Sea, recreational anglers are considered to be of low vulnerability and high recoverability. The sensitivity of the receptor is therefore considered to be low.

Magnitude of Impacts

During the operational phase, there are generally few impacts on fish, as the targeted resource for anglers, from the physical presence of infrastructure. The magnitude of impacts from the physical presence of infrastructure is considered to be limited, with the only likely significant effects arising from electromagnetic fields (EMF). The potential impacts of operational cables on electro-sensitive species are likely to be low, on the basis of the highly localised spatial extent.

Associated maintenance activities are not anticipated to generate significant impacts on target species. A detailed assessment of the likely significant effects on fish and shellfish ecology has been undertaken in the Fish and Shellfish Chapter and are summarised in Table 20.10, and justifications are not duplicated in this chapter.

Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from indirect activity impacts on marine recreational activities from the physical presence of infrastructure would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the angling receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on angling receptors could result in a slight effect, which is not significant in EIA terms.

20.5.3.5 Impact 10 - Indirect Disturbance Impacts on Defence and Security from Repair and Maintenance Activities within the ECC

Sensitivity of the Receptors

The ECC is aligned through Danger Area EID1. This is an active area within with the DoD undertake firing activities and there may also be military vessels undertaking practice operations in the area (which may be limited to safety or patrol vessels).

Vulnerability and value of the receptor are high, with high recoverability. The sensitivity of the receptor is considered to be high, given the location of the ECC within the military danger area.

Magnitude of Impact

The proposed development will require access within the Danger Area EID1 during the operational phase of the development to undertake maintenance activities on the offshore export cable.

The proposed development will adhere to will adhere to marine notices issued in relation to Danger Area EID1 and undertake consultation with the DoD prior to any maintenance works that infringe on Danger Area EIDI (as per the embedded mitigation outlined in Table 20.9) to ensure the risk of disturbance and disruption to military activities and practices will be minimised as far as practicable. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from indirect disturbance from maintenance activities within the ECC will be negligible.

Significance of the Effect

Overall, it is predicted that the sensitivity of the defence and security receptors for Project Option 1 and Project Option 2 is high and the magnitude of the impact is low. The high sensitivity and negligible magnitude of the impact on defence and security receptors result in a not significant level of effect, which is not significant in EIA terms.

20.5.4 Decommissioning

20.5.4.1 Impact 11 - Direct Displacement or Access Impacts on Subsea Cables and Pipelines from Increased Vessel Movements and the use of Advisory Safety Zones

Sensitivity of the Receptor

The potential for disturbance and access impacts associated with increased vessel movements and the use of advisory safety zones during decommissioning activities will be similar to those for construction and of a similar magnitude (refer to Impact 1).

The sensitivity of the receptor has been assessed as medium.

Magnitude of Impact

Potential impacts on subsea cables and pipelines during the decommissioning phase of the proposed development are deemed to be similar to those for construction and are of a similar magnitude. Due to the closest assets (subsea cables) being located at least 0.5km from the offshore development area and the transient nature of the majority of vessels journeying between the ports and offshore development area there will be little risk of impact to subsea cables and pipelines. Any vessels requiring to undertake decommissioning works within the advisory safety zones will have provided advance notice to other mariners of their intentions and maintenance duration / activities.

The magnitude of impact from Project Option 1 and Project Option 2, resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of the subsea cable and pipeline receptors for Project Option 1 and Project Option 2 is medium and the magnitude of the impact is low. The medium sensitivity and low magnitude of the impact on subsea cable and pipeline receptors could result in a slight effect, which is not significant in EIA terms.

20.5.4.2 Impact 12 - Direct Disturbance and Damage Impacts on Subsea Cable and Pipeline Assets and Infrastructure from Decommissioning Activities

Sensitivity of the Receptor

The potential for disturbance and damage impacts to existing assets during decommissioning activities will be similar to those for construction and of a similar magnitude (refer to Impact 2).

The sensitivity of the receptor to direct disturbance and damage to subsea cables and pipelines from decommissioning activities is deemed to be medium.

Magnitude of the Impact

The magnitude of impact from Project Option 1 and Project Option 2, resulting from direct disturbance and damage to existing assets and infrastructure from decommissioning activities would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of subsea cable and pipeline receptors for Project Option 1 and Project Option 2 is medium and the magnitude of the impact is low. The medium sensitivity and low magnitude of the impact on subsea cable and pipeline receptors could result in a slight effect, which is not significant in EIA terms.

20.5.4.3 Impact 13 - Direct Displacement or Access Impacts on Marine Recreational Activities from Increased Vessel Movements and the use of Advisory Safety Zones

Sensitivity of the Receptor

Overall, the sensitivity of marine recreational activity receptors to direct displacement or access impacts due to vessel movements and the use of advisory safety zones is deemed to be low (refer to Impact 3).

Magnitude of Impact

Potential impacts on marine recreational activities during the decommissioning phase of the proposed development will be similar to those for construction and are of a similar magnitude.

The magnitude of impact from Project Option 1 and Project Option 2 resulting from direct displacement or access impacts associated with increased vessel movements and the use of advisory safety zones would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of marine recreational activity receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on marine recreational activities could result in a slight effect, which is not significant in EIA terms.

20.5.4.4 Impact 14 - Indirect Disturbance or Displacement Impacts on Marine Recreational Activities from Decommissioning Activities (Causing Increased Sediment Dispersion and/or Noise Impacts and/or Impacts to Fish Species)

Sensitivity of the Receptor

Overall, the sensitivity of marine recreational activity receptors to indirect disturbance or displacement from decommissioning activities is deemed to be low.

Magnitude of Impact

Potential impacts on marine recreational activities during the decommissioning phase of the proposed development will be similar to those for construction and are of a similar magnitude.

The magnitude of impact from Project Option 1 and Project Option 2 resulting from indirect disturbance or displacement from decommissioning activities causing increased sediment dispersion and/or noise impacts and/or impacts to fish species would be low.

Significance of the Effect

Overall, it is predicted that the sensitivity of marine recreational activity receptors for Project Option 1 and Project Option 2 is low and the magnitude of the impact is low. The low sensitivity and low magnitude of the impact on marine recreational activity receptors could result in a slight effect, which is not significant in EIA terms.

20.5.4.5 Impact 15 - Indirect Disturbance Impacts on Defence and Security from Decommissioning within the ECC

Sensitivity of the Receptor

The ECC is aligned through Danger Area EID1. This is an active area within with the DoD undertake firing activities and there may also be military vessels undertaking practice operations in the area (which may be limited to safety or patrol vessels).

Vulnerability and value of the receptor are high, with high recoverability. The sensitivity of the receptor is considered to be high, given the location of the ECC within the military danger area (refer to Impact 5).

Magnitude of Impact

The proposed development may potentially require access within the Danger Area EID1 to remove cables (if required). It is envisaged that, where appropriate, buried assets such as cables will be left in situ when the proposed development is decommissioned. However, discussions with stakeholders and regulators may identify the need for cables to be wholly or partially removed.

The proposed development will adhere to issued notices by the DoD and undertake consultation with the DoD prior to any construction works within the ECC (as per the embedded mitigation outlined in Table 20.9) to ensure the risk of disturbance and disruption to military activities and practices will be minimised as far as practicable. Consequently, the magnitude of impact from Project Option 1 and Project Option 2 resulting from indirect disturbance from construction activities within the ECC will be negligible.

Significance of the Effect

Overall, it is predicted that the sensitivity of defence and security receptors for Project Option 1 and Project Option 2 is high and the magnitude of the impact is negligible. The high sensitivity and medium magnitude of the impact on defence and security receptors during decommissioning result in a not significant level of effect, which is not significant in EIA terms.

20.6 Mitigation and Monitoring Measures

Mitigation measures that were identified and adopted as part of the evolution of the proposed development design (embedded into the proposed development design) and that are relevant to I&OU are listed in Table 20.9 and not considered again here. No additional mitigation and monitoring measures specific to infrastructure and other users were identified in this assessment.

20.7 Residual Effects

This section presents the residual effects of the proposed development once the mitigation outlined in Section 20.4 has been applied. For infrastructure and other users no additional mitigation is proposed, as outlined in Section 20.6, and as such the residual effects of the project remain the same as the likely significant effects identified in Section 20.5, which takes into account the embedded mitigation identified in Section 20.4.2.

Potential impact	Likely significant effect (pre- mitigation) – Project Option 1	Likely significant effect (pre- mitigation) – Project Option 2	Residual effect – Project Option 1	Residual effect – Project Option 2
Construction				
Impact 1: Direct displacement or access impacts on subsea cables and pipelines associated with increased vessel movements and the use of advisory safety zones	Slight	Slight	Slight	Slight

Table 20.11 Residual effects relating to I&OU

Potential impact	Likely significant effect (pre- mitigation) – Project Option 1	Likely significant effect (pre- mitigation) – Project Option 2	Residual effect – Project Option 1	Residual effect – Project Option 2
Impact 2: Disturbance and damage impacts on subsea cables and pipelines assets and infrastructure from construction activities and vessels	Slight	Slight	Slight	Slight
Impact 3: Direct displacement or access impacts on marine recreational activities from increased vessel movements and the use of advisory safety zones	Recreational sailing receptors Slight	Recreational sailing receptors Slight	Recreational sailing receptors Slight	Recreational sailing receptors Slight
	Other water sports Slight	Other water sports Slight	Other water sports receptors Slight	Other water sports receptors Slight
	Angling receptors Slight	Angling receptors Slight	Angling receptors Slight	Angling receptors Slight
Impact 4: Indirect disturbance or displacement impacts on marine recreational activities from construction activities (causing increased sediment dispersion and/or noise impacts, and/or impacts to fish	Recreational sailing receptors Slight	Recreational sailing receptors Slight	Recreational sailing receptors Slight	Recreational sailing receptors Slight
species)	Other water sports Slight	Other water sports Slight	Other water sports Slight	Other water sports Slight
	Angling Slight	Angling Slight	Angling Slight	Angling Slight
Impact 5: Indirect disturbance impacts on defence and security from construction activities within the ECC	Not significant	Not significant	Not significant	Not significant
Operation				
Impact 6: Direct displacement or access impacts on subsea cables and pipelines from increased vessel movements and the use of advisory safety zones	Slight	Slight	Slight	Slight
Impact 7: Direct disturbance and damage impacts on subsea cables and pipelines assets and infrastructure from operational activities and vessels	Slight	Slight	Slight	Slight
Impact 8: Direct displacement or access impacts on marine recreational activities from increased vessel movements, infrastructure (e.g. WTGs) and the use of	Recreational sailing Slight	Recreational sailing Slight	Recreational sailing Slight	Recreational sailing Slight
advisory safety zones	Angling Slight	Angling Slight	Angling Slight	Angling Slight
Impact 9: Indirect activity impacts on marine recreational activities from the physical presence of infrastructure (e.g. WTGs)	Other water sports Slight	Other water sports Slight	Other water sports Slight	Other water sports Slight

Potential impact	Likely significant effect (pre- mitigation) – Project Option 1	Likely significant effect (pre- mitigation) – Project Option 2	Residual effect – Project Option 1	Residual effect – Project Option 2		
	Angling	Angling	Angling	Angling		
	Slight	Slight	Slight	Slight		
Impact 10: Indirect disturbance impact on defence and security from repair and maintenance activities within the ECC	Not significant	Not significant	Not significant	Not significant		
Decommissioning						
Impact 11: Direct displacement or access impacts on subsea cables and pipelines from increased vessel movements and the use of advisory safety zones	Slight	Slight	Slight	Slight		
Impact 12: Direct disturbance and damage impacts on subsea cables and pipelines assets and infrastructure from decommissioning activities	Slight	Slight	Slight	Slight		
Impact 13: Direct displacement or access impacts on marine recreational activities from increased vessel movements and the use of advisory safety zones	Slight	Slight	Slight	Slight		
Impact 14: Indirect disturbance or displacement impacts on marine recreational activities from decommissioning activities (causing increased sediment dispersion and/or noise impacts and/or impacts to fish species)	Slight	Slight	Slight	Slight		
Impact 15: Indirect disturbance impacts on defence and security from decommissioning within the ECC	Not significant	Not significant	Not significant	Not significant		

20.8 Transboundary Effects

Transboundary effects are defined as those effects upon the receiving environment of other states, whether occurring from the proposed development alone, or cumulatively with other projects in the wider area. No transboundary effects have been identified. This is because any likely significant effects on I&OU receptors are anticipated to be within 12km of the offshore development area, which is entirely within the Ireland Exclusive Economic Zone (EEZ).

20.9 Cumulative Effects

Likely significant cumulative effects of the proposed development in-combination with existing and / or approved projects for I&OU have been identified, considered and assessed. The methodology for this cumulative assessment is a three-stage approach which is presented in the Cumulative and Inter-Related Effects Chapter.

The Cumulative and Inter-Related Effects Chapter contains the outcome of Stage 1 Establishing the list of 'Other Existing and/or Approved Projects'; and Stage 2 'Screening of 'Other Existing and/or Approved Projects'. This section presents Stage 3, an assessment of whether the proposed development in combination with other projects, grouped in tiers, would be likely to have significant cumulative effects.

The assessment specifically considers whether any of the existing or approved developments in the local or wider area have the potential to alter the significance of effects associated with the proposed development.

Developments which are already built and operating, and which are not identified in this chapter, are included in the baseline environment or have been screened out as there is no potential to alter the significance of effects.

The assessment of cumulative effects has considered likely significant effects that may arise during construction, operation and decommissioning of the proposed development. Cumulative effects were assessed to a level of detail commensurate with the information that has either been directly shared with the proposed development or was publicly available at the time of assessment.

Given the location and nature of the proposed development, a tiered approach to establishing the list of other existing and/or approved projects has been undertaken in Stage 1 of the cumulative effects assessment. The tiering of projects is based on project relevance to the proposed development, and it is not a hierarchical approach nor based on weighting. Further information on the tiers is provided in Section 20.10.2 and in the Cumulative and Inter-Related Effects Chapter.

20.9.1 I&OU Cumulative Screening Exercise

The existing and/or approved projects selected as relevant to the cumulative effects assessment of impacts to I&OU are based on an initial screening exercise undertaken on a long list (see Cumulative and Inter-Related Effects Chapter). Consideration of effect-receptor pathways, data confidence and temporal and spatial scales has allowed the selection of the relevant projects the I&OU cumulative short-list.

When assessing likely significant effects for I&OU, projects were screened into the assessment based on their ability to impact receptors within a 12km screening range surrounding the array area and a 12km range around the offshore ECC, representing one tidal ellipse distance for a single tidal cycle and therefore encompasses the extent of impacts to I&OU from the proposed development.

For the full list of projects considered, including those screened out, please see the Cumulative and Inter-Related Effects Chapter and Appendix 38.2.

20.9.2 Projects Considered within the Cumulative Effects Assessment

The planned, existing and/or approved projects selected through the screening exercise as potentially relevant to the assessment of impacts to I&OU are presented in Table 20.12.

The tiers for the assessment are:

- Tier 1 is limited to the Operation and Maintenance Facility (OMF) for the proposed development. The OMF option being considered involves the adaption and leasing part of an existing port facility at Greenore. Further detail is provided in The Offshore Description Chapter.
- Tier 2 is the east coast Phase One Offshore Wind Farms.
- Tier 3 is all other projects that have been screened in for this topic.

The tiering structure is intended to provide an understanding of the potential for likely significant effects of the proposed development with the construction of its OMF (tier one), followed by a cumulative assessment of the likely significant effect of that scenario combined with the east coast Phase One Offshore Wind Farms (tier two); and lastly the combination of the tier one and tier two with all other existing and/or approved projects that have screened in (tier three).

The screening exercise undertaken for I&OU resulted in projects being identified for assessment in tier three only. The OMF and the east coast Phase One Offshore Wind Farms are at a sufficient distance from the project that the potential physical extents of their impacts (direct or indirect) will not overlap for I&OU receptors with impacts from the proposed development.

Table 20.12 Projects and plans considered within the cumulative impact assessment

Development type	Project	Status	Data confidence	Distance to the proposed development		Justification for screening into the cumulative effects assessment	
				Array area	ECC		
Tier 1	Operations and Maintenance Facility (OMF)	Not screened into the cumulative assessment for infrastructure and other users.					
Tier 2							
Phase One Offshore wind	Oriel Wind Park	Not screened into t	he cumulative assessment for	infrastructure a	and other users.		
farm	Dublin Array Offshore Wind Farm	Not screened into the cumulative assessment for infrastructure and other users.					
	Codling Wind Park	Not screened into the cumulative assessment for infrastructure and other users.					
	Arklow Bank Phase 2	Not screened into the cumulative assessment for infrastructure and other users.					
Tier 3							
Subsea cables	Havhingsten Telecommunication Cable	Operational	High	0.7km	9.7km	Independent project within 12km of proposed development Ongoing impacts from the operation and maintenance of	
	Rockabill Telecoms Cable	Operational	High	4.9km	13.0km	receptors cumulatively with the construction, operations and decommissioning activities of the proposed development.	
	East West Interconnector	Operational	High	5.0km	11.4km		
	HIBERNIA 'C'	Operational	High	7.7km	17.0km		
	SIRIUS SOUTH	Operational	High	9.4km	18.7km		
	CeltixConnect - Sea Fibre Networks	Operational	High	11.3km	20.1km		
	ZAYO Emerald Bridge One	Operational	High	12.1km	20.2km		

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Development type	Project	Status	Data confidence	Distance to the proposed development		Justification for screening into the cumulative effects assessment	
				Array area	ECC		
Surveys	MaresConnect Electricity Interconnector Site Investigation	Consultation	Medium – Foreshore Licence Application in consultation. Reference FS007635	17.9km	2.0km	Site investigation works to inform development of a subsea cable 2km from the offshore development area at the closest point. Site investigation works have the potential to increase vessel numbers in the study area.	
Coastal Assets & Infrastructure	Greater Dublin Drainage Outfall Pipe	Licence valid 2020 to 2045	High	11.3km	24.8km	Installation activities are likely to result in temporary, short- term seabed disturbances	
Dumping at Sea	Drogheda Port Company – Dumping Site A1	Active	High	11.7km	10.2km	Ongoing dumping at sea activities during within the study area and within the proposed development construction phase may	
	Drogheda Port Company – Dumping Site A2	Active	High	11.7km	10.2km	result in a cumulative increase in 55C	
O&G pipelines	PL938: Interconnector Scotland to Ireland IC1	Active	High	4.2km	10.6km	Pipelines may require maintenance activities which may result in short-term, temporary seabed disturbance.	
	PL1890: Interconnector Scotland to Ireland IC2	Active	High	0.5km	2.7km		

20.9.3 Project Impacts and Options Included in the Assessment

The identification of potential impacts for the cumulative assessment has been undertaken by considering the relevant characteristics from both project options (refer to Section 20.4.3) and the potential for a pathway for them to have direct and indirect effects on known receptors (as identified in Section 20.5) when combined with other projects.

For each impact, the project option with the greatest potential for a likely significant effect has been determined based on the comparison and justification provided in Table 20.10. The impacts considered in the cumulative assessment are presented in Table 20.13. As the residual effects for Project Option 1 and Project Option 2 are the same (as identified in Section 20.7), the cumulative effects assessment presented in this section applies to both options.

As the only direct physical overlap between the offshore development area with an infrastructure and other user receptor is the DoD Danger Area EID1, it is not anticipated that a pathway exists for cumulative direct disturbance and damage to subsea cables and pipelines during all phases. This impact is therefore not considered further.

No existing or other projects have been identified in the cumulative long list as occurring within the array area. Therefore, it is not anticipated that a pathway exists for cumulative direct disturbance with the array area on marine recreational activities. This impact is therefore not considered further.

Potential cumulative impact	Phase	Tiers and projects	Justification for inclusion in cumulative effects assessment
1. Direct displacement or access impacts on subsea cables and pipelines associated with increased vessel movements and the use of advisory safety zones	Construction, operation and decommissioning	Tier 3 – Subsea cables and oil and gas (O&G) pipelines	The construction and operation of other projects may cause an increase in vessel traffic in the study area which may impact on subsea cables and pipelines maintenance activities.
2. Direct displacement or access impacts on marine recreational activities from increased vessel movements and the use of advisory safety zones	Construction, operation and decommissioning	Tier 3 – Subsea cables, O&G pipelines	The construction and operation of other projects may cause an increase in vessel traffic in the study area which may impact on marine recreational activities.
3. Indirect disturbance or displacement impacts on marine recreational activities (from construction and decommissioning activities causing increased sediment dispersion and/or noise impacts, and/or impacts to fish species)	Construction and decommissioning	Tier 3 –Subsea cables, coastal assets and infrastructure, Dumping at Sea and O&G pipelines	Construction and decommissioning works can cause temporary increase in SSC and associated sediment deposition and increases in underwater noise, which may affect sensitive fish and shellfish receptors, indirectly affecting marine recreational activity receptors (angling).
4. Indirect disturbance impacts on defence and security from proposed development works within the ECC	Construction, operation and decommissioning	Tier 3 – Interconnector 2 Scotland to Ireland IC2 pipeline; Dumping at Sea sites	There is the potential for maintenance activities from other projects to have a cumulative effect on the DoD Danger Area E1D1 as there is a temporal and physical overlap with the proposed development.

Table 20.13 Project option considered for the assessment of potential cumulative impacts

20.9.3.1 Cumulative Impact 1 - Direct Displacement or Access Impacts on Subsea Cables and Pipelines Associated with Increased Vessel Movements and the use of Advisory Safety Zones

Tier 1

The OMF at Greenore (which is beyond the study area) has not been screened into the cumulative effects assessment as it is not anticipated there will be any physical effect overlap with receptors due to the distance between the OMF and the offshore infrastructure area (ECC and array area).

Tier 1 and 2

The Phase One offshore wind farms (which are all beyond the study area) have not been screened into the cumulative effects assessment as it is not anticipated that there will be any physical effect overlap with receptors due to the distance between the wind farms and the offshore infrastructure area (ECC and array area) (refer to the Cumulative and Inter-Related Effects Chapter for details on their position).

Tier 1 and 2 and 3 (All Tiers)

No Tier 1 or Tier 2 projects have been screened into the assessment of Cumulative Impact 1.

Projects that are screened into Tier 3 that may possibly have a cumulative impact with the proposed development during construction, operation and decommissioning phases on subsea cables and pipelines receptors from increased vessel movements are limited to the proposed MaresConnect subsea cable, and existing cables and pipelines that may have ongoing maintenance activities (refer to Table 20.13).

All subsea cables and pipeline receptors are located outside of the offshore development area, the only potential cumulative effect on these receptors are from vessels transiting beyond the offshore development area within the study area and combining with the vessel movements from other projects.

This could interfere with vessels involved with maintenance works for the receptors. These impacts will be of local and temporary duration. In the project alone assessment, the sensitivity of the receptors to the impact is deemed to be medium and this is retained the cumulative assessment.

Although several subsea cable and pipeline projects have been screened into the cumulative effects assessment, their position is outside of the offshore development area and operational activities for these other projects are expected to involve infrequent maintenance works. There is no publicly available information on the exact location of MaresConnect subsea cable; however, it is anticipated to make landfall at one of five locations off the coast of County Dublin, including Ardgillan, Balcarrick, Loughshiny, Robswalls or Rush, as indicated by the MaresConnect Interconnector foreshore licence application. As such, construction works for MaresConnect are not anticipated to overlap spatially with proposed development works. Taking this into account the magnitude of impact on receptors is anticipated to be negligible.

Given the medium sensitivity and negligible magnitude, the significance of the effect throughout the construction, operation and decommissioning phases will be not significant, which is not significant in EIA terms.

20.9.3.2 Cumulative Impact 2 – Direct Displacement or Access Impacts on Marine Recreational Activities from Increased Vessel Movements and the use of Advisory Safety Zones

Tier 1

The OMF at Greenore (which is beyond the study area) has not been screened into the cumulative effects assessment as it is not anticipated there will be any physical effect overlap with receptors due to the distance between the OMF and the offshore infrastructure area (ECC and array area).

Tier 1 and 2

The Phase One offshore wind farms (which are all beyond the study area) have not been screened into the cumulative effects assessment as it is not anticipated that there will be any physical effect overlap with receptors due to the distance between the wind farms and the offshore infrastructure area (ECC and array area) (refer to the Cumulative and Inter-Related Effects Chapter for details on their position).

Tier 1 and 2 and 3 (All Tiers)

No Tier 1 or Tier 2 projects are considered relevant to Cumulative Impact 2.

Projects that are screened into tier 3 that may possibly have a cumulative impact with the proposed development during construction, operation and decommissioning phases on marine recreational receptors are limited to the proposed MaresConnect subsea cable and existing cables and pipelines that may have ongoing maintenance activities (refer to Table 20.13). Due to the location of these other projects (being offshore) no further consideration of cumulative effects on nearshore receptors (other water sports and angling) is made under this impact assessment.

An increase in vessel traffic both within the offshore development area and transiting to the offshore development area combined with additional vessel traffic from other projects could lead to minor route changes being required for marine recreational receptors (recreational sailing and diving).

These impacts will be of local and temporary duration. In the project alone assessment, there are very few marine recreational activities occurring within the study area and the sensitivity of the receptors to the impact is deemed to be low and this is retained in the cumulative assessment.

Although several subsea cable and pipeline projects have been screened into the cumulative effects assessment, their position is outside of the offshore development area and operational activities for these other projects are expected to involve infrequent maintenance works. There is no publicly available information on the exact location of MaresConnect subsea cable; however, it is anticipated to make landfall at one of five locations off the coast of County Dublin, including Ardgillan, Balcarrick, Loughshiny, Robswalls or Rush, as indicated by the MaresConnect Interconnector foreshore licence application. As such, construction works for MaresConnect are not anticipated to overlap spatially with proposed development works. Taking this into account the magnitude of impact on marine recreational receptors is anticipated to be negligible.

Given the low sensitivity and negligible magnitude, the significance of the effect throughout the construction, operation and decommissioning phases will be not significant, which is not significant in EIA terms.

20.9.3.3 Cumulative Impact 3 – Indirect Disturbance or Displacement Impacts on Marine Recreational Activities (from Construction and Decommissioning Activities Causing Increased Sediment Dispersion and/or Noise Impacts, and/or Impacts to Fish Species)

Tier 1

The OMF at Greenore (which is beyond the study area) has not been screened into the cumulative effects assessment as it is not anticipated there will be any physical effect overlap with receptors due to the distance between the OMF and the offshore infrastructure area (ECC and array area).

Tier 1 and 2

The Phase One offshore wind farms (which are all beyond the study area) have not been screened into the cumulative effects assessment as it is not anticipated that there will be any physical effect overlap with receptors due to the distance between the wind farms and the offshore infrastructure area (ECC and array area) (refer to the Cumulative and Inter-Related Effects Chapter for details on their position).

Tier 1 and 2 and 3 (All Tiers)

No Tier 1 or Tier 2 projects are considered relevant to Cumulative Impact 3.

Of the Tier 3 projects screened into the cumulative assessment, there is potential for the following projects and activities to have a cumulative indirect disturbance effect on marine recreational activities:

- Ongoing maintenance activities associated with subsea cables and O&G pipelines;
- installation works associated with the Greater Dublin Drainage Outfall Pipe; and
- Dumping at Sea activities.

These projects have the potential to cause temporary increase in SSC and associated sediment deposition which may overlap with SCC impacts from the proposed development and indirectly displace marine recreational activities of recreational sailing, other water sports and angling.

In the project alone assessment, the sensitivity of the receptors to the impact is deemed to be low for recreational sailing, other water sports and angling and this is retained for the cumulative assessment.

Although several subsea cables and O&G pipelines have been scoped into the cumulative effects assessment due to their proximity to the proposed development, operational activities for the projects are expected to involve infrequent maintenance works.

It is anticipated that increases in SSC and sediment deposition from the activities associated with the screened in projects will be close to background levels and will quickly disperse. This is unlikely to be perceptible by recreational marine activity receptors. Considering this, the distances from the proposed development and the dynamic nature of the environment, any effects from sediment dispersion on receptors are anticipated to be minimal. Taking this into account the magnitude of impact on receptors is anticipated to be negligible.

Given the low sensitivity and negligible magnitude, the significance of the effect throughout the construction, operation and decommissioning phases will be not significant, which is not significant in EIA terms.

20.9.3.4 Cumulative Impact 4 – Indirect Disturbance Impacts on Defence and Security from Proposed Development Works within the ECC

Tier 1

The OMF at Greenore (which is beyond the study area) has not been screened into the cumulative effects assessment as it is not anticipated there will be any physical effect overlap with receptors due to the distance between the OMF and the offshore infrastructure area (ECC and array area).

Tier 1 and 2

The Phase One offshore wind farms (which are all beyond the study area) have not been screened into the cumulative effects assessment as it is not anticipated that there will be any physical effect overlap with receptors due to the distance between the wind farms and the offshore infrastructure area (ECC and array area) (refer to the Cumulative and Inter-Related Effects Chapter for details on their position).

Tier 1 and 2 and 3 (All Tiers)

No Tier 1 or Tier 2 projects are considered relevant to Cumulative Impact 4.

The following Tier 3 projects have potential for activities to intersect with Danger Area EID1:

- Interconnector 2 Scotland to Ireland IC2 pipeline;
- Drogheda Port Company Dumping Site A1; and
- Drogheda Port Company Dumping Site A2.

In the project alone assessment, the sensitivity of the receptor (the Defence Danger Area EID1) to is deemed to be high and this is retained for the cumulative assessment.

The impact scoped in is limited, as the proposed development will not interfere with defence and security operations.

The proposed development will adhere to marine notices issued in relation to Danger Area EID1 and undertake consultation with the DoD prior to any construction works within the ECC (as per the embedded mitigation outlined in Table 20.9) to ensure the risk of disturbance and disruption to military activities and practices will be minimised as far as practicable. It is reasonable to assume that all other projects will adhere to the same requirements of the DoD.

Consequently, the magnitude of impact resulting from indirect disturbance from cumulative impacts during construction, operation and decommissioning activities will be negligible.

Given the high sensitivity and negligible magnitude, the significance of the effect throughout the construction, operation and decommissioning phases will be not imperceptible, which is not significant in EIA terms.

20.10 References

Angling Ireland, n.d., 'Sea angling on the east coast', Available online: https://fishinginireland.info/sea/east/ [Accessed April 2024]

Barnes M.D. (2017) 'Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects', Report for the Environmental Working Group of the Offshore Renewable Energy Steering Group and the Department of Communications, Climate Action and Environment, Dublin: Department of Communications, Climate Action and Environment, Available online: https://cieem.net/resource/guidance-on-eis-and-nispreparation-for-offshore-renewable-energy-projects/ [Accessed April 2024].

BoatTrips.ie, n.d., 'All other boat tours in Ireland', Available online: https://boattrips.ie/list-of-all-boat-tours-trips-in-ireland/ [Accessed April 2024]

DCCAE, 2021, 'The Offshore Renewable Energy Development Plan', Available online: https://www.gov.ie/en/publication/e13f49-offshore-renewable-energy-development-plan/ [Accessed April 2024].

DCCAE, 2022, 'Oil and Gas (Exploration and Production) Data' Available online: https://www.gov.ie/en/publication/63e171-oil-and-gas-exploration-production-data/ [Accessed April 2024].

DECC, 2022, 'draft Offshore Renewable Energy Development Plan II (OREDP II)'updated 2023, Available online: https://www.gov.ie/en/publication/71e36-offshore-renewable-energy-development-plan-ii-oredp-ii/ [Accessed April 2024].

DECC, 2023, 'Minster Ryan signs joint declaration that will see Ireland and Germany cooperate with respect to green hydrogen', Available online: https://www.gov.ie/en/press-release/5b097-minster-ryan-signs-joint-declaration-that-will-see-ireland-and-germany-cooperate-with-respect-to-green-hydrogen/ [Accessed April 2024].

Department of Communications, Energy and Natural Resources (DCENR), 2010, 'Welcome to the online Integrated Petroleum Affairs System (IPAS)'. Available online: http://gis.dcenr.gov.ie/internetIPAS/servlet/internet/IPAS2IHome [Accessed April 2024]

Department of Housing, Local Government and Heritage (DHLGH), nd., Activities map (BETA). Available online: https://www.marineplan.ie/?page=Activities-Map-%28BETA%29 [Accessed April 2024].

DHLGH, 2018b, 'National Marine Planning Framework', Available online: https://www.gov.ie/en/publication/a4a9a-national-marine-planning-framework/ [Accessed April 2024].

DHLGH, 2023, 'Foreshore applications', Available online: https://www.gov.ie/en/collection/f2196-foreshore-applications-and-determinations/ [Accessed April 2024]

DHPLG, 2018a, 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)', Available online: https://www.gov.ie/en/publication/53aee9-guidelines-for-planning-authorities-and-an-bord-pleanala-on-carrying/ [Accessed April 2024].

DHPLG, 2020, 'Marine Planning and Development Management Bill', Available online: https://www.gov.ie/en/publication/effd5-further-information-on-the-marine-planning-and-development-management-bill/ [Accessed April 2024].

Diving Ireland, n.d., 'Dive Sites', Available online: https://diving.ie/dive-sites/ [Accessed April 2024].

Dublin sea fishing map, n.d., Available online: https://fishinginireland.info/sea/east/dublin/ [Accessed April 2024].

Number 39 of 2009 - Foreshore and Dumping at Sea Act 2009, as amended, Available online: https://data.oireachtas.ie/ie/oireachtas/act/2009/39/eng/enacted/a3909.pdf [Accessed April 2024].

EPA, 2023, 'Dumping at Sea Register', Available online: https://www.epa.ie/publications/licensing-permitting/freshwater--marine/Dumping-at-Sea-Register-18.10.23.pdf [Accessed April 2024]

EPA, n.d., 'Licensing & Permitting', Available online: https://www.epa.ie/our-services/licensing/ [Accessed April 2024]

EPA Ireland Catalogue, n.d., 'Urban waste water treatment agglomeration boundaries', Available online: https://gis.epa.ie/geonetwork/srv/api/records/1c66dc3c-12c5-4552-9407-ad5ef7d114c8 [Accessed April 2024]

eOceanic, 2024, 'Dublin', Available online: https://eoceanic.com/sailing/harbours/europe/ireland/dublin/ [Accessed April 2024]

Extreme Nomads, 2022, 'Kitesurfing in Ireland: A local's guide to the best spots', Available online: https://extremenomads.life/kitesurfing-in-ireland-best-spots/ [Accessed February 2024]

Gas Networks Ireland, 'Pipeline Map', n.d., Available online: https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/ [Accessed April 2024]

International Cable Protection Committee (ICPC), 2021, 'Telecommunications Cable and Oil Pipeline/Power Cables Crossing Criteria', Available online: https://www.iscpc.org/publications/recommendations/ [Accessed April 2024].

Irish Aviation Authority (IAA), n.d., Available online: https://www.iaa.ie/ [Accessed April 2024].

Irish Sailing, n.d., 'Cruising Clubs and Associations', Available online: https://www.sailing.ie/Cruising/Cruising-Clubs-and-Associations [Accessed April 2024].

KIS-ORCA – Seafish, 2019, 'Offshore Renewable & Cables Awareness', Available online: https://kis-orca.org/map/ [Accessed April 2024].

Kiteforum, n.d., 'Spots', Available online: https://se.kiteforum.com/kitesurf/country/Ireland [Accessed April 2024]

Marine Institute, 2022, 'Ireland's Marine Atlas', Available online: https://atlas.marine.ie/#?c=57.1631:-9.5032:7 [Accessed April 2024].

Marine Institute, 2022, 'The Irish Marine Data Buoy Observation Network', Available online: <u>https://www.marine.ie/site-area/data-services/real-time-observations/irish-marine-data-buoy-observation-network</u> [April 2024].

Marine Plan Ireland, n.d., 'Activities Map', Available online: https://www.marineplan.ie/?page=Activities-Map-%28BETA%29&views [Accessed April 2024]

North Sea Transition Authority (NSTA), 2022, 'NSTA Offshore Infrastructure Pipelines and Offshore Wind Farm (OWF) cables with connection to the UK', Available online: https://www.nstauthority.co.uk/the-move-to-net-zero/interactive-energy-map-for-the-ukcs/ [April 2024].

Portmarnock Sub-Aqua Club (PSAC), 2018. 'Portmarnock Sub-Aqua Club', Accessible online: https://psac.net/ [April 2024].

Surfers against Sewage (SAS), 2009, 'Guidance on Environmental Impact Assessment of Offshore Renewable Energy Development on Surfing Resources and Recreation'. Available online: https://www.sas.org.uk/wp-content/uploads/2012/04/eia-1.pdf

Surfline, n.d., 'Surf spots', Available online: https://www.surfline.com/surf-reports-forecasts-cams-map [Accessed April 2024]

TeleGeography, 2024, 'Submarine Cable Map' Available online: https://www.submarinecablemap.com/ [Accessed April 2024] Tethys, n.d., 'Environmental effects of wind and marine renewable energy', Available online: https://tethys.pnnl.gov/ [Accessed April 2024]

4C Offshore, 2022, 'Global Offshore Wind Farm Database', Available online: https://www.4coffshore.com/windfarms/ [Accessed April 2024].