



Arklow Bank Wind Park 2

Environmental Impact Assessment Report

Volume II, Chapter 15: Shipping and Navigation

Version	Date	Status	Author	Reviewed by	Approved by
1.0	14/02/2024	Final (External)	Anatec	GoBe Consultants	Sure Partners Limited

Statement of Authority

Experts	Qualifications	Relevant Experience
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Adam Foster	B.Sc. (Hons) in Mathematics, University of Aberdeen	Adam Foster is a Senior Risk Analyst at Anatec Ltd, and has over 10 years experience in shipping and navigation and marine risk assessment. He has been involved in numerous Navigation Risk Assessment processes including for successfully consented UK projects, and has experience in all associated assessment components including stakeholder liaison, leading hazard workshops, and risk modelling.
John Beattie	- M.Sc. in Information Technology Systems, University of Strathclyde, UK. - B.Eng (Hons) 2:1 Chemical Engineering, University of Strathclyde, UK.	John is a Director and Principal Risk Analyst with Anatec with over 25 years of experience managing risk assessments for the renewables, oil & gas and marine industries. In offshore renewables, John has worked on numerous UK wind farm Navigation Risk Assessments.

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Glossary

Term	Meaning
Allision	The act of striking or collision of a moving vessel against a stationary object.
Automatic Identification System (AIS)	A system by which vessels automatically broadcast their identity, key statistics including location, destination, length, speed and current status, e.g., under power. Most commercial vessels and United Kingdom (UK) / European Union (EU) fishing vessels over 15 m length are required to carry AIS.
Arklow Bank Wind Park 1 (ABWP1)	Arklow Bank Wind Park 1 consists of seven wind turbines, offshore export cable and inter-array cables. Arklow Bank Wind Park 1 has a capacity of 25.2 MW. Arklow Bank Wind Park 1 was constructed in 2003/04 and is owned and operated by Arklow Energy Limited. It remains the first and only operational offshore wind farm in Ireland.
Arklow Bank Wind Park 2 (ABWP2) – Offshore Infrastructure	“The Proposed Development”, Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements under the existing Maritime Area Consent.
Arklow Bank Wind Park 2 (ABWP2) (the Project)	Arklow Bank Wind Park 2 (ABWP2) (The Project) is the onshore and offshore infrastructure. This EIAR is being prepared for the Offshore Infrastructure. Consents for the Onshore Grid Infrastructure (Planning Reference 310090) and Operations Maintenance Facility (Planning Reference 211316) has been granted on 26th May 2022 and 20th July 2022, respectively. - Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements to be consented in accordance with the Maritime Area Consent. This is the subject of this EIAR and will be referred to as ‘the Proposed Development’ in the EIAR. - Arklow Bank Wind Park 2 Onshore Grid Infrastructure: This relates to the onshore grid infrastructure for which planning permission has been granted. - Arklow Bank Wind Park 2 Operations and Maintenance Facility (OMF): This includes the onshore and nearshore infrastructure at the OMF, for which planning permission has been granted. - Arklow Bank Wind Park 2 EirGrid Upgrade Works: any non-contestable grid upgrade works, consent to be sought and works to be completed by EirGrid.
Array Area	The Array Area is the area within which the Wind Turbine Generators (WTGs), the Offshore Substation Platforms (OSPs), and associated cables (export, inter- array and interconnector cabling) and foundations will be installed.
Cable Corridor and Working Area	The Cable Corridor and Working Area is the area within which export, inter-array and interconnector cabling will be installed. This area will also

Term	Meaning
	facilitate vessel jacking operations associated with installation of WTG structures and associated foundations within the Array Area.
Collision	The act or process of colliding (contact) between two moving objects.
Competent Authority (CA)	The authority designated as responsible for performing the duties arising from the EIA Directive as amended. For this application, the Competent Authority is An Bord Pleanála (ABP).
Environmental Impact Assessment (EIA)	An Environmental Impact Assessment (EIA) is a statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council (EIA Directive).
EirGrid	State-owned electric power transmission system operator (TSO) in Ireland and Transmission Asset Owner (TAO) for the Project's transmission assets.
Formal Safety Assessment (FSA)	A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity.
Landfall	The area in which the offshore export cables make landfall and is the transitional area between the offshore cabling and the onshore cabling.
Marine Guidance Note	A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping.
Maritime Area Consent (MAC)	A consent to occupy a specific part of the maritime area on a non-exclusive basis for the purpose of carrying out a Permitted Maritime Usage strictly in accordance with the conditions attached to the MAC granted on 22nd December 2022 with reference number 2022-MAC-002.
Mitigation Measure	Measure which would avoid, reduce, or remediate an impact.
Navigational Risk Assessment (NRA)	A document which assesses the hazards to shipping and navigation of a proposed Offshore Renewable Energy Installation based upon the FSA.
Permitted Maritime Usage	The construction and operation of an offshore wind farm and associated infrastructure (including decommissioning and other works required on foot of any permission for such offshore wind farm).

Term	Meaning
The Application	The full set of documents that will be submitted to An Bord Pleanála in support of the consent application.
The Developer	Sure Partners Ltd.

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Acronyms

Term	Meaning
ABWP1	Arklow Bank Wind Park 1
ABWP2	Arklow Bank Wind Park 2
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
ASAM	Aeronautical Services Advisory Memorandum
BAS	Burial Assessment Study
BIM	Bord Iascaigh Mhara
c.	Circa
CBRA	Cable Burial Risk Assessment
CCTV	Closed-circuit television
CIA	Cumulative Impact Assessment
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
DCCAE	Department of Communications, Climate Action & Environment
DoD	Department of Defence
DPC	Dublin Port Company
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERCoP	Emergency Response Cooperation Plan
EU	European Union
FLO	Fisheries Liaison Officer
FSA	Formal Safety Assessment
HAT	Highest Astronomical Tide
HLV	Heavy Lift Vessel

Term	Meaning
HSE	Health and Safety Executive
IAA	Irish Aviation Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IMO	International Maritime Organization
IPS	Intermediate Periphery Structure
IRCG	Irish Coast Guard
LAT	Lowest Astronomical Tide
Lidar	Light Detection and Ranging
LMP	Lighting and Marking Plan
MAC	Maritime Area Consent
MCA	Maritime and Coastguard Agency
MCIB	Marine Casualty Investigation Board
MGN	Marine Guidance Note
MI	Marine Institute
MPCP	Marine Pollution Contingency Plan
MRCC	Maritime Rescue Coordination Centre
MSO	Marine Survey Office
NIS	Natura Impact Statement
NOTAM	Notice to Airmen
NRA	Navigation Risk Assessment
NtM	Notice to Mariners
NUC	Not Under Command
NVIS	Night Vision Imaging System
OGI	Onshore Grid Infrastructure
OMF	Operations and Maintenance Facility
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform

Term	Meaning
POCC	Port of Cork Company
Radar	Radio Detection and Ranging
RAM	Restricted in their Ability to Manoeuvre
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
SFPA	Sea Fisheries Protection Authority
SOLAS	International Convention for the Safety of Life at Sea
SPS	Significant Periphery Structure
TSS	Traffic Separation Scheme
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UPS	Uninterrupted Power Supply
VMP	Vessel Management Plan
WTG	Wind Turbine Generator

Units

Unit	Description
km	Kilometre
m	Metre
nm	Nautical mile

15 Shipping and Navigation

15.1 Introduction

15.1.1.1 This chapter assesses potential impacts from the Arklow Bank Wind Park 2 (ABWP2) Offshore Infrastructure (hereafter referred to as the Proposed Development) to shipping and navigation users during the construction, operation & maintenance and decommissioning phases. It is informed by Volume III, Appendix 15.1: Navigation Risk Assessment (NRA), which has been produced in line with the relevant marine guidance as described in Section 15.2.

15.1.1.2 This chapter should be read in conjunction with:

- Volume II, Chapter 14: Commercial Fisheries and Aquaculture which assesses impacts associated with commercial fishing (as opposed to this chapter which assesses impacts to fishing vessels in transit);
- Volume II, Chapter 19: Infrastructure and Other Users; and
- Volume II, Chapter 22: Major Accidents and Natural Disasters.

15.2 Regulatory background

15.2.1.1 The legislation of relevance to the assessment of shipping and navigation is as follows, noting that further details of the relevant provisions are given in Table 15.1.

- United Nations Convention on the Law of the Sea (UNCLOS) (United Nations (UN), 1982);
- Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) (International Maritime Organization (IMO), 1972/77); and
- International Convention for the Safety of Life at Sea (SOLAS) Chapter V (IMO, 1974).

15.2.1.2 The relevant policy to the assessment of shipping and navigation is as follows, noting that further details of the relevant provisions are given in Table 15.1.

- National Marine Planning Framework (2021); and
- Offshore Renewable Energy Development Plan (2014).

15.2.1.3 Current understanding is that there will be specific guidance released in the near future that sets out how shipping and navigation risk assessments should be undertaken, in particular the requirements for the NRA process. General consultation with key stakeholders to date (see Section 15.3) indicates that this guidance will closely resemble the Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 (MCA, 2021) which is the primary guidance used for equivalent assessments for Offshore Renewable Energy Installations (OREIs) in the United Kingdom (UK). The draft version of the expected guidance was released for targeted consultation in January 2024, however, is yet to be finalised at the time of writing (April 2024). Review of the draft guidance confirms that it is similar to MGN 654 in its current draft form. The Developer has applied the principles of MGN 654 (or the active preceding equivalent guidance) throughout the process, and confirms it will comply with the final guidance as far as is practicable upon its finalisation.

15.2.1.4 MGN 654 requires the use of the IMO Formal Safety Assessment (FSA) (IMO, 2018) process. Therefore, the FSA has been used to assess impacts to shipping and navigation users within this chapter.

15.2.1.5 Other relevant guidance documents applied are detailed below (noting this includes UK guidance where applicable in line with MGN 654 requirements):

- Guidance on Environmental Impact Statements (EIS) and Natura Impact Statements (NIS) Preparation for Offshore Renewable Energy Projects (Department of Communications, Climate Action & Environment (DCCAE), 2017);
- MGN 372 (Merchant and Fishing) OREIs: MGN 372 Amendment 1 (M+F) Guidance to mariners operating in vicinity of UK OREIs (MCA, 2022);
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Guidance (G1162) on the Marking of Man-Made Offshore Structures (IALA, 2022); and
- The Royal Yachting Association's (RYA's) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) - Wind Energy. 5th Edition - (RYA, 2019).

Table 15.1: Legislation and policy context

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
Statutory			
Legislation			
UN	UNCLOS (UN, 1982)	Article 60: “Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognised sea lanes essential to international navigation.”	IMO adopted routing measures have been identified noting none are in the Study Area (see Section 15.5.2) and therefore there is no interference from the Proposed Development. Impacts on general vessel routing are assessed in Sections 15.9 and 15.10.
IMO	COLREGS (IMO, 1972/77)	Rule 8 Part (a) “Any action taken to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.”	COLREGS provisions have been considered where relevant throughout this Chapter. In particular, collision avoidance provisions have been considered in the relevant impact assessment sections (Sections 15.9 and 15.10).
		Rule 19 Part (b) “Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre.”	
IMO	SOLAS (IMO, 1974)	Regulation 33 “The master of a ship at sea which is in a position to be able to provide assistance on receiving information from any source that persons are in distress at sea, is	SOLAS provisions have been considered where relevant throughout this Chapter. In particular, passage planning provisions have been considered in the relevant impact

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
		bound to proceed with all speed to their assistance.”	assessment sections (Sections 15.9 and 15.10).
		Regulation 34 “Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned.”	
Planning Policy and Development Control			
Government of Ireland	National Marine Planning Framework (2021) Ports, Harbours, and Shipping	Ports, Harbours and Shipping Policy 1: To provide for shipping activity and freedom of navigation the following factors will be taken into account when reaching decisions regarding development and use: • The extent to which the locational decision interferes with existing or planned routes used by shipping, access to ports and harbours and navigational safety. This includes commercial anchorages and approaches to ports as well as key littoral and offshore routes; • A mandatory NRA; • Where interference is likely, whether reasonable alternatives can be identified. • Where there are no reasonable alternatives, whether mitigation through measures adopted in accordance with the principles and procedures established by the IMO can be achieved at no significant cost to the shipping or ports sector.	Impacts associated with deviation, ports and anchorages are assessed in Sections 15.9 and 15.10. An NRA has been drafted in support of this Chapter as required (Volume III, Appendix 15.1).

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
		Ports, Harbours and Shipping Policy 2: Proposals that may have a significant impact upon current activity and future opportunity for expansion of port and harbour activities should demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate significant adverse impacts, d) if it is not possible to mitigate significant adverse impacts on current activity and future opportunity for expansion of port and harbour activities, proposals should set out the reasons for proceeding. Ports, Harbours and Shipping Policy 3: Proposals that may have a significant impact upon current activity and future opportunity for expansion of port and harbour activities must demonstrate consideration of the National Ports Policy, the National Planning Framework, and relevant provisions related to the TEN-T network. Ports, Harbours and Shipping Policy 4: Proposals within ports limits, beside or in the vicinity of ports and/or that impact upon the main routes of significance to a port must demonstrate within applications that they have: • been informed by consultation at pre-application stage or earlier with the relevant port authority, and;	Impacts associated with safety of port operations and access are assessed in Sections 15.9 and 15.10.

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
		- have carried out an NRA including an analysis of maritime traffic in the area, and; - have consulted the Department of Transport, Marine Survey Office (MSO) and Commissioners of Irish Lights. Applicants must continue to engage parties identified in pre-application processes as appropriate during the decision-making process.	
Government of Ireland	National Marine Planning Framework (2021) Safety at Sea	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; - 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.	Impacts to commercial and recreational vessels are assessed in Sections 15.9 and 15.10.
		Safety at Sea Policy 2: Proposals for offshore renewable energy infrastructure that have the potential to significantly reduce under-keel clearance must demonstrate how they will, in order of preference (a) avoid, (b) minimise, (c)	Impacts associated with under keel clearance are assessed in Sections 15.9 and 15.10.

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
		mitigate adverse impacts, or (d) if it is not possible to mitigate significant adverse impacts, proposals should set out the reasons for proceeding.	
		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.	As per Section 15.7.3 lighting and marking as directed by CIL and in compliance with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 (IALA, 2021) and charting have been assumed as factored in measures.
		Safety at Sea Policy 4: Establishing, changing or disestablishing aids to navigation must be sanctioned, in advance of works, by the Commissioners of Irish Lights.	See Volume III, Appendix 25.6: Lighting and Marking Plan.
		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 maritime SAR 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.	Impacts associated with SAR operations are assessed in Sections 15.9 and 15.10.

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
Government of Ireland	National Marine Planning Framework (2021) Defence and Security	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. This includes potential interference with: • Safety of navigation and access to naval facilities; • Firing, test or exercise areas; • Communication, and surveillance systems; • Fishery protection functions.	The vessel traffic data assessed (see Section 15.5.1) includes capture of military vessels. Safety of navigation to vessels has been assessed in Sections 15.9 and 15.10.
Government of Ireland	Offshore Renewable Energy Development Plan (2014) Ports, Shipping and Navigation	Displacement of Shipping • Where feasible site devices away from constraints and areas of high vessel densities. • Undertake an NRA which should include a survey of all vessels in the vicinity of the Proposed Development. Reduced Visibility • Avoiding areas of high vessel densities and areas constrained by land e.g. adjacent to the entrances of port and Lochs. • In busy shipping areas, potential effects may be reduced by minimising the period of installation, the number of vessels required and the area occupied during	Impacts associated with deviation are assessed in Sections 15.9 and 15.10. An NRA has been drafted in support of this Chapter as required (Volume III, Appendix 15.1). Impacts associated with deviation, displacement and collision risk are assessed in Sections 15.9 and 15.10. As per Section 15.7.3 lighting and marking as directed by CIL and in compliance with IALA G1162 (IALA, 2021) has been assumed as embedded mitigation (see Volume III, Appendix 25.6: Lighting and Marking Plan).

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
		installation would reduce the potential impact on visibility. Any vessels and devices should be lit and marked in accordance with the IALA guidelines, in agreement with the Commissioners of Irish Lights.	
		Collision Risk - Avoid constrained areas or areas of high shipping densities and regularly used shipping routes. - In busy shipping areas, potential effects may be reduced by minimising the period of installation, the number of vessels required and the area occupied during installation. - Maintain good communications with the relevant ports, and issue the appropriate notifications during installation, maintenance, and decommissioning - The scale of potential effect on navigation should be assessed as part of the Environmental Impact Assessment (EIA) and NRA as outlined above.	Impacts associated with deviation, displacement and collision risk are assessed in Sections 15.9 and 15.10
Government of Ireland	Offshore Renewable Energy Development Plan (2014) Recreation and Tourism	Access Restrictions - Undertake construction, where possible, outside of peak tourist seasons (June to September) to minimise disruption to visitors and local people. - Identify and avoid popular routes for sailing or other water sports such as kayaking.	Impacts associated with recreational vessels are assessed in Sections 15.9 and 15.10.

Publisher	Name of document incl. reference	Key provisions	Section where provision is addressed
		Where possible, facilitate safe access through arrays for sailing or other water sports.	
		Safety and Collision Risk - Avoid popular cruising routes, diving areas and key water sport locations. - Incorporate suitable safety features such as lighting, netting and buoys into the device design. - Provide suitable information for the public regarding safety. - Restrict access to construction sites. - Observe good practice during construction, removal and maintenance.	Impacts to recreational vessels are assessed in Sections 15.9 and 15.10. As per Section 15.7.3 lighting and marking as directed by CIL and in compliance with IALA G1162 (IALA, 2021) has been assumed as embedded mitigation (see Volume III, Appendix 25.6: Lighting and Marking Plan). As per Section 15.7.3 promulgation of information has been assumed as a factored in measure. As per Section 15.7.3 the implementation of advisory safe passing distances where appropriate has been assumed a factored in measure.

15.3 Consultation

15.3.1.1 A summary of consultation undertaken to date deemed of relevance to shipping and navigation is provided in Table 15.2. Reference to where each point is addressed is included. Further details can be found in Volume III, Appendix 15.1: Navigation Risk Assessment.

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Table 15.2: Summary of consultation relating to Shipping and Navigation

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
20 February 2019	Meeting with Irish Coast Guard (IRCG)	Emergency plans will need to be developed on a case-by-case basis.	See Volume III, Appendix 25.5: Emergency Response Cooperation Plan.
		There will need to be a control centre / coordinator monitoring from shore.	
		Consultation could be considered with the Sea Fisheries Protection Authority (SFPA), headquartered in Clonakilty, County Cork, Bord Iascaigh Mhara (BIM), the Irish Sea Fisheries Board, and the Marine Institute (MI).	
20 February 2019	Meeting with Irish Lights	Arklow Bank is currently marked by north and south cardinal buoys. Irish Lights could relocate these to mark the extents of the wind farm following construction. Alternatively aids to navigation on the turbines may be sufficient. This will depend on the final turbine layout.	Buoyage requirements will be discussed and agreed with Irish Lights via the LMP process (Volume III, Appendix 25.6: Lighting and Marking Plan).
		Use of construction buoyage will require discussion once there is more certainty over construction plans.	
		Automatic Identification System (AIS) aids to navigation may be required depending on the final layout.	
		Noted the construction works may attract "sightseers".	Impacts to recreational users have been considered in Section 15.9 and 15.10.
		Irish Lights indicated no specific concerns with the project at this stage.	Noted.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
20 February 2019	Meeting with MSO	Of the approximately 2,000 fishing vessels registered in Ireland only around 10% are required to carry AIS. Therefore, consultation with the local fishing industry is considered important.	Consultation has been undertaken with SFPA, Wicklow Bay Sea Angling Club and Wicklow Boat Charters.
		There could be an issue for wind farm related vessels exiting the site and encountering north-south traffic passing inshore of the site.	Increased collision risk is assessed in Section 15.9.3 and Section 15.10.3.
		Noted Brexit may impact future traffic patterns.	Modelling has been undertaken to account for increased future levels of traffic; additional details provided in Section 15.5.3 and Volume III, Appendix 15.1: Navigation Risk Assessment.
		Noted there may be effects on marine Radio Detection and Ranging (Radar). MSO were not aware of any issues with vessels passing the existing Arklow site.	Interference with marine navigational equipment has been assessed in Volume III, Appendix 15.1: Navigation Risk Assessment, for full details.
20 June 2019	Hazard Workshop (Arklow Fishing Sector, Arklow Sailing Club, Irish Ferries, Irish Lights, RNLI, and Wicklow Harbour in attendance).	Baseline and potential impacts discussed with local stakeholders (see Volume III, Appendix 15.1: Navigation Risk Assessment, for full details).	See Volume III, Appendix 15.1: Navigation Risk Assessment, for full details.
October 2020	Scoping response from Irish Lights	Possible constraint on navigable water north of the Array Area and on routes that transit west of the India Bank.	Volume III, Appendix 15.1: Navigation Risk Assessment considers navigable depths and other relevant navigational features.
		Dublin port to be consulted and local recreational and fishing clubs/interests.	Dublin Port has been issued with the Scoping Report, although no response has been received to date. A representative from Dublin Port attended the second

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
			hazard workshop. Local leisure and fishing clubs have also been consulted (see below). Deviations to routes are considered in detail within Volume III, Appendix 15.1: Navigation Risk Assessment, including vessels to/from Dublin Port.
		Changes in sediment transport may occur due to the presence of the turbines that could alter the depths in the navigable channel to the west of Arklow Bank.	Changes in sediment transport are addressed in Volume II, Chapter 6: Coastal Processes. Volume III, Appendix 15.1: Navigation Risk Assessment has considered re-routing a minimum of 1 nm from the Array Area. This is considered to account for changes in navigable depths which may affect routes.
		Non-AIS traffic may be underrepresented.	Non-AIS traffic has been accounted for in recent vessel traffic surveys. See Table 15.4 for details.
		The North Arklow buoy would need to be relocated or the northern limits of the Proposed Development similarly marked.	Buoyage requirements will be discussed and agreed with Irish Lights via the LMP process (Volume III, Appendix 25.6).
October 2020	Scoping response from SFPA	Commented that Arklow Bank Wind Park 1 (ABWP1) has had no effect on the local fishing fleet.	Noted. See Volume II, Chapter 14: Commercial Fisheries for further details.
		Requested contact details for the Fisheries Liaison Officer (FLO) and list of stakeholders.	See Volume II, Chapter 14: Commercial Fisheries for details of fisheries consultation and factored in mitigation measures including appointment of a FLO.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
October 2020	Scoping response from Belfast Harbour	No comment.	N/A
October 2020	Scoping response from Department of Defence (DoD)	Notices to Mariners (NtMs) should be promulgated prior to construction indicating any area with restrictions.	Promulgation of information via NtM and other appropriate means are included as factored in mitigation measures (see Section 15.7.3). Advisory safe passing distances shall be in place (see Section 15.7.3).
		Queried if there will be speed restrictions present.	Advisory safe passing distances shall be in place (see Section 15.7.3). There are no plans for specific speed restrictions noting that COLREGS Rule 6 requires vessels to proceed at a safe speed in the prevailing circumstances and conditions.
		Cables will need to be indicated on the respective charts.	All infrastructure (including cables) will be charted (see Section 15.7.3).
		Queried what lighting will mark the construction site and the operational structures.	Lighting and marking of the Proposed Development will be agreed with Irish Lights and will broadly be in accordance with IALA G1162 (IALA, 2022) (see Section 15.7.3).

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
October 2020	Arklow Sailing Club - Scoping Response	Provided a chart showing race marks, including one ('Turbine') in the vicinity of the existing ABWP1 Wind Turbine Generators (WTGs), which is used regularly. Arklow Sailing Club race as far north as the horseshoe buoy off Wicklow and as far south as Chore harbour on a regular basis. Once a year, Arklow Sailing Club race around the WTGs. The number of sailing boats in each sailing event varies but a heavily attended event would usually attract more than 20 boats. Organised sailing occurs on Wednesday evenings and Saturday afternoons from April to end of October. Some longer Saturday races may take place between 10 am and 6 pm.	Considered in NRA baseline (Volume III, Appendix 15.1). Recreational stakeholders have also been consulted during the Stakeholder Outreach.
		Queried whether there will be access through the wind farm for marine traffic or an exclusion zone. Concern in relation to potential for increase in traffic inshore of the Arklow Bank.	Vessels will be free to transit through the Array Area, noting that advisory safe passing distances will be in place during construction/ major maintenance (see Section 15.7.3). Post Wind Farm Routeing is considered in Volume III, Appendix 15.1: Navigation Risk Assessment.
October 2020	Scoping response from Wicklow Bay Sea Angling Club	Identified a number of offshore and shoreline fishing marks are used by fishing vessels both clubs and individuals.	Considered in NRA baseline (Volume III, Appendix 15.1).

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
		- Two chartered fishing boats are run by Wicklow Boat Charters. - Private boats are also present in the area, and largely launch out of Wicklow. - Many club, provincial, and national championships are fished out of Wicklow. - A number of clubs fish out of Greystones and Bray.	Considered in NRA baseline (Volume III, Appendix 15.1).
		Concerns included effects during surveys, sampling, and construction, reduced access, damage to the seabed, water borne particles affecting fish populations, and noise and vibration affecting fish populations.	Considered in NRA baseline (Volume III, Appendix 15.1). Advisory safe passing distances shall be in place during construction/major maintenance (see Section 5), so access will not be restricted. Local liaison and NtMs will be issued prior to any works. Issues relating to damage to the seabed, water borne particles, and noise and vibration are considered in Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology.
October 2020	Scoping Response from Wicklow Sailing Club	Club races involving approximately seven to 15 vessels come in close proximity to the Proposed Development two or three times a year. Noted the biannual SSE Renewables Round Ireland Yacht race.	Recreational vessels and the SSE Renewables Round Ireland Yacht race are considered in Volume III, Appendix 15.1: Navigation Risk Assessment.
		Proposed Development should act as an aid to navigation, improving safety when sailing in proximity to the bank.	Lighting and marking of the Proposed Development will be agreed with Irish Lights and will broadly be in accordance

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
			with IALA G1162 (IALA, 2022) (see Section 15.7.3).
October 2020	Scoping Response from Wicklow Boat Charters	A number of angling groups and individuals fish within the area. Noted a number of offshore and shoreline fishing marks are used in the area and that Wicklow Boat Charters used these fishing marks a minimum of 220 times in 2019. Noted two chartered fishing boats are in the local area, both run by Wicklow Boat Charters. Concerns included effects on recreational fishing during survey and construction phase, in particular reduced access, damage to seabed affecting fishing, water borne particles affecting fish/fishing, and noise and vibration affecting fish/fishing.	Considered in NRA baseline (Volume III, Appendix 15.1). Noted. Considered in NRA baseline (Volume III, Appendix 15.1), with impacts assessed in Sections 15.9 and Section 15.10. Advisory safe passing distances shall be in place during construction/major maintenance (see Section 15.7.3), so access will not be restricted. Issues relating to damage to the seabed, water borne particles, and noise and vibration are considered in Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
4 February 2021	Meeting with Irish Lights	Irish Lights would expect compliance with IALA G1162 ¹ and UK MCA MGN 654 ² . Irish guidance is being discussed with MSO and is not expected to diverge from IALA / UK.	Compliance is included as factored in measures in Section 15.7.3.
		Stated use of temporary lighting during construction a “reasonable approach”. UK industry standard should be followed. Operational lighting and marking should be as per IALA G1162.	Lighting and marking of the Proposed Development will be agreed with Irish Lights and will broadly be in accordance with IALA G1162 (IALA, 2022) (see Section 15.7.3).
		Developer is responsible for ensuring the design is robust enough to meet IALA requirements, and on this basis there were no specific requirements for Uninterrupted Power Supply (UPS) etc.	
		Irish Lights preference is for best practice with regards to synchronisation i.e., lights should be synchronised in the same light type i.e., Significant Periphery Structures (SPSs), Intermediate Periphery Structures (IPSs), sound signals.	
		Consideration would need to be given to lighting and marking during the decommissioning phase, however it is assumed that this would be similar to the construction phase.	
9 February 2021	Meeting with IRCG	Noted that the MCA / Health and Safety Executive (HSE) <i>Regulatory Expectations for Emergency Response Arrangements for the Offshore</i>	As per Section 15.7.3, emergency response procedures are detailed in Volume III, Appendix 25.5: Emergency Response

¹ Latest version of equivalent IALA guidance.

² Latest version of equivalent MGN guidance.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
		<i>Renewable Energy Industry</i> should also be considered, in addition to the National SAR Plan and National Contingency Plan.	Cooperation Plan. This document will be agreed with IRCG and consider relevant guidance as required by IRCG.
		Recommended consultation undertaken with the MSO, Irish Lights and Irish Aviation Authority (IAA).	Consultation with the MSO, Irish Lights and IAA has been undertaken as per this table.
		Any information sharing agreements with regards to closed-circuit television (CCTV) in particular would be useful.	Circulation of information is a factored in measure, see Section 15.7.3.
		Noted importance of maintaining an ongoing synergy between wind farm developers and IRCG, in particular Maritime Rescue Coordination Centre (MRCC) Dublin. This should include the sharing of emergency response plans, joint training exercises, and further discussions around layout.	
		Pollution response plans should be put in place.	A Marine Pollution Contingency Plan (MPCP) is included as a factored in measure, see Section 15.7.3.
		Consideration should be given to both surface and air assets.	Volume III, Appendix 15.1: Navigation Risk Assessment considers both lifeboat mobilisations and SAR helicopters.
		No active guidance for SAR lighting and marking, however UK guidance will represent a good starting point.	Lighting and marking of the Proposed Development will be agreed with Irish Lights and will broadly be in accordance with IALA G1162 (IALA, 2022) (see Section 15.7.3).
		Noted the importance of ensuring aviation / SAR lighting was Night Vision Imaging System (NVIS) compatible for SAR purposes.	

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
26 October 2021	Meeting with IAA	Noted the Aeronautical Services Advisory Memorandum (ASAM) No.18 was formulated to address the first round of offshore wind development in Ireland, this is due to be updated, however no changes as of yet.	This document has been considered in the LMP (Volume III, Appendix 25.6).
		Noted the need to engage with the DoD.	The DoD submitted a scoping response, included in this table.
		From an aviation perspective, IAA stated SAR would likely be the key consideration for the Proposed Development as opposed to general aviation.	SAR Helicopters are considered in Volume III, Appendix 15.1: Navigation Risk Assessment.
		During the construction phase, in line with S.I.215 all en-route obstacles including mobile cranes are required to be reported to IAA at least 30 days in advance. There may be a need to issue Notices to Airmen (NOTAMs) based on the information provided.	Provision of information is a factored in measure, see Section 15.7.3.
		Stated the importance of having agreed protocol in place with regards to how the Proposed Development and IRCG will communicate / act during an emergency incident.	See Volume III, Appendix 25.5: Emergency Response Cooperation Plan.
		Requested if indicative details of the locations and heights of the turbines could be provided so any impacts on surveillance charts can be assessed.	Circulation of information is a factored in measure, see Section 15.7.3.
10 August 2023	Dedicated meeting with IRCG	Noted that accommodation and rescue facilities for the Offshore Substation Platforms (OSPs) would assist if any rescue operations were required or if workers were unable to return to shore.	Impacts on SAR have been assessed in Section 15.9.6 and Section 15.10.6.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
		Noted that non-AIS data should be considered in the assessment.	Vessel traffic surveys utilising Radar and visual observations to capture non AIS traffic have been undertaken. Considered in NRA baseline (Volume III, Appendix 15.1).
		Indicated that lighting provisions and additional SAR mitigations are likely to resemble that within the UK MGN 654 guidance.	MGN 654 has been considered as primary guidance as detailed in Volume III, Appendix 15.1: Navigation Risk Assessment.
		IRCG noted a preference for east / west SAR Access lanes in line with MGN 654 (MCA, 2021) principles, rather than north/south.	Impacts on SAR including in relation to layout have been assessed in Section 15.9.6 and Section 15.10.6
21 August 2023	Dedicated meeting with MSO	Noted that Irish guidance is likely to closely resemble MGN 654.	This Environmental Impact Assessment Report (EIAR) chapter and the NRA has been undertaken in alignment with MGN 654 as detailed in Volume III, Appendix 15.1: Navigation Risk Assessment.
		Noted content with the data collected given that it aligns with MGN 654.	The data collected aligns with MGN 654; in particular, more than 28 days of seasonal vessel traffic has been captured via AIS, Radar and visual observations (see Section 15.5.1).
		Noted content for project to use advisory safe passing distances in lieu of safety zones, but noted that this should be clear in the promulgation of information.	Full details of approach are provided in the Vessel Management Plan (VMP) (Volume III, Appendix 25.7: Vessel Management Plan).

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
		Noted that SSE should keep the United Kingdom Hydrographic Office (UKHO) informed throughout the consenting process. Noted that the VMP should be circulated to shipping and navigation stakeholders.	
22 August 2023	Consultation with Royal National Lifeboat Institution (RNLI) at Hazard Workshop	Queried if due consideration was being given to recreational traffic and their harbour access.	Associated impacts have been assessed in Section 15.9 and Section 15.10.
22 August 2023	Consultation with Irish Ferries at Hazard Workshop	Stated that it was reassuring to see low levels of traffic at Arklow Bank presently and therefore the low potential for a large increase in vessel displacement, including to Irish Ferry vessels.	This was reflected in the base case routing and future case routing used in the collision and allision modelling. See Volume III, Appendix 15.1: Navigation Risk Assessment for details.
		Queried about the level of coordination in the discussions between the Arklow project and other nearby cumulative projects.	Developer is engaging with other Phase 1 projects to exchange data for the purposes of cumulative assessment.
22 August 2023	Consultation with Dublin Port at Hazard Workshop	Noted that if water depths become particularly shallow close to shore due to cable protection then an inshore buoy may be needed but that the cable and depths should also be charted.	Underkeel clearance has been assessed in Section 15.9 and Section 15.10.
		Queried if there would be a guard vessel during construction phase.	Use of guard vessels where appropriate as determined via risk assessment has been considered as a factored in mitigation in Section 15.9 and Section 15.10.
6 September 2023	Dedicated meeting with Irish Lights	Noted that they are content with the data collection process following that set out in MGN 654.	Details on data collected are presented in Section 15.5.1, noting that this includes MGN 654 compliant survey data.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
		Noted there may be a need for a cardinal mark for the gap between the Proposed Development and Codling.	
		Noted they would be looking for two to three AIS aids to navigation but that this would depend on the layout.	Buoyage requirements will be discussed and agreed with Irish Lights via the LMP process (Volume III, Appendix 25.6).
		Stated that sound signals are not commonly used but could be discussed as part of the LMP process.	The LMP can be found in Volume III, Appendix 25.6.
		Stated content with the use of construction buoyage and temporary lighting for construction phase mitigations, noting that the final plans would need to be agreed via the LMP.	The LMP can be found in Volume III, Appendix 25.6.
		Indicated a buoy could be used to mark the reduction in underkeel clearance resulting from cable protection but that this would depend on the reduction.	The LMP can be found in Volume III, Appendix 25.6.
4 August 2023	Email correspondence with Stena Lines	Stated “our vessels on [sic] the North Sea will not be affected”.	Noted and considered in in Section 15.9 and Section 15.10.
18 August 2023	Port of Cork Company (POCC) – Scoping response	POCC consider that the ABWP2 EIAR should take account of the potential impacts on shipping & operations at the construction staging port during the construction phase and potentially the operational and decommissioning phases of any development.	This has been assessed in Section 15.9 and Section 15.10.
		POCC recommend that projects have regard to the Port of Cork Masterplan 2023.	See Section 15.5.3.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
		Projects should also have regard to all other known proposed renewable energy and carbon capture projects in the harbour and potential interactions with these projects. This cumulative assessment should consider interactions with extra shipping movements generated by its own and all other known projects during construction and operational phases.	Cumulative impacts have been assessed in Section 15.12, noting that potential for traffic increases associated with port expansion is provided in Section 15.5.3.
		Consultation should be undertaken with: • MSO; • Irish Lights; • SAR providers (IRCG, RNLI); • Ports and harbours; • Ferry and commercial vessel companies; • Irish Chamber Shipping; • Recreational User Groups; and • Fishing Representatives.	Extensive consultation with appropriate parties including those listed have been consulted with as per this section.
		The following impacts should be considered: • Displacement and third-party collision risk; • Third-party to Project vessel collision risk; • Allision risk; • Loss of station; • Port access; • Impacts on existing Aids to Navigation; • Subsea structure interaction; • Impacts on emergency response provision; • Use of navigation, communication and position fixing equipment; and • Cumulative and transboundary impacts.	These impacts have been assessed in Section 15.9 / Section 15.10 and / or Volume III, Appendix 15.1: Navigation Risk Assessment.

Date	Consultation type	Consultation and key issue raised	Section where provision is addressed
8 April 2024	Meeting at SSE Offices	SAR Access through the layouts associated with Project Design Options 1 and 2 were presented to the IRCG.	Impacts on SAR including in relation to layout have been assessed in Section 15.9.6 and Section 15.10.6

15.4 Study area

15.4.1.1 A 10 nautical mile (nm) buffer³ has been applied around the Array Area (hereafter referred to as the 'Study Area'), as presented in Figure 15.1. This Study Area has been defined to provide local context to the analysis of risks by capturing the relevant routes and vessel traffic movements in proximity to the Array Area. This is a standard radius for shipping and navigation and has been used in the majority of offshore wind farm NRAs in the UK. It also aligns with the approach from both the 2019 and 2023 Scoping Report, and has been presented to key shipping and navigation stakeholders including at the Hazard Workshops (see Section 15.3).

15.4.1.2 It is noted that the Study Area also captures the Cable Corridor and Working Area.

³ Noted that the 10nm buffer captures the onshore area – this area does not contain any vessel traffic or navigational features and as such is not relevant to the assessment.

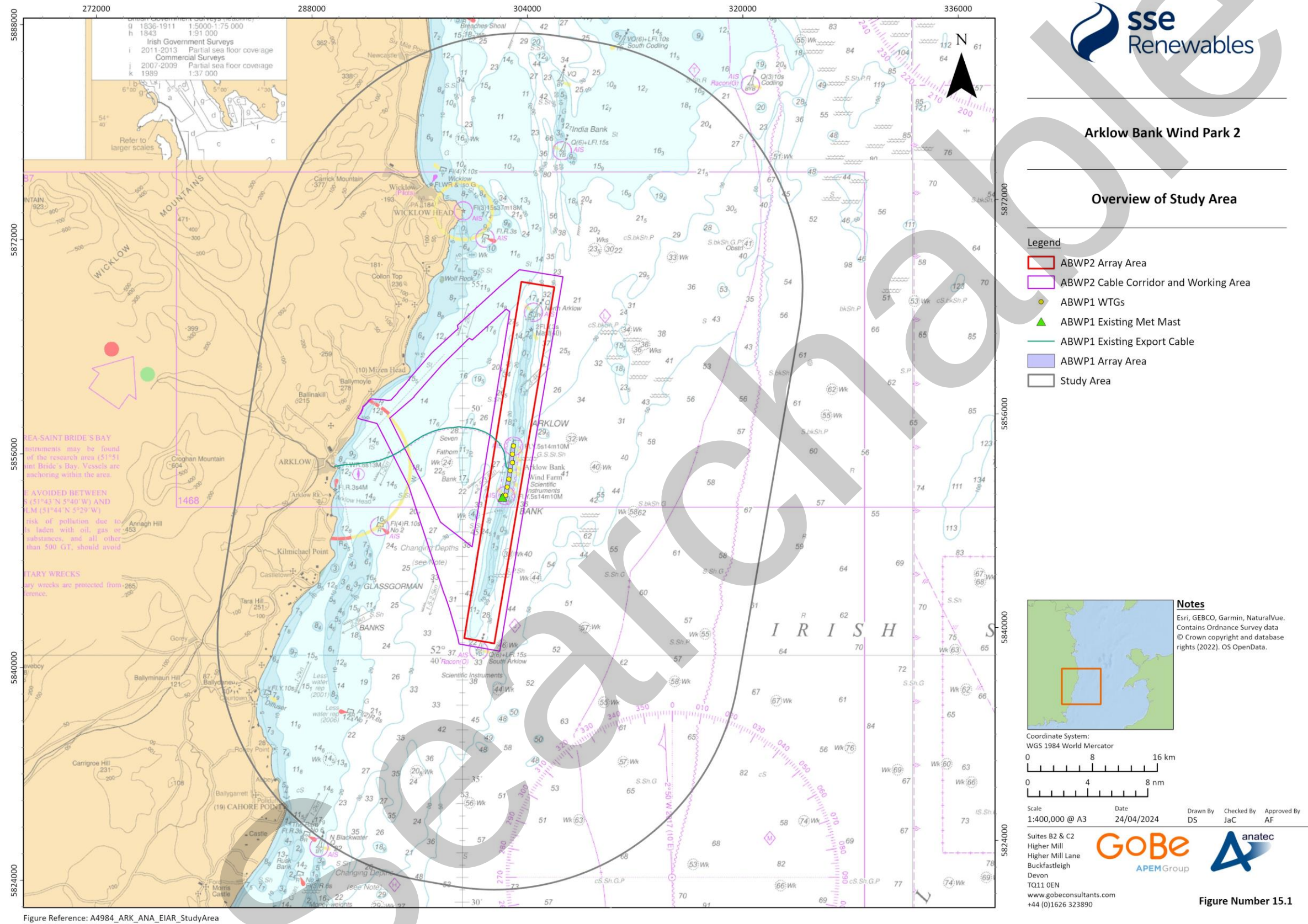


Figure 15.1: Overview of Study Area

15.5 Methodology

15.5.1 Methodology to inform the baseline

Desktop studies

15.5.1.1 Information on shipping and navigation within the Study Area was collected through a detailed desktop review of existing studies and datasets. These reports are summarised in Table 15.3, noting they were the latest available at the time of the assessment.

Table 15.3: Summary of key desktop reports and data resources

Title	Source	Year	Author
Long-term AIS data	Anatec	2022 (assessment undertaken in 2023)	Anatec in-house data
RNLI Incident Data	RNLI	2013-2022 (assessment undertaken in 2023)	RNLI
Marine Casualty Investigation Board (MCIB) Incident Data	MCIB	1992-2022 (assessment undertaken in 2023)	MCIB
UKHO Admiralty Charts	UKHO	2023 (assessment undertaken in 2023)	UKHO
Admiralty Sailing Directions Irish Coast Pilot NP40	UKHO	2019 (assessment undertaken in 2023)	UKHO

Site specific surveys

15.5.1.2 In order to inform the EIAR, site-specific surveys were undertaken. A summary of the surveys used to inform the shipping and navigation impact assessment is outlined in Table 15.4 below.

Table 15.4: Site specific surveys

Data source	Date(s) of survey	Overview of survey	Survey contractor	Reference to further information
Dedicated survey vessel	7 July 2023 – 14 August 2023	Summer vessel traffic survey data consisting of AIS, Radar and visual observations recorded from a dedicated survey vessel on-site.	Survey undertaken by the <i>Connector</i> vessel in liaison with Anatec Ltd.	Volume III, Appendix 15.1: Navigation Risk Assessment
Dedicated survey vessel	8 September 2022 – 26 September 2022	Summer vessel traffic survey data consisting of AIS, Radar and visual	Survey undertaken by the <i>Roman Rebel</i> vessel in	Volume III, Appendix 15.1: Navigation Risk Assessment

Data source	Date(s) of survey	Overview of survey	Survey contractor	Reference to further information
		observations recorded from a dedicated survey vessel on-site.	liaison with Anatec Ltd.	
On-site survey vessel	15 July 2019 – 28 July 2019	Summer vessel traffic survey data consisting of AIS, Radar and visual observations recorded from a survey vessel on-site.	Survey undertaken by the <i>AMS Retriever</i> vessel in liaison with Anatec Ltd.	Volume III, Appendix 15.1: Navigation Risk Assessment

15.5.2 Baseline environment

15.5.2.1 This section summarises the baseline assessment undertaken within Volume III, Appendix 15.1: Navigation Risk Assessment, in particular in terms of navigational features and vessel traffic.

Array Area

NAVIGATIONAL FEATURES

15.5.2.2 Key and relevant navigational features have been identified based on information provided on Admiralty Charts and within the Pilot Book for the area (UKHO, 2019). Full details of this assessment are provided in Volume III, Appendix 15.1: Navigation Risk Assessment, with a summary of key features provided below. An overview of these features is provided in Figure 15.2.

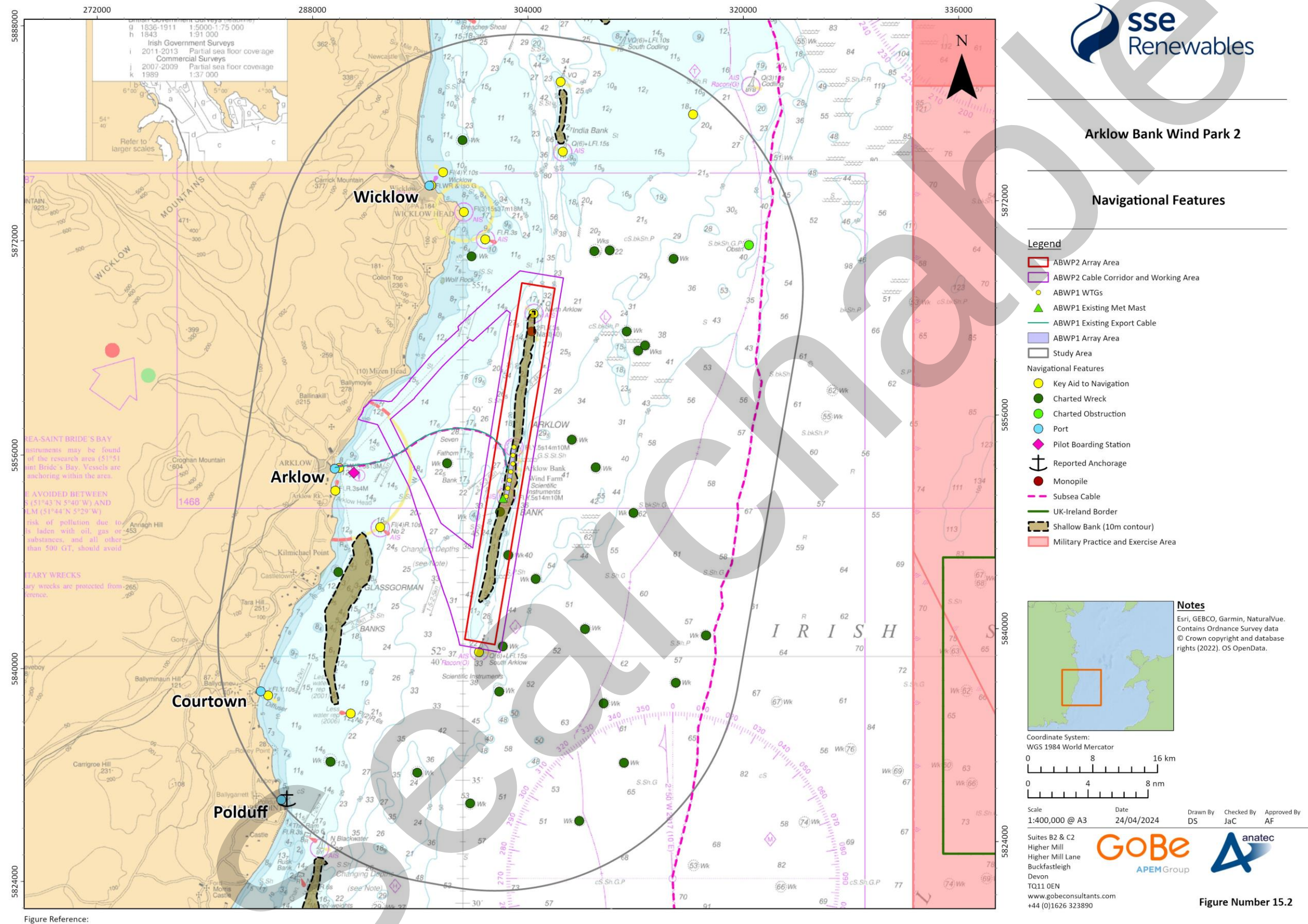


Figure 15.2: Navigational Features

15.5.2.3 There are no IMO adopted routeing measures within the Study Area. However, it should be considered that commercial vessel routeing within proximity to the Array Area is largely dictated by three TSSs located beyond the Study Area:

- Off Tuskar Rock TSS, 26 nm to the south;
- Off Smalls TSS, 49 nm to the south; and
- Off Skerries TSS, 46 nm northeast.

15.5.2.4 Vessels will passage plan to align with the appropriate lanes of these TSS, and the resultant routes can be seen within the vessel traffic survey data.

15.5.2.5 The other key feature within the area defining vessel routeing in the area are the shallow banks off the coast, including the Arklow Bank around which the Array Area is located. Given the grounding hazard, the vast majority of vessels will avoid these banks. The northern and southern extents of the Arklow Bank are marked with cardinal buoys as follows:

- North cardinal buoy with AIS marking the northern bank extent; and
- South cardinal buoy with AIS and Racon marking the southern bank extent.

15.5.2.6 Arklow Bank Wind Park 1 (ABWP1) consists of seven WTGs, each of which are marked with aids to navigation. A Light Detection and Ranging (Lidar) buoy on top of a monopile is also present at ABWP1 (see Figure 15.2).

15.5.2.7 Key ports in the area are Arklow to the west, and Wicklow to the northwest, and it is noted that Dublin is located further north. A notable proportion of vessels in the area are in transit to or from Dublin (based on an assessment of the 2023 and 2022 vessel traffic survey data, approximately 25% of vessels indicated they were bound to Dublin via their AIS transmissions). There is a pilot boarding station off Arklow.

VESSEL TRAFFIC

15.5.2.8 Full details and analysis of the vessel traffic survey data collected to date for the Proposed Development are provided in Volume III, Appendix 15.1: Navigation Risk Assessment. A summary of the most recently available data collected during vessel traffic surveys undertaken in 2023 and 2022 is provided below, with reference to other datasets made where appropriate.

15.5.2.9 The vessel traffic survey data collected during a 29-day period in July/August 2023 and a 14-day period in September 2022 is presented in Figure 15.3 and Figure 15.4, respectively.

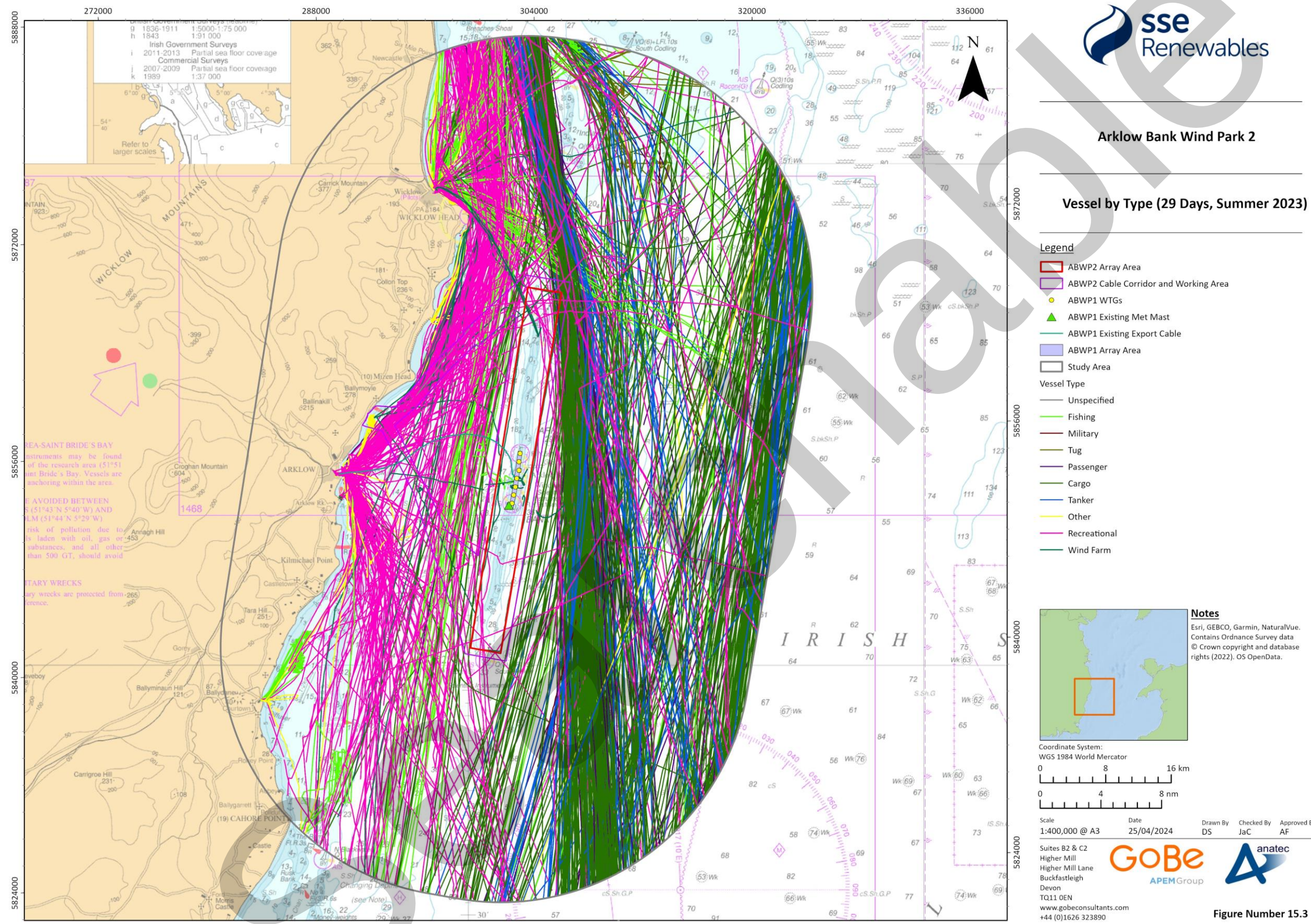


Figure 15.3: Vessels by Type (29 Days, Summer 2023)

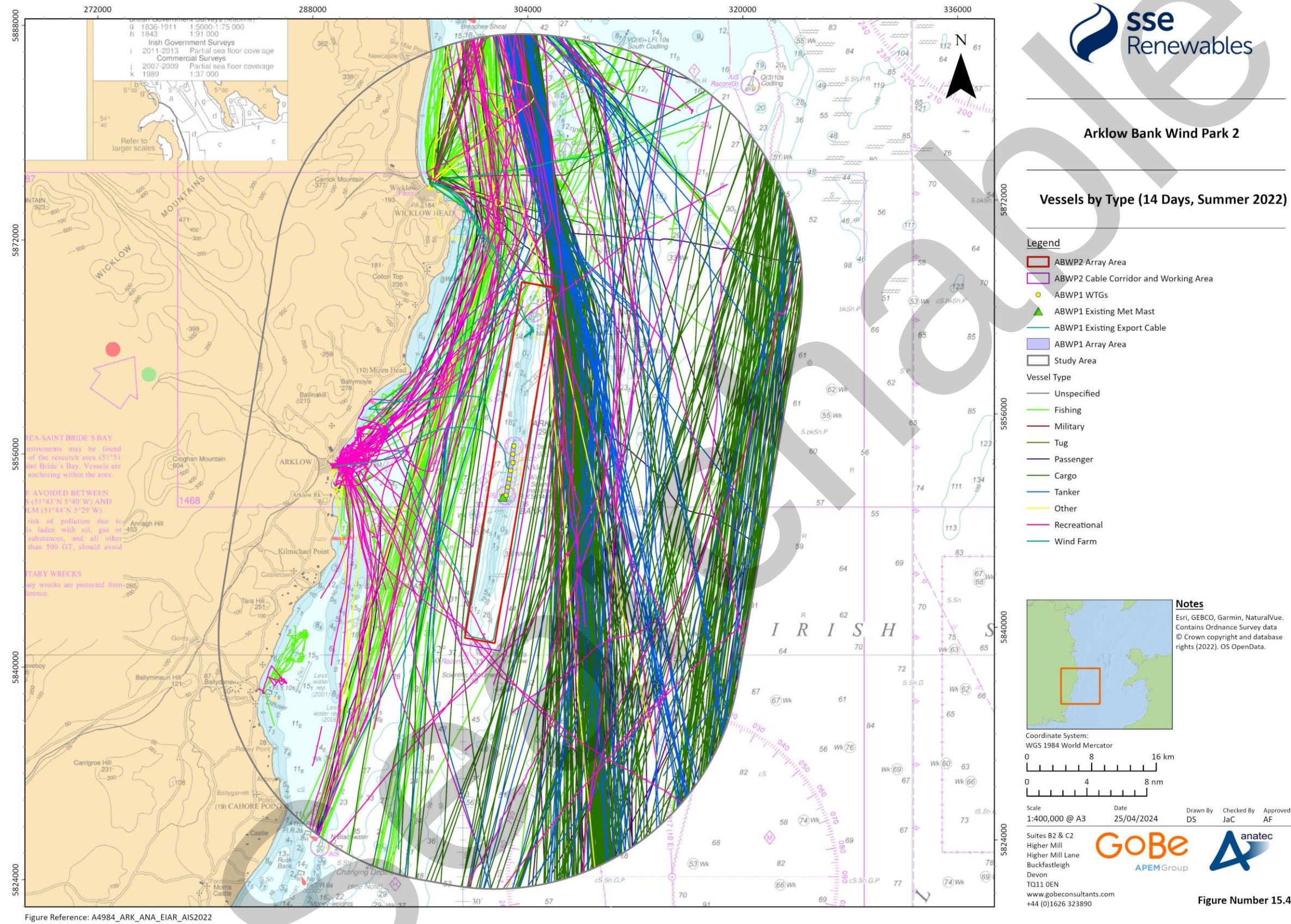


Figure 15.4: Vessels by Type (14 Days, Summer 2022)

- 15.5.2.10 As shown (and in line with the discussion provided on relevant navigational features), routing in the area is largely defined by the shallow banks. The majority of commercial vessels pass offshore of the Arklow Bank, with smaller vessel types (e.g., fishing and recreation) more commonly being found inshore.
- 15.5.2.11 An average of 36-37 unique vessels were recorded per day within the Study Area during the July/August 2023 period, which was broadly consistent with the average of 36 per day recorded during the September 2022 period. The busiest full day across both survey periods was the 11 July 2023, on which 59 vessels were recorded. The quietest full days across both survey periods were the 8 July 2023 and the 25 September 2022, on each of which 24 unique vessels were recorded.
- 15.5.2.12 The most common vessel type recorded within the Study Area during both survey periods was cargo, accounting for 40% during the 2023 period and 43% during the 2022 period. During the 2023 period, recreational was the next most common (31%) followed by fishing (10%) and tanker (7%). During the 2022 period, the next most common types were fishing (22%) and recreational (15%) followed by tanker (9%) and passenger (6%).
- 15.5.2.13 The average length of vessel recorded within the Study Area during the 2023 and 2022 survey periods was 78 m and 86 m, respectively. The smallest vessels (less than 15 m) mainly consisted of fishing vessels, recreational vessels, and lifeboats. The longest vessel across both survey periods was a 330 m cruise ship, on a northward transit at the eastern extent of the Study Area during the 2023 period. The average draught across both periods was estimated at 5 m. The deepest draught recorded across both survey periods was 14 m, broadcast by a cargo vessel in southwest transit offshore of the Array Area during the 2022 period.
- 15.5.2.14 Five instances of anchoring were observed in the Study Area across the survey periods, each instance involving a cargo vessel and three of the five instances being located at the approach to Wicklow.

Cable Corridor and Working Area

- 15.5.2.15 The Cable Corridor and Working Area are located entirely within the Study Area. Key points on the vessel traffic intersecting the Cable Corridor and Working Area are detailed as follows:
- Average of 12 to 13 vessels per day intersecting the Cable Corridor and Working Area during the July/August 2023 period, which was similar to the average of 13 to 14 vessels per day recorded during the September 2022 period.
 - During the July/August 2023 period, the most common vessel type was recreational, accounting for 48%. During the September 2022 period, the most common vessel type was cargo, accounting for 33%.
 - During the July/August 2023 period, the average draught was 5.7 m and the maximum was 9.2 m. During the September 2022 period, the average draught was 4.8 m and the maximum was 8.5 m.
 - During the July/August 2023 period, the nearest anchoring occurred within approximately 200 m of the northern section of the Cable Corridor and Working Area. During the September 2022, the nearest anchoring occurred within approximately 5.8 nm from the Cable Corridor and Working Area.

15.5.3 'Do nothing' scenario

- 15.5.3.1 Annex IV of the EIA Directive sets out the information required to be included in an EIAR. This includes "a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge". In the event that

the Proposed Development does not proceed, an assessment of the future baseline conditions has been carried out and is described within this section and in detail within Volume III, Appendix 15.1: Navigation Risk Assessment.

- 15.5.3.2 Consultation has indicated no known plans for expansion of the local ports at Arklow or Wicklow. It has been raised that Dun Laoghaire Harbour is planning to expand for the purposes of accommodating additional commercial traffic and attracting more recreational traffic (Dun Laoghaire Harbour, 2011), but this is not anticipated to result in significant additional arrivals relative to baseline levels at busy ports in the wider region (e.g. Dublin). Dublin Port Company (DPC) published a 2012 to 2040 Master Plan with a goal to increase traffic volumes, which could affect traffic passing the Array Area in future, however the 2018 Review indicates this is not guaranteed (DPC, 2018). POCC have published their 2050 Masterplan (POCC, 2023) which similarly indicates plans for future aspirational growth. While the Port of Cork is located on the south coast, associated vessels to or from Dublin will likely pass in proximity to the Array Area.
- 15.5.3.3 In terms of fishing vessels, again future levels will depend on a number of factors, however it was raised during consultation that the UK's departure from the European Union (EU) may affect the fishing patterns of Irish vessels, resulting in more activity in Irish waters.
- 15.5.3.4 Generally speaking, fluctuations in future commercial traffic levels are difficult to predict as they are dependent on a number of factors (e.g. market conditions). Therefore, for the purposes of the "Do Nothing" modelling scenario, a 10% and 25% increase in commercial, fishing and recreational traffic has been assumed for the future case (see Volume III, Appendix 15.1: Navigation Risk Assessment for full details). The application of a range of percentage increase values is line with best practice.

15.5.4 Data limitations

- 15.5.4.1 Data limitations and assumptions are summarised below, with further details presented in Volume III, Appendix 15.1: Navigation Risk Assessment.

Automatic identification system data

- 15.5.4.2 It is assumed that vessels under an obligation to broadcast information via AIS have done so, across each vessel traffic dataset. It has also been assumed that the details broadcast via AIS (such as vessel type and dimensions) are accurate unless clear evidence to the contrary was identified.
- 15.5.4.3 The long term AIS analysis does not capture any vessel that was not broadcasting via AIS. However, non AIS vessels were captured via the vessel traffic surveys.

Historical incident data

- 15.5.4.4 The RNLI incident data is not comprehensive of all incidents, as any incident to which an RNLI resource was not mobilised has not been accounted for.
- 15.5.4.5 Similarly, the MCIB incident data only accounts for incidents that have been subject to a complete investigation. In addition, coordinates are not available for every incident in the MCIB dataset.
- 15.5.4.6 However, it is considered likely that any notable incidents will have been captured between the two datasets, noting that the incident data has been presented to stakeholders including the RNLI at the hazard workshops.

United Kingdom Hydrographic Office Admiralty charts

- 15.5.4.7 The UKHO Admiralty Charts are updated periodically and therefore the information shown may not reflect the real time features within the region with total accuracy. Additionally, not all navigational features may be charted, e.g. certain aids to navigation and wrecks. However, the

identified navigational features have been presented to stakeholders for review including at the hazard workshops.

15.6 Methodology for assessing the significance of effects

15.6.1 Key parameters for assessment

- 15.6.1.1 The assessment of significance of effects has been carried out on both of the two discrete Project Design Options detailed in Volume II, Chapter 4, Description of Development. This approach has allowed for a robust and full assessment of the Proposed Development.
- 15.6.1.2 The two Project Design Options and parameters relevant to each potential impact are detailed in Table 15.5 and Table 15.6.

Table 15.5: Project design parameters and impacts assessed – Project Design Option 1

Potential impact	Phase			Project Design Option 1
	C	O	D	
Displacement of vessel traffic (displacement of established commercial vessel routes resulting in increased journey times and distances)	✓	✓	✓	Construction phase • Single phase of construction lasting up to five years. • Installation of 56 WTGs and two OSPs within full extent of the Array Area. • Advisory safe passing distances around under construction structures (500 m) and pre-commissioned structures (50 m); advisory clearance distances of up to 500 m around all installation vessels. • Confirmatory surveys. Operational and maintenance phase Operational life of up to 36.5 years. • 56 WTGs and two OSPs within full extent of the Array Area. • Advisory safe passing distances around structures undergoing major maintenance (500 m) and advisory clearance distances of up to 500 m around cable repair vessels. • Temporal O&M surveys. Decommissioning phase • Single phase of decommissioning lasting circa (c.) 2.5 years. • Removal of 56 WTGs and two OSPs within full extent of Array Area. • Advisory safe passing distances around structures being decommissioned (500 m).
Port access restrictions (restricted access in and out of ports in proximity to the Proposed Development)	✓	✓	✓	Construction phase • Single phase of construction lasting maximum five years. • Installation of 56 WTGs and two OSPs within full extent of Array Area. • Maximum of 4,150 vessel round trips to the Array Area over the 5-year construction phase, including 20 vessel round trips for installation of the offshore export cables (including activities at the landfall), comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, cable installation vessels, guard vessels, survey vessels, crew transfer vessels, and scour/cable protection installation vessels. Operational and maintenance phase • Maximum operational life of 36.5 years. • 56 WTGs and two OSPs within full extent of Array Area.

Potential impact	Phase	Project Design Option 1
	C O D	
		- Maximum of 1,359 vessel round trips per year comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels, from local ports or transiting from a previously operational location. Decommissioning phase - Single phase of decommissioning lasting c. 2.5 years. - Removal of 56 WTGs and two OSPs within full extent of Array Area. - Maximum of 4,150 vessel round trips to the Array Area over the decommissioning phase comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, guard vessels, survey vessels and crew transfer vessels.
Increased collision risk (displacement of established commercial vessel routes resulting in an increased number of vessel to vessel encounters and consequently an increased risk of a vessel to vessel collision)	✓ ✓ ✓	Construction phase Single phase of construction lasting a maximum of five years. - Installation of 56 WTGs and two OSPs within full extent of Array Area. - Advisory safe passing distances around under construction structures (500 m) and pre-commissioned structures (50 m); advisory clearance distances of maximum 500 m around cable installation vessels. - Maximum of 4,150 vessel round trips to the Array Area over the 5-year construction phase, including 20 vessel round trips for installation of the offshore export cables (including activities at the landfall), comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, cable installation vessels, guard vessels, survey vessels, crew transfer vessels, and scour/cable protection installation vessels. - Confirmatory surveys. Operational and maintenance phase - Maximum operational life of 36.5 years. 56 WTGs and two OSPs within full extent of Array Area. - Advisory safe passing distances around structures undergoing major maintenance (500 m) and advisory clearance distances of maximum 500 m around cable repair vessels. - Maximum of 1,359 vessel round trips per year comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels, from local ports or transiting from a previously operational location. - Temporal O&M surveys. Decommissioning phase

Potential impact	Phase	Project Design Option 1		
	C	O	D	
				• Single phase of decommissioning lasting c. 2.5 years. • Removal of 56 WTGs and two OSPs within full extent of Array Area. • Advisory safe passing distances around structures being decommissioned (500 m). • Maximum of 4,150 vessel round trips to the Array Area over the decommissioning phase comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, guard vessels, survey vessels and crew transfer vessels.
Increased allision risk (increased risk of a vessel to structure allision, either involving a powered or drifting vessel)	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • Installation of 56 WTGs and two OSPs within full extent of Array Area. • Two OSPs located internally within the Array Area will be installed on monopile foundations, with topside dimensions modelled of 33.5×46 m (excluding antennae). • Advisory safe passing distances around under construction structures (500 m) and pre-commissioned structures (50 m). Operational and maintenance phase • Maximum operational life of 36.5 years. • 56 WTGs on monopile foundations with dimensions at sea surface of 7 to 11 m, within full extent of Array Area. • Two OSPs located internally within the Array Area on monopile foundations, with topside dimensions modelled of 33.5×46 m (excluding antennae). • Advisory safe passing distances around structures undergoing major maintenance (500 m). • Minimum spacing of 500 m (tip to tip) between proposed structures. Decommissioning phase • Single phase of decommissioning lasting c. 2.5 years. • Removal of 56 WTGs installed on monopile foundations with dimensions at sea surface of 7 to 11 m, within full extent of Array Area. • Removal of two OSPs located internally within the Array Area and installed on monopile foundations with topside dimensions of 33.5×46 m modelled (excluding antennae); and • Advisory safe passing distances around structures being decommissioned (500 m).

Potential impact	Phase			Project Design Option 1
	C	O	D	
Cable interaction risk (risk of snagging by vessel anchors or fishing gear and possible reduction in under keel clearance)	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • Installation of 100 to 122 km of inter-array cables with seabed burial depth ranging from 0 m to 1.5 m, within full extent of Array Area. • Installation of 25 to 28 km of interconnector cables with a burial depth of 2.5 m. • Installation of 35 to 40 km of offshore export cables with seabed burial depth ranging from 0 m to 1.5 m. • Inter-array cables may require cable protection for 15% of the total length, 1.5 m in height. • Interconnector cables may require cable protection for 50% of the total length, 1.8 m in height. • Offshore export cables may require cable protection for 20% of the total length, 1.5 m in height. • Cable protection at cable crossings Operational and maintenance phase • Maximum operational life of 36.5 years. • 100 to 122 km of inter-array cables with seabed burial depth ranging from 0 m to 1.5 m, within full extent of Array Area. • 25 to 28 km of interconnector cables with a burial depth of 2.5 m. • 35 to 40 km of offshore export cables with seabed burial depth ranging from 0 m to 1.5 m. • Inter-array cables may require cable protection for 15% of the total length, 1.5 m in height. • Interconnector cables may require cable protection for 50% of the total length, 1.8 m in height. • Offshore export cables may require cable protection for 20% of the total length, 1.5 m in height. • Cable protection at cable crossings Decommissioning phase • Single phase of decommissioning lasting c. 2.5 years. • Cables and cable protection (as described above) left in situ post decommissioning.
Diminished emergency response capability	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • 4,150 vessel round trips to the Array Area over the 5-year construction phase, including 20 vessel round trips for installation of the offshore export cables (including activities at the landfall), comprised

Potential impact	Phase	Project Design Option 1
	C O D	of jack-up barge/dynamic positioning vessels, tug/anchor handlers, cable installation vessels, guard vessels, survey vessels, crew transfer vessels, and scour/cable protection installation vessels. • 294 helicopter return trips to the Array Area over the 5-year construction phase. Operational and maintenance phase • Maximum operational life of 36.5 years. • 1,359 vessel round trips per year comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels. • 485 helicopter return trips per year. Decommissioning phase • 4,150 vessel round trips to the Array Area over the decommissioning phase comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, guard vessels, survey vessels and crew transfer vessels. • 294 helicopter return trips to the Array Area over the decommissioning phase.

Table 15.6: Project design parameters and impacts assessed - Project Design Option 2

Potential impact	Phase			Project Design Option 2
	C	O	D	
Displacement of vessel traffic (displacement of established commercial vessel routes resulting in increased journey times and distances)	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • Installation of 47 WTGs and two OSPs within full extent of the Array Area. • Advisory safe passing distances around under construction structures (500 m) and pre-commissioned structures (50 m); advisory clearance distances of maximum 500 m around all installation vessels. • Confirmatory surveys. Operational and maintenance phase • Maximum operational life of 36.5 years. • 47 WTGs and two OSPs within full extent of the Array Area. • Advisory safe passing distances around structures undergoing major maintenance (500 m) and advisory clearance distances of maximum 500 m around cable repair vessels. • Temporal O&M surveys. Decommissioning phase • Single phase of decommissioning lasting c. 2.5 years. • Removal of 47 WTGs and two OSPs within full extent of Array Area. • Advisory safe passing distances around structures being decommissioned (500 m).
Port access restrictions (restricted access in and out of ports in proximity to the Proposed Development)	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • Installation of 47 WTGs and two OSPs within full extent of Array Area. • 4,150 vessel round trips to the Array Area over the 5-year construction phase, including 20 vessel round trips for installation of the offshore export cables (including activities at the landfall), comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, cable installation vessels, guard vessels, survey vessels, crew transfer vessels, and scour/cable protection installation vessels. Operational and maintenance phase • Maximum operational life of 36.5 years.

Potential impact	Phase	Project Design Option 2
	C O D	
		47 WTGs and two OSPs within full extent of Array Area. 1,359 vessel round trips per year comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels, from local ports or transiting from a previously operational location. Decommissioning phase - Single phase of decommissioning lasting c. 2.5 years. - Removal of 47 WTGs and two OSPs within full extent of Array Area. 4,150 vessel round trips to the Array Area over the decommissioning phase comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, guard vessels, survey vessels and crew transfer vessels.
Increased collision risk (displacement of established commercial vessel routes resulting in an increased number of vessel to vessel encounters and consequently an increased risk of a vessel to vessel collision)	✓ ✓ ✓	Construction phase - Single phase of construction lasting maximum of five years. - Installation of 47 WTGs and two OSPs within full extent of Array Area. - Advisory safe passing distances around under construction structures (500 m) and pre-commissioned structures (50 m); advisory clearance distances of maximum 500 m around cable installation vessels. 4,150 vessel round trips to the Array Area over the 5-year construction phase, including 20 vessel round trips for installation of the offshore export cables (including activities at the landfall), comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, cable installation vessels, guard vessels, survey vessels, crew transfer vessels, and scour/cable protection installation vessels. - Confirmatory surveys. Operational and maintenance phase - Maximum operational life of 36.5 years. 47 WTGs and two OSPs within full extent of Array Area. - Advisory safe passing distances around structures undergoing major maintenance (500 m) and advisory clearance distances of maximum 500 m around cable repair vessels; and 1,359 vessel round trips per year comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels, from local ports or transiting from a previously operational location. - Temporal O&M surveys.

Potential impact	Phase	Project Design Option 2
	C O D	
		Decommissioning phase • Single phase of decommissioning lasting c. 2.5 years. • Removal of 47 WTGs and two OSPs within full extent of Array Area. • Advisory safe passing distances around structures being decommissioned (500 m). • 4,150 vessel round trips to the Array Area over the decommissioning phase comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, guard vessels, survey vessels and crew transfer vessels.
Increased allision risk (increased risk of a vessel to structure allision, either involving a powered or drifting vessel)	✓ ✓ ✓	Construction phase • Single phase of construction lasting maximum of five years. • 47 WTGs and two OSPs within full extent of Array Area. • Two OSPs located internally within the Array Area will be installed on monopile foundations, with topside dimensions modelled of 33.5×46 m (excluding antennae). • Advisory safe passing distances around under construction structures (500 m) and pre-commissioned structures (50 m). Operational and maintenance phase • Maximum operational life of 36.5 years. • 47 WTGs on monopile foundations with dimensions at sea surface of 7 to 11 m, within full extent of Array Area. • Two OSPs located internally within the Array Area on monopile foundations, with topside dimensions modelled of 33.5×46 m (excluding antennae). • Advisory safe passing distances around structures undergoing major maintenance (500 m). • Minimum spacing of 500 m (tip to tip) between proposed structures. Decommissioning phase • Single phase of decommissioning lasting c. 2.5 years. • Removal of 47 WTGs installed on monopile foundations with dimensions at sea surface of 7 to 11 m, within full extent of Array Area. • Removal of two OSPs located internally within the Array Area and installed on monopile foundations with topside dimensions of 33.5×46 m modelled (excluding antennae); and • Advisory safe passing distances around structures being decommissioned (500 m).

Potential impact	Phase			Project Design Option 2
	C	O	D	
Cable interaction risk (risk of snagging by vessel anchors or fishing gear and possible reduction in under keel clearance)	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • Installation of 100 to 122 km of inter-array cables with seabed burial depth ranging from 0 m to 1.5 m, within full extent of Array Area. • Installation of 25 to 28 km of interconnector cables with a burial depth of 2.5 m. • Installation of 35 to 40 km of offshore export cables with seabed burial depth ranging from 0 m to 1.5 m. • Inter-array cables may require cable protection for 15% of the total length, 1.5 m in height. • Interconnector cables may require cable protection for 50% of the total length, 1.8 m in height. • Offshore export cables may require cable protection for 20% of the total length, 1.5 m in height. • Cable protection at cable crossings Operational and maintenance phase • Maximum operational life of 36.5 years. • 100 to 122 km of inter-array cables with seabed burial depth ranging from 0 m to 1.5 m, within full extent of Array Area. • 25 to 28 km of interconnector cables with a burial depth of 2.5 m. • 35 to 40 km of offshore export cables with seabed burial depth ranging from 0 m to 1.5 m. • Inter-array cables may require cable protection for 15% of the total length, 1.5 m in height. • Interconnector cables may require cable protection for 50% of the total length, 1.8 m in height. • Offshore export cables may require cable protection for 20% of the total length, 1.5 m in height. • Cable protection at cable crossings Decommissioning phase • Single phase of decommissioning lasting c. 2.5 years. • Cables and cable protection (as described above) left in situ post decommissioning.
Diminished emergency response capability	✓	✓	✓	Construction phase • Single phase of construction lasting maximum of five years. • 4,150 vessel round trips to the Array Area over the 5-year construction phase, including 20 vessel round trips for installation of the offshore export cables (including activities at the landfall),

Potential impact	Phase	Project Design Option 2
	C O D	comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, cable installation vessels, guard vessels, survey vessels, crew transfer vessels, and scour/cable protection installation vessels. • 294 helicopter return trips to the Array Area over the 5-year construction phase. Operational and maintenance phase • Maximum operational life of 36.5 years. • 1,359 vessel round trips per year comprised of crew transfer vessels, jack-up vessels, cable repair vessels and other vessels. • 485 helicopter return trips per year. Decommissioning phase • 4,150 vessel round trips to the Array Area over the decommissioning phase comprised of jack-up barge/dynamic positioning vessels, tug/anchor handlers, guard vessels, survey vessels and crew transfer vessels. • 294 helicopter return trips to the Array Area over the decommissioning phase.

15.6.2 Impacts scoped out of the assessment

15.6.2.1 Impacts to navigation, communication and position fixing equipment have been assessed in Volume III, Appendix 15.1: NRA and screened out of the EIAR.

15.7 Methodology to assess the significance of effects

15.7.1 Overview

15.7.1.1 The IMO FSA approach (IMO, 2018) has been utilised to assess impacts relevant to shipping and navigation. In summary, the FSA is a structured and systematic methodology based upon risk analysis and Cost Benefit Analysis (if applicable) to reduce the impacts to As Low As Reasonably Practicable (ALARP) parameters. This approach aligns with the assessment undertaken to produce the Hazard Log based upon the outputs of the Hazard Workshops undertaken, as required under the NRA methodology (MCA, 2021).

15.7.1.2 The criteria for determining the significance of effects under the FSA is a two-stage process that involves defining the frequency of occurrence and the severity of consequence of the impact, both of which are outlined in the proceeding sections.

15.7.2 Impact assessment criteria

Frequency of Occurrence

15.7.2.1 Table 15.7 presents the definitions used for determining frequency of occurrence.

Table 15.7: Definition of terms relating to the frequency of occurrence

Rank	Description	Definition
1	Negligible	< 1 per 10,000 years
2	Extremely unlikely	1 per 100-10,000 years
3	Remote	1 per 10-100 years
4	Reasonably probable	1 per 1-10 years
5	Frequent	Yearly

Severity of Consequence

15.7.2.2 Table 15.8 presents the definitions used for determining severity of consequence.

Table 15.8: Definition of terms relating to the severity of consequence

Rank	Description	Definition			
		People	Property	Environment	Business
1	Negligible	No perceptible effect	No perceptible effect	No perceptible effect	No perceptible effect
2	Minor	Slight injurie(s)	Minor damage to property i.e., superficial damage	Tier 1 local assistance required	Minor reputational impact – limited to users
3	Moderate	Multiple moderate or single serious injury	Damage not critical to operations	Tier 2 limited external assistance required	Local reputational impacts
4	Serious	Multiple serious injuries or single fatality	Damage resulting in critical impact on operations	Tier 2 regional assistance required	National reputation impacts
5	Major	More /than one fatality	Total loss of property	Tier 3 national assistance required	International reputational impacts

Significance of Effect

15.7.2.3 The risk associated with each shipping and navigation impact is determined by correlating the frequency of occurrence with the severity of consequence. This provides the tolerability based on the tolerability matrix presented in Table 15.9.

15.7.2.4 Once identified, the tolerability of an impact is assessed to ensure it is ALARP. Further risk control measures may be required to further mitigate an impact in accordance with the ALARP principles, noting that unacceptable risks are not considered to be ALARP. For the purposes of this assessment, any impacts with risk of a tolerable (assuming ALARP) risk or less have been concluded to be not significant in terms of the EIA Directive.

Table 15.9: Risk Ranking Matrix

		Severity of Consequence				
		Major	Serious	Moderate	Minor	Negligible
	Frequent	Unacceptable	Unacceptable	Unacceptable	Tolerable	Tolerable
	Reasonably Probable	Unacceptable	Unacceptable	Tolerable	Tolerable	Broadly Acceptable
	Remote	Unacceptable	Tolerable	Tolerable	Broadly Acceptable	Broadly Acceptable
	Extremely Unlikely	Tolerable	Tolerable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
	Negligible	Tolerable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable

15.7.3 Factored in measures

15.7.3.1 The Project Design Options set out in Volume II, Chapter 4: Description of Development include a number of factored in measures and management measures (or controls) which have been factored into the Proposed Development and are committed to be delivered by the Developer as part of the Proposed Development.

15.7.3.2 These factored in measures are standard measures applied to offshore wind development, including lighting and marking of the Proposed Development, use of 'soft-starts' for piling operations etc, to reduce the potential for impacts. Factored in measures relevant to the assessment on shipping and navigation are presented in Table 15.10. These measures are integrated into the description of development and have therefore been considered in the impact assessment (i.e. the determination of significance assumes implementation of these measures). These measures are considered standard industry practice for this type of development. This approach is in line with Environmental Protection Agency (EPA) guidance which states that 'in an EIAR it may be useful to describe avoidance measures that have been integrated into the project' (EPA, 2022).

Table 15.10: Factored in measures

Factored in measures	Justification
Application and use of 'rolling' 500 m advisory safe passing distances surrounding all fixed structures where work is being undertaken by a construction or maintenance vessel, and around cable installation/maintenance vessels.	Necessary to ensure safe passing distances are made clear to third party traffic. See Volume III, Appendix 25.7: Vessel Management Plan.
Application and use of 50 m advisory safe passing distances around all surface structures up until the point of commissioning.	Necessary to ensure safe passing distances are made clear to third party traffic. See Volume III, Appendix 25.7: Vessel Management Plan.
Appropriate vessel health and safety including IMO conventions and health and safety	Necessary to ensure vessels utilised are appropriate for intended tasks. See Volume III, Appendix 25.7: Vessel Management Plan.

Factored in measures	Justification
requirements, including MSO requirements for vessel certification.	requirements, including MSO requirements for vessel certification. Cable Burial Risk Assessment (CBRA) undertaken pre-construction including consideration of under keel clearance and appropriate cable protection applied based upon the outcomes. Cable will be buried to 0.5 m where possible, cable protection will be utilised where identified as necessary. The aim of the CBRA is to undertake a risk assessment in order to determine suitable burial depths for a cable along the entire route to protect the cable from third party and natural hazards. This includes identifying all hazards to the cable and carrying out a risk assessment to make recommendations on the burial depth required along the length of the cable to ensure that the risk to the cable is within acceptable limits. The CBRA includes an assessment of seabed conditions (based on available survey data) and an assessment of shipping, fishing, dredging, military activities etc. Burial requirements are normally driven by the risk from fishing gear and vessel anchors, as well as the seabed conditions along the cable route (which affects the anchor and fishing gear penetration depths). This process will be informed by a Burial Assessment Study (BAS) which looks at the different installation methodologies available (see Volume II, Chapter 4, Description of Development for further details) and provides recommendations as to the suitability of each option based on the seabed conditions. The BAS also identifies areas where burial may not be feasible and additional protection (e.g. rock placement) may be required. This will feed into the CBRA to provide cable

Factored in measures	Justification
protection requirements (burial and external protection).	
Charting of all structures associated with the Proposed Development on relevant nautical and electronic charts.	To ensure third party vessels are aware of the Proposed Development and associated locations to facilitate passage planning and minimise allision risk. See Volume III, Appendix 25.7: Vessel Management Plan.
Compliance from all project vessels with Irish Law (including the holding of correct certification as required by MSO), and international maritime regulations as adopted by the relevant flag state including International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972/77) and SOLAS (IMO, 1974).	To ensure interactions/encounters with third party traffic are suitably and safely managed. See Volume III, Appendix 25.7: Vessel Management Plan.
Application of MGN 654 with respect to WTG design and construction, undertaken in liaison with IRCG including the agreement of a SAR checklist. This includes the submission of “supporting documentation” to IRCG if requested as per the wording of the draft DoT guidance (see Section 15.2).	To ensure recognised safe standards are met with regards to navigational safety and SAR. Note this is UK guidance, but was indicated as appropriate by key statutory stakeholders during consultation.
Implementation of emergency response plans in consultation with IRCG.	To ensure emergency response procedures (i.e. the Emergency Response Cooperation Plan (ERCoP); see Volume III, Appendix 25.5: Emergency Response Cooperation Plan) are clearly defined including how the Proposed Development will cooperate with the IRCG in an emergency, and how emergency response will be facilitated.
Implementation of a buoyed construction/decommissioning area around the Array Area during the respective phases.	To ensure the area within which works are ongoing is clear to passing traffic. See Volume III, Appendix 25.6: Lighting and Marking Plan.
Lighting and marking to be agreed with Irish Lights via an LMP (see Volume III, Appendix 25.6: Lighting and Marking Plan), whose requirements align with IALA Guidance G1162 (IALA, 2022).	To ensure appropriate lighting and marking of the Proposed Development, including temporary lighting and marking during the construction phase to alert passing vessels to potential hazards.
Marine Pollution Contingency Plan (MPCP).	To ensure plans are in place to manage any marine pollution spills (Volume III, Appendix 25.1 Environmental Management Plan, Annex 2).

Factored in measures	Justification
Marine coordination, including VMP (see Volume III, Appendix 25.7: Vessel Management Plan).	To ensure project vessel movements are appropriately managed.
WTG blade clearance above Highest Astronomical Tide (HAT) of approximately 35 m (37m above Lowest Astronomical Tide (LAT)).	To minimise risk of allision with sailing vessels. This value exceeds the minimum blade clearance required under Royal Yachting Association (RYA, 2019) and MCA guidance (MCA, 2021).
Circulation of information via NtMs and other appropriate methods including FLO.	To ensure details of the Proposed Development are provided to parties that may be affected to facilitate passage planning. See Volume III, Appendix 25.7: Vessel Management Plan.
Provision of self-help capability.	To provide additional emergency response resources to facilitate response to emergency incidents. See Volume III, Appendix 25.5: Emergency Response Cooperation Plan.
Use of a temporary guard vessel where justified by risk assessment (e.g. to protect unlit structures and/or unprotected cable prior to burial).	To allow protection of any particularly sensitive operations undertaken. See Volume III, Appendix 25.7: Vessel Management Plan.
The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence for Site Investigations (FS007339).	The Developer was granted a Foreshore Licence (FS007339) for Site Investigations (associated with the Proposed Development) from the Minister for Housing, Local Government and Heritage in May 2022. The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence for Site Investigations (FS007339) being carried out. As such there is no temporal overlap between the activities consented in this Foreshore Licence and the Proposed Development and there will be no potential for cumulative effects.
The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence Application for Site Surveys FS007555 (should a licence be granted) are being carried out.	The Developer submitted a Foreshore Licence Application for Site Surveys to the Minister for Housing, Local Government and Heritage in April 2023 (FS007555) and this application is pending determination. The Developer confirms and commits that it will not carry out any works in respect of the Proposed Development under the planning permission (if granted) at the same time as any activities the subject of the Foreshore Licence Application for Site Surveys FS007555 (should a licence be granted) are being carried out.

Factored in measures

Justification

As such there is no temporal overlap between the activities proposed in the Foreshore Licence Application and the Proposed Development.

15.8 Assessment of the significance of effects

- 15.8.1.1 The impacts of the construction, operational and maintenance and decommissioning phases of both Project Design Options forming the Proposed Development have been assessed on shipping and navigation. The potential impacts arising from the construction, operational and maintenance and decommissioning phases of the Proposed Development are listed in Table 15.5 and Table 15.6, along with the project parameters against which each impact has been assessed.
- 15.8.1.2 A description of the potential effect on shipping and navigation caused by each identified impact is provided in Section 15.9 and Section 15.10.

15.9 Assessment of Project Design Option 1

15.9.1 Impact 1 –Displacement of Vessel Traffic

- 15.9.1.1 The structures to be built within the Array Area, and associated construction and maintenance works/vessels (including that associated with the Cable Corridor and Working Area) may lead to displacement of vessel traffic within the area surrounding the Proposed Development.
- 15.9.1.2 As described in Section 15.5.2, all larger commercial vessels in the Study Area already avoid the Array Area, noting the shallow depths of the Arklow Bank. As such, for commercial traffic, only minor deviations are likely, and only for routes which currently pass in close proximity to the Array Area. This was validated by the routeing assessment presented within Volume III, Appendix 15.1: Navigation Risk Assessment, which predicted limited deviations for four of the 12 identified main routes, noting that the increase in route length corresponding to each deviation was less than 1 nm. While any such deviations may be affected by the use of construction buoyage, it is likely that any changes in routeing established during the construction phase will be maintained during the operational phase.
- 15.9.1.3 With respect to commercial ferries (which are more sensitive to this impact given their timetabled services), Irish Ferries confirmed during the Hazard Workshop held in 2019 that their Masters already maintain a large clearance from the shallow Arklow Bank and thus have no concerns; they reiterated during the second Hazard Workshop held in 2023 that there is low potential for their vessels to experience large displacement. Moreover, the general consensus during the Hazard Workshop held in 2019 was that Arklow Bank is already avoided in general due to the grounding risk; on this basis, any deviations from Arklow Bank due to the presence of the Proposed Development could be considered to decrease grounding risk further.
- 15.9.1.4 Regarding the operational traffic associated with the maintenance of the existing ABWP1 project, liaison will be required to ensure that the final layout does not impede access to these existing turbines, and it will be ensured that the construction and maintenance plans are shared in advance.
- 15.9.1.5 Based on both the vessel traffic data and consultation, instances of third party transits over the Arklow Bank are very rare. Regardless, there would be no formal restrictions on such transits during any phase, noting advisory safe passing distances will be in place as per Section 15.7.3. Based on the size of vessels observed to cross the bank (mainly small recreational vessels albeit on a very infrequent basis) relative to the minimum spacing between proposed structures for Project Design Option 1 (500 m tip to tip), it is considered that the presence of structures will not prevent such transits and as such any associated impact will be limited.

- 15.9.1.6 Details of the Proposed Development would be promulgated in advance of and during construction/maintenance/decommissioning activities (as set out in Volume III, Appendix 25.7: Vessel Management Plan), and the structures would be displayed on the relevant nautical charts. This will facilitate advanced passage planning of third-party traffic accounting for the presence of the Proposed Development. Positions of construction buoys will also be agreed with Irish Lights to ensure displacement is minimal. Further details on buoyage are provided in Volume III, Appendix 25.6: Lighting and Marking Plan.
- 15.9.1.7 There may also be a need for vessels to deviate to avoid the vessels associated with the installation of the export cables within the Cable Corridor and Working Area. As above, promulgation of information will be undertaken to alert vessels to the ongoing works, and any interactions will also be managed by COLREGs, noting that they will likely be localised in nature and short term in duration. Therefore, should an encounter incident occur within the Cable Corridor and Working Area, the vessels involved are likely to be able to resume their respective passages with no long-term consequences.

Construction phase

FREQUENCY OF OCCURRENCE

- 15.9.1.8 Based on consultation and the description of the baseline, the significant majority of vessels will not be displaced by the Proposed Development given they already avoid the shallow depths of the Arklow Bank, and baseline transits over the bank are rare. There is searoom to accommodate any displacement that does occur.
- 15.9.1.9 Any displacement associated with the Cable Corridor and Working Area will be spatially limited to the area immediately around the installation vessel and temporary in nature.
- 15.9.1.10 The frequency of occurrence is therefore assessed to be Reasonably Probable, given that while deviations are likely to occur, the vast majority would be of no perceptible impact.

SEVERITY OF CONSEQUENCE

- 15.9.1.11 Based on the routeing assessment presented within Volume III, Appendix 15.1: Navigation Risk Assessment, any increases to commercial vessel journey distances will be limited, noting that established vessel routeing in the area is such that the shallow water depths of the Arklow Bank are already avoided. It is also noted that any deviations away from the Arklow Bank will reduce grounding risk, and as such may be of benefit. Any deviation arising from the cable installation process within the Cable Corridor and Working Area would be low in terms of additional distance given the limited spatial area impacted.
- 15.9.1.12 As such there is not considered likely to be any notable adverse consequence on vessel routeing.
- 15.9.1.13 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF THE EFFECT

- 15.9.1.14 Overall, the frequency of occurrence is deemed to be **Reasonably Probable** and the severity of consequence is considered to be **Minor**. The effect will therefore be of **Tolerable Significance**.

PROPOSED MITIGATION

- 15.9.1.15 The impact is managed via the factored in measures including the VMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.1.16 The significance of effect from changes in displacement of vessel traffic during the construction phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of vessel displacement during the construction phase.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.9.1.17 Based on consultation and the description of the baseline, the significant majority of vessels will not be displaced by the Proposed Development given they already avoid the shallow depths of the Arklow Bank, and baseline transits over the bank are rare. Any displacement associated with the Cable Corridor and Working Area would be limited to periods of cable maintenance requiring surface vessel presence which is anticipated to be a low frequency occurrence.

15.9.1.18 The frequency of occurrence is therefore assessed to be Remote.

SEVERITY OF CONSEQUENCE

15.9.1.19 Based on the routeing assessment presented within Volume III, Appendix 15.1: Navigation Risk Assessment, any increases to commercial vessel journey distances will be limited, noting that by the operational phase it is likely that the minor deviations predicted will be well established. It is also noted that any deviations away from the Arklow Bank will reduce grounding risk, and as such may be of benefit.

15.9.1.20 As such there is not considered likely to be any notable adverse consequence on vessel routeing.

15.9.1.21 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.1.22 Overall, the frequency of occurrence is deemed to be **Remote** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.1.23 The impact is broadly acceptable and therefore no additional mitigation is proposed.

RESIDUAL EFFECT ASSESSMENT

15.9.1.24 The significance of effect from changes in vessel displacement during the operational and maintenance phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of vessel displacement during the operational and maintenance phase.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.9.1.25 Based on consultation and the description of the baseline, the significant majority of vessels will not be displaced by the Proposed Development given they already avoid the shallow depths of the Arklow Bank, and baseline transits over the bank are rare. There is searoom to accommodate any displacement that does occur. Any displacement associated with the Cable Corridor and

Working Area would be limited to any works requiring surface vessel presence, with the impacted area being limited spatially and temporary in nature.

15.9.1.26 As such decommissioning activities are unlikely to have a frequent impact. Once the Proposed Development is decommissioned, the impact will be less than during the operational and maintenance phase given the removal of surface piercing infrastructure.

15.9.1.27 The frequency of occurrence is therefore assessed to be Reasonably Probable.

SEVERITY OF CONSEQUENCE

15.9.1.28 During the decommissioning phase, it is anticipated that all structures above the seabed level will be completely removed, with cables and scour/cable protection to be left in situ. Decommissioning proposals are out in Volume III, Appendix 4.1: Rehabilitation Schedule. Deviations will be well established by the decommissioning phase, however it should be considered that there may be some additional minor displacement associated with additional levels of project vessels. Once the Proposed Development is decommissioned, any displacement will be less than during the operational and maintenance Phase given the removal of surface piercing infrastructure.

15.9.1.29 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.1.30 Overall, the frequency of occurrence is deemed to be **Reasonably Probable** and the severity of consequence is considered to be **Minor**. The effect will therefore be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.1.31 The impact is managed via the factored in measures including the VMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.1.32 The significance of effect from changes in displacement of vessel traffic during the decommissioning phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of vessel displacement during the decommissioning phase.

15.9.2 Impact 2 – Port Access Restrictions

15.9.2.1 The construction, operation and decommissioning of the Proposed Development may result in restricted access in and out of ports in the vicinity. Based on the findings presented within Volume III, Appendix 15.1: Navigation Risk Assessment, the only port which may be affected is Arklow given its location directly to the west of the Array Area. However, as per the baseline vessel routing, the significant majority of vessels in the area already avoid the Array Area noting the shallow waters associated with the Arklow Bank, and as such established routing into Arklow Port will not be affected to any notable degree by the presence of activities within the Array Area itself.

15.9.2.2 Vessels and works associated with the installation or maintenance of the offshore export cables may temporarily affect port access. However, any such impact will be temporary and limited in spatial extent to the area immediately around the installation operation. As set out in Volume III, Appendix 25.7: Vessel Management Plan, vessel management procedures including marine coordination will be in place to ensure associated impacts including port access are managed. Associated details would be promulgated including to relevant port and harbour authorities to ensure both the authorities and third party vessels were aware.

15.9.2.3 At its closest point the Cable Corridor and Working Area is located in excess of 1 nm from the charted Arklow Harbour pilotage and as such no associated impacts on pilotage are anticipated, noting that pilotage is non-compulsory for Arklow Harbour.

15.9.2.4 Port access restrictions associated with the use of Arklow Port as the operations and maintenance base are considered in the Cumulative Impact Assessment (CIA) presented in Section 15.12.3.

Construction phase

FREQUENCY OF OCCURRENCE

15.9.2.5 It is not considered likely that impacts to port access will be a regular occurrence, noting that any such restrictions are anticipated to only be associated with offshore export cable route works and associated vessel movements.

15.9.2.6 The frequency of occurrence is therefore assessed to be Remote.

SEVERITY OF CONSEQUENCE

15.9.2.7 Given existing vessel access routes into Arklow already avoid the Array Area, the only potential consequence is minor and temporary restriction associated with the offshore export cable route works and associated vessel movements. However, there is not anticipated as being a scenario whereby port access is prevented, with minor deviations or waits for non-commercial traffic the most likely consequence.

15.9.2.8 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.2.9 Overall, the frequency of occurrence is deemed to be **Remote** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.2.10 The impact is broadly acceptable and therefore no additional mitigation is proposed.

RESIDUAL EFFECT ASSESSMENT

15.9.2.11 The significance of effect from changes in port access restrictions during the construction phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of port restriction during the construction phase.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.9.2.12 It is not considered likely that impacts to port access will be a regular occurrence during the operational phase, noting that any such restrictions are anticipated to be associated with occasional monitoring or maintenance of the offshore export cables.

15.9.2.13 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.2.14 Given existing vessel access routes into Arklow already avoid the Array Area, the only potential consequence is minor and temporary restriction associated with operational monitoring or

maintenance of the offshore export cables. There is not anticipated as being a scenario whereby port access is prevented, with minor deviations/waits for non-commercial traffic the most likely consequence.

15.9.2.15 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.2.16 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.2.17 The impact is broadly acceptable and therefore no additional mitigation is proposed.

RESIDUAL EFFECT ASSESSMENT

15.9.2.18 The significance of effect from changes in port access restrictions during the operational and maintenance phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of port restriction during the operational and maintenance phase.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.9.2.19 Given the potential for increased project vessel movements during decommissioning, port access restrictions will be similar to that assessed for the construction phase.

15.9.2.20 The frequency of occurrence is therefore assessed to be Remote.

SEVERITY OF CONSEQUENCE

15.9.2.21 During decommissioning, there may be an increase in project vessel movements in the area compared with those for the operational phase. However, there is not anticipated as being a scenario whereby port access is prevented, with minor deviations/waits for non-commercial traffic the most likely consequence.

15.9.2.22 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.2.23 Overall, the frequency of occurrence is deemed to be **Remote** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.2.24 The impact is broadly acceptable and therefore no additional mitigation is proposed.

RESIDUAL EFFECT ASSESSMENT

15.9.2.25 The significance of effect from changes in port access restrictions during the decommissioning phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of port access restrictions during the decommissioning phase.

15.9.3 Impact 3 – Increased Collision Risk

- 15.9.3.1 The construction, operation and decommissioning of the Proposed Development may lead to a displacement of established commercial vessel routes resulting in an increased number of vessel to vessel encounters and consequently an increased risk of a vessel to vessel collision.
- 15.9.3.2 Given only minor deviations to established commercial vessel routeing are expected, there is not anticipated to be a notable increase in collision risk. This aligns with the findings of the collision modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, with the vessel to vessel collision return period once deviations are established being estimated at approximately one in 152 years. This represents a 3% increase from the base case collision frequency prior to construction, and therefore the majority is attributed to current vessel traffic levels as opposed to the deviations resulting from the Proposed Development.
- 15.9.3.3 It should be considered that there will be a minor reduction in searoom to vessels passing inshore of the Array Area. Based on the routeing assessment in Volume III, Appendix 15.1: NRA, commercial vessel numbers passing inshore are low (less than one per day on the defined inshore route) with the vast majority of such commercial vessels being southbound (meaning head on encounters between commercial vessels are less likely). This is reflected in the vessel to vessel collision modelling, which showed collision risk inshore of the Array Area to be lower than offshore, where vessel numbers are notably higher. Any encounters that do occur including involving any inshore recreational or fishing vessels will be managed via COLREGs. Placement of construction buoys will be discussed and agreed with Irish Lights to ensure inshore searoom is maintained. Further details are provided in Volume III, Appendix 25.6: Lighting and Marking Plan.
- 15.9.3.4 There is also potential encounter and collision risk associated with third party vessels and vessels associated with the Proposed Development. This will include Heavy Lift Vessels (HLVs) and jack-up vessels which, when undertaking construction or maintenance work, will be Restricted in their Ability to Manoeuvre (RAM). To ensure project vessel activities and transits are effectively managed, marine coordination and other operational procedures such as entry/exit points and designated routes will be in place to ensure project vessels are effectively managed.
- 15.9.3.5 It is noted that concern was raised during consultation over a scenario where a project vessel within the Array Area emerged from between structures and encountered northbound/southbound traffic passing inshore of the Array Area. As above, operational procedures, including a VMP (see Volume III, Appendix 25.7: Vessel Management Plan), will be in place to manage project vessel movements in and around the Array Area.
- 15.9.3.6 It should also be considered that given the shallow banks in the area, the presence of Arklow Port, and the existing and planned turbines, traffic in the area will be vigilant to potential risks, including other vessels.

Construction phase

FREQUENCY OF OCCURRENCE

- 15.9.3.7 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, in addition to consultation and the baseline description, a collision resulting from the construction of the Proposed Development is not considered a likely event.
- 15.9.3.8 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

- 15.9.3.9 Consequences of a collision will depend on the sizes and types of the vessels involved, and their speeds and courses. Based on the findings presented within Volume III, Appendix 15.1:

Navigation Risk Assessment (baseline and modelling), a collision between large commercial routed vessels in transit, which have the highest potential consequences, will not be a common occurrence. However, a higher consequence collision may still occur.

15.9.3.10 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.3.11 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.3.12 The impact is managed via the factored in measures including the VMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.3.13 The significance of effect from changes in collision risk during the construction phase is ALARP and therefore not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of collision risk during the construction phase.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.9.3.14 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, in addition to consultation and the baseline description, a collision resulting from the operational and maintenance of the Proposed Development is not considered a likely event.

15.9.3.15 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.3.16 Consequences of a collision will depend on the sizes and types of the vessels involved, and their speeds and courses. Based on the findings presented within Volume III, Appendix 15.1: Navigation Risk Assessment (baseline, modelling), a collision between large commercial routed vessels in transit, which have the highest potential consequences, will not be a common occurrence. However, a higher consequence collision may still occur.

15.9.3.17 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.3.18 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.3.19 The impact is managed via the factored in measures including the VMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.3.20 The significance of effect from changes in collision risk during the operational and maintenance phase ALARP and therefore is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of collision risk during the operational and maintenance phase.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.9.3.21 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, in addition to consultation and the baseline description, a collision resulting from the decommissioning of the Proposed Development is not considered a likely event, even accounting for potential increases in project vessel activity during decommissioning.

15.9.3.22 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.3.23 Consequences of a collision will depend on the sizes and types of the vessels involved, and their speeds and courses. Based on the findings presented within Volume III, Appendix 15.1: Navigation Risk Assessment (baseline and modelling), a collision between large commercial routed vessels in transit, which have the largest potential consequences, will not be a common occurrence. However, a higher consequence collision may still occur.

15.9.3.24 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.3.25 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.3.26 The impact is managed via the factored in measures including the VMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.3.27 The significance of effect from changes in collision risk during the decommissioning phase is ALARP and therefore not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of collision risk during the decommissioning phase.

15.9.4 Impact 4 – Increased Allision Risk

15.9.4.1 The installation and presence of structures within the Array Area (including partially completed structures) will result in an increased risk of a vessel to structure allision, either involving a powered or drifting (Not Under Command (NUC)) vessel.

15.9.4.2 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, the powered allision return period was estimated at one per 2,726 years, with the drifting return period estimated at one per 356 years. Fishing allision frequency was estimated at one per 393 years. The assessment was considered conservative, as no account of the shallow water depths

of the Arklow Bank was made (i.e. the potential for vessels grounding prior to allision was not taken into account).

- 15.9.4.3 It is likely that the only vessels that will deliberately enter into the Array Area are small recreational or fishing vessels. This assumption is primarily based upon the baseline description (see Section 15.5.2.8) which showed that larger vessels avoid the Arklow Bank; however, experience of other operational wind farm projects also shows that such commercial vessels would typically avoid internal navigation within wind farms regardless of water depth. Should a recreational vessel enter the Array Area there is a blade/yacht mast allision risk if navigating in close proximity to a WTG. However, with a minimum WTG blade clearance of approximately 35 m above HAT (equates to 37 m above LAT) and noting transits within the Array Area are only likely to be from small vessels given water depth restrictions, it is anticipated that the likelihood of a recreational vessel with air draught capable of interacting with a blade is very low.
- 15.9.4.4 It should be considered that partially completed or pre-commissioned structures may not yet have operational lighting and marking, and as such may pose an increased allision risk during the construction phase (this was raised as a concern during the first Hazard Workshop as per Volume III, Appendix 15.1: Navigation Risk Assessment). Temporary lighting and marking (e.g. buoyage) during the construction phase will be implemented in agreement and discussion with Irish Lights, and advisory safe passing distances will be utilised. During the operational and maintenance phase, operational lighting and marking in line with IALA G1162 (IALA, 2022) and in agreement with Irish Lights will be in place to manage allision risk. During decommissioning, temporary lighting will be utilised as set out in Volume III, Appendix 4.1: Rehabilitation Schedule. Further details of lighting and marking are provided in Volume III, Appendix 25.6: Lighting and Marking Plan.
- 15.9.4.5 A vessel drift scenario may only develop into an allision situation if it occurs in proximity to a structure within the Array Area. This would only be the case where the vessel was either located within or in close proximity to the Array Area, and the direction of the wind and/or tide directs the vessel towards a structure. Should a vessel start to drift towards the Array Area, the vessel will first initiate its own procedures for such an event, which may involve dropping anchor or the use of thrusters (depending on availability and power supply). This may include an emergency anchoring event which would involve checking relevant nautical charts to ensure that deployment of the anchor will not lead to other risks (such as anchor snagging on a subsea cable) in line with emergency procedures. Given the water depths in the area, use of anchor to counter a drift scenario is considered feasible (noting this may be vessel dependent).
- 15.9.4.6 Furthermore, any vessels on site associated with the Proposed Development may be able to provide assistance (depending upon type and capability) in liaison with IRCG and as required under SOLAS obligations (IMO, 1974). Further details of emergency response are provided in Volume III, Appendix 25.5: Emergency Response Cooperation Plan.

Construction phase

FREQUENCY OF OCCURRENCE

- 15.9.4.7 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, consultation and baseline description, an allision resulting from the construction of the Proposed Development is not considered a likely event.
- 15.9.4.8 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

- 15.9.4.9 Noting the low likelihood of a routed vessel allision based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, and based on the baseline description and consultation indicating that vessel transits into the Array Area are likely to be from small craft

(noting such transits are rare), it is considered likely that any allision will be low speed and low energy. However, higher consequence allisions may occur on a lower frequency basis.

15.9.4.10 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.4.11 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.4.12 The impact is managed via the factored in measures including the LMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.4.13 The significance of effect from changes in allision risk during the construction phase is ALARP and therefore not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of allision risk during the construction phase.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.9.4.14 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, consultation and baseline description, an allision resulting from the presence of the Proposed Development is not considered a likely event.

15.9.4.15 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.4.16 Noting the low likelihood of a routed vessel allision based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, and based on the baseline description and consultation indicating that vessel transits into the Array Area are likely to be from small craft (noting such transits are rare), it is considered likely that any allision will be low speed and low energy. However, higher consequence allisions may occur on a lower frequency basis.

15.9.4.17 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.4.18 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance** and **ALARP**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.4.19 The impact is managed via the factored in measures including the LMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.4.20 The significance of effect from changes in allision risk during the operational and maintenance phase is ALARP and therefore not significant in EIA terms. Therefore, no additional mitigation to

that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of allision risk during the operational and maintenance phase.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.9.4.21 Based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, consultation and baseline description, an allision resulting from the decommissioning of the Proposed Development is not considered a likely event.

15.9.4.22 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.4.23 Noting the low likelihood of a routed vessel allision based on the modelling presented within Volume III, Appendix 15.1: Navigation Risk Assessment, and based on the baseline description and consultation indicating that vessel transits into the Array Area are likely to be from small craft (noting such transits are rare), it is considered likely that any allision will be low speed and low energy. However, higher consequence allisions may occur on a lower frequency basis.

15.9.4.24 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.4.25 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.4.26 The impact is managed via the factored in measures including the LMP, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.4.27 The significance of effect from changes in allision risk during the decommissioning phase is ALARP and therefore not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of allision risk during the decommissioning phase.

15.9.5 Impact 5 – Cable Interaction Risk

15.9.5.1 The presence of subsea cables and any cable protection (i.e. armouring) introduces a risk of snagging/interaction by vessel anchors, and could lead to a reduction in under keel clearance. Impacts associated with fishing gear interaction are assessed within Volume II, Chapter 14: Commercial Fisheries.

15.9.5.2 The baseline description showed anchoring activity within the area to be limited, with consultation output validating this finding. Further, the nearest charted anchorage area is located approximately 9.7 nm southwest of the Array Area at Polduff Harbour. The likelihood of a dragged anchor interaction is therefore considered low. Regardless, the cables will be buried where possible, with cable protection installed where burial is not possible, to minimise interaction risk. Burial depths and any required cable protection will be within the envelope of the Proposed Development set out in Volume II, Chapter 4: Description of Development and further refined as part of the CBRA (see Table 15.10). The CBRA will consider potential anchor penetration depths

based on assessment of vessel size within the area, however it is intended that cables will be buried where possible, with cable protection utilised where necessary.

- 15.9.5.3 It should be considered that a vessel may require to drop anchor in an emergency (e.g. to avoid drifting into the Arklow Bank or allision with a structure), or inadvertently (e.g. mechanical failure, human error). However, as discussed above, the cables will be protected against anchor interaction, and it is noted that even in an emergency situation the presence of charted cables should still be considered prior to deliberately deploying anchor.
- 15.9.5.4 Cable burial and use of cable protection means that anchors from smaller vessels are unlikely to be capable of penetrating deep enough to interact with the cables. Cable burial depths and any cable protection will be refined via the CBRA carried out prior to construction (see Table 15.10) and as such should also protect against larger vessels and anchors, however in cases of interaction the most likely outcome is damage to the cables as opposed to risk of snagging and/or damage to the vessel.
- 15.9.5.5 During construction, there may be cases of exposed cable prior to burial or protection. In such cases, use of a temporary guard vessel where deemed appropriate via risk assessment will be employed. It is noted that cable burial depth and any associated cable protection will be periodically monitored and maintained during the operational phase, with appropriate measures implemented as appropriate on a temporary basis where potential risk is identified (see Table 15.10).
- 15.9.5.6 There is also a potential risk of the under keel clearance being reduced as a result of the subsea cables and/or cable protection. A CBRA will be undertaken prior to construction (see Table 15.10) which will consider vessel draughts in the area against water depths to ensure any areas where navigational safety could be compromised are identified, and avoided where possible, or otherwise controlled, e.g. through updated charts. Any reduction in water depth of more than 5% referenced to Chart Datum will be discussed with the MSO and CIL to agree any required mitigation. This is in line with proposed wording of the draft Department of Transport (DfT) Marine Navigational Safety & Emergency Response Risk of Offshore Renewable Energy Installations (DfT, 2024) and aligns with the approach within MGN 654 (MCA, 2021).

Construction phase

FREQUENCY OF OCCURRENCE

- 15.9.5.7 Given the lack of baseline anchoring, and noting low likelihood of inadvertent or emergency anchoring, cable interaction is not considered likely to be a frequent event. Given the potential for exposed cables prior to implementation of protection through burial or armouring, interaction frequency risk may be higher during construction than during operation.
- 15.9.5.8 The frequency of occurrence is therefore assessed to be Remote.

SEVERITY OF CONSEQUENCE

- 15.9.5.9 Noting that the cables will be buried and/or protected, it is likely that the majority of potential interactions will not result in contact with the cables. Where an anchor did penetrate to a depth whereby cable interaction was possible, the likely size of anchor means the most likely consequence is cable damage as opposed to snagging risk to the vessel. Measures will be in place to ensure any under keel clearance risks are minimised (see Table 15.10).
- 15.9.5.10 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.5.11 Overall, the frequency of occurrence is deemed to be **Remote** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.5.12 The impact is managed via the factored in measures including the CBRA, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.5.13 The significance of effect from changes in cable interaction risk during the construction phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of cable interaction risk during the construction phase.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.9.5.14 Given the lack of baseline anchoring, and noting low likelihood of inadvertent or emergency anchoring, cable interaction is not considered likely to be a frequent event.

15.9.5.15 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.5.16 Noting that the cables will be buried and/or protected, the majority of potential interactions will not result in contact with the cables. Where an anchor did penetrate to a depth whereby cable interaction was possible, the likely size of anchor means the most likely consequence is cable damage as opposed to snagging risk to the vessel. Measures will be in place to ensure any under keel clearance risks are minimised (see Table 15.10).

15.9.5.17 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.5.18 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.5.19 The impact is managed via the factored in measures including the CBRA, and therefore no additional mitigation is proposed. The impact is therefore ALARP.

RESIDUAL EFFECT ASSESSMENT

15.9.5.20 The significance of effect from changes in cable interaction risk during the operational and maintenance phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of cable interaction risk during the operational and maintenance phase.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.9.5.21 Given the lack of baseline anchoring, and noting low likelihood of inadvertent or emergency anchoring, cable interaction is not considered likely to be a frequent event.

15.9.5.22 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.5.23 It is proposed that the cables and any associated cable protection will be left in situ. Noting that the cables will be buried and/or protected, the majority of potential interactions will not result in contact with the cables. Where an anchor did penetrate to a depth whereby cable interaction was possible, the likely size of anchor means the most likely consequence is cable damage as opposed to snagging risk to the vessel, and following decommissioning this is inconsequential. Decommissioning will be undertaken such that any continuing risks to navigation are minimised.

15.9.5.24 The severity of consequence is therefore assessed to be Minor.

SIGNIFICANCE OF EFFECT

15.9.5.25 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Minor**. The effect will, therefore, be of **Broadly Acceptable Significance**, which is **not significant** in EIA terms.

PROPOSED MITIGATION

15.9.5.26 The impact is managed via the factored in measures including the CBRA, and therefore no additional mitigation is proposed. The impact is therefore **ALARP**.

RESIDUAL EFFECT ASSESSMENT

15.9.5.27 The significance of effect from changes in cable interaction risk during the decommissioning phase is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 15.10 are considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of cable interaction risk during the decommissioning phase.

15.9.6 Impact 6 – Diminished Emergency Response Capability

15.9.6.1 The construction, operation and decommissioning of the Proposed Development will result in an increased number of vessels and personnel undertaking the associated activities in the vicinity of the Array Area. This may increase the likelihood of an incident requiring an emergency response and consequently may diminish emergency response capability in the region.

15.9.6.2 Given the distance offshore of the Array Area, and position relative to local emergency response resources, it is anticipated that an emergency responder could reach nearby incidents within a reasonable timeframe in the event of an incident. Notably, this includes All Weather Lifeboats stationed at RNLI stations in Arklow and Wicklow. The RNLI stated during consultation (see Section 15.3) that there would be “no impact on RNLI responses” from the Proposed Development.

15.9.6.3 Based on the historical RNLI incident response data studied, baseline incident rates are considered low, with an average of 40 to 41 incidents per year within the Study Area requiring lifeboat response (with only three in the Array Area). On this basis, it is unlikely that the Proposed Development will raise the potential of simultaneous incident rates to a degree that would impact upon emergency response resources in the area. This is based on assessment of incidents

associated with existing offshore wind farms in the UK undertaken within Volume III, Appendix 15.1: Navigation Risk Assessment, which shows that there is unlikely to be a large increase in incident rates associated with the Proposed Development.

- 15.9.6.4 Project vessels may be available to provide emergency response in the event of an incident in the area in liaison with IRCG, noting project vessels are likely to be well-equipped with well-trained crews which could assist in an emergency. Volume III, Appendix 25.5: Emergency Response Cooperation Plan sets out how the Developer will liaise, communicate and cooperate with IRCG in the event that such incidents occur.
- 15.9.6.5 SAR access lanes in line with MGN 654 (MCA, 2021) and the draft DoT guidance (see Section 15.2) available through both Project Design Options were presented to the IRCG at a meeting in April 2024 (see Section 15.3). The application of Limits of Deviation could increase or decrease the available coverage, and therefore it is considered necessary to reconsult with IRCG after a Project Design Option is selected to confirm they are content with the final coverage. This process will include:
- Agreement of the SAR checklist with IRCG as per Section 15.7.3;
 - Application of Limits of Deviation to maximise SAR coverage in an east/west orientation as far as is practicable and subject to site constraints, noting that IRCG stated during consultation a preference for East/West SAR access lanes; and
 - Provision of additional “supporting documentation” if requested by the IRCG as per the wording of the draft DoT guidance (see Section 15.2) and in alignment with the approach required under MGN 654.

Construction phase

FREQUENCY OF OCCURRENCE

- 15.9.6.6 Given low baseline incident rates indicated by the incident data studied and consultation, the potential for an increase in incidents resulting from the Proposed Development such that emergency response resources cannot manage is considered unlikely.
- 15.9.6.7 The frequency of occurrence is therefore assessed to be **Extremely unlikely**.

SEVERITY OF CONSEQUENCE

- 15.9.6.8 Given baseline incident rates are low, the likely consequence is considered to be a limited increase in local incidents which will remain manageable noting that the Proposed Development will increase available resources in an emergency situation, and the Developer will agree a SAR checklist with IRCG. However higher consequence incidents (at lower frequency) would include potential for fatality.
- 15.9.6.9 The severity of consequence is therefore assessed to be **Serious**.

SIGNIFICANCE OF EFFECT

- 15.9.6.10 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

- 15.9.6.11 It is considered necessary to confirm final SAR coverage with the IRCG, following application of Limits of Deviation to maximise SAR coverage in an east/west orientation as far as is practicable and subject to site constraints. The impact is considered **Tolerable and ALARP** assuming application of this additional mitigation.

RESIDUAL EFFECT ASSESSMENT

15.9.6.12 Assuming the application of the stated additional mitigation, the significance of effect from changes in allision risk during the construction phase is ALARP and therefore not significant in EIA terms. Therefore, no significant adverse residual effects have been predicted in respect of diminished emergency response capability during the construction phase.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.9.6.13 Given low baseline incident rates indicated by the incident data studied and consultation, a tangible effect upon emergency response resources is not considered a likely occurrence. It is also noted that due to a reduction in project vessel numbers during operation, it is likely that associated increases in incident frequency will also be lower than that assessed for the construction phase.

15.9.6.14 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.6.15 Given baseline incident rates are low, the likely consequence is considered to be a limited increase in local incidents which will remain manageable noting that the Proposed Development will increase available resources in an emergency situation, and the Developer will agree a Safety Justification and SAR checklist with IRCG. However higher consequence incidents (at lower frequency) would include potential for fatality.

15.9.6.16 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.6.17 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.6.18 It is considered necessary to confirm final SAR coverage with the IRCG, following application of Limits of Deviation to maximise SAR coverage in an east/west orientation as far as is practicable and subject to site constraints. The impact is considered **Tolerable and ALARP** assuming application of this additional mitigation.

RESIDUAL EFFECT ASSESSMENT

15.9.6.19 Assuming the application of the stated additional mitigation, the significance of effect from changes in allision risk during the construction phase is ALARP and therefore not significant in EIA terms. Therefore, no significant adverse residual effects have been predicted in respect of diminished emergency response capability during the operational and maintenance phase.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.9.6.20 Given low baseline incident rates indicated by the incident data studied and consultation, a tangible effect upon emergency response resources is not considered a likely occurrence.

15.9.6.21 The frequency of occurrence is therefore assessed to be Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.9.6.22 Given baseline incident rates are low, the likely consequence is considered to be a limited increase in local incidents which will remain manageable noting that the Proposed Development will increase available resources in an emergency situation. However higher consequence incidents (at lower frequency) would include potential for fatality.

15.9.6.23 The severity of consequence is therefore assessed to be Serious.

SIGNIFICANCE OF EFFECT

15.9.6.24 Overall, the frequency of occurrence is deemed to be **Extremely unlikely** and the severity of consequence is considered to be **Serious**. The effect will, therefore, be of **Tolerable Significance**.

PROPOSED MITIGATION

15.9.6.25 It is considered necessary to confirm final SAR coverage with the IRCG, following application of Limits of Deviation to maximise SAR coverage in an east/west orientation as far as is practicable and subject to site constraints. The impact is considered **Tolerable and ALARP** assuming application of this additional mitigation.

RESIDUAL EFFECT ASSESSMENT

15.9.6.26 Assuming the application of the stated additional mitigation, the significance of effect from changes in allision risk during the construction phase is ALARP and therefore not significant in EIA terms. Therefore, no significant adverse residual effects have been predicted in respect of diminished emergency response capability during the decommissioning phase.

15.10 Assessment of Project Design Option 2

15.10.1 Impact 1 – Displacement of Vessel Traffic

15.10.1.1 Vessel displacement around the Array Area is determined by the Array Area boundary as well as the spacing between structures within the Array Area (which determines how likely vessels are to transit through the Array Area as opposed to deviate around).

15.10.1.2 Both Project Design Options share the same Array Area and also have the same minimum spacing between proposed structures (500 m tip to tip). For the Cable Corridor and Working Area, the same installation process in terms of surface vessels will be applied for both Project Design Options.

15.10.1.3 On this basis, the assessment of the effect of Project Design Option 1 on vessel displacement is considered directly applicable to Project Design Option 2; see Section 15.9.1.

15.10.2 Impact 2 – Port Access Restrictions

15.10.2.1 As both Project Design Options share the same Array Area and Cable Corridor and Working Area boundary and would involve equivalent levels of project vessel numbers during each of the construction, operation, and decommissioning phases the assessment of the effect of Project Design Option 1 on port access restrictions is considered directly applicable to Project Design Option 2; see Section 15.9.2. It is noted that the same mitigations including the implementation of Volume III, Appendix 25.7: Vessel Management Plan will apply.

15.10.2.2 Port access restrictions associated with the use of Arklow Port as the operations and maintenance base are considered in the cumulative impact assessment presented in Section 15.12.3.

15.10.3 Impact 3 – Increased Collision Risk

15.10.3.1 The Proposed Development may increase collision risk between third party vessels by displacing commercial vessel routes and increasing the number of vessel to vessel encounters; this displacement would be a direct result of the Array Area boundary and any surface vessel presence associated with the Cable Corridor and Working Area. The Proposed Development may also increase collision risk between project vessels and third party vessels due to the presence of project vessel traffic to and from, and in, the Array Area.

15.10.3.2 Both Project Design Options share the same Array Area boundary, and Cable Corridor and Working Area and similar levels of project vessel traffic would also be expected between the two Project Design Options (see Section 15.10.1). On this basis, the assessment of the effect of Project Design Option 1 on increased collision risk, including the quantitative modelling undertaken, is considered directly applicable to Project Design Option 2; see Section 15.9.3.

15.10.4 Impact 4 – Increased Allision Risk

15.10.4.1 Allision modelling has been undertaken for Project Design Option 2 and presented within Volume III, Appendix 15.1: Navigation Risk Assessment. Based this modelling, the powered allision return period was estimated at one per 3,489 years, with the drifting return period estimated at one per 422 years. Fishing allision frequency was estimated at one per 438 years.

15.10.4.2 These results are similar to those derived from equivalent modelling undertaken for Project Design Option 1, and are not considered as materially changing impact significance. It should also be noted that, due to the similar minimum spacing between proposed structures for each of the two Project Design Options (500m tip to tip) the likelihood of small vessels transiting through the array is considered to be similar.

15.10.4.3 The same mitigations, notably lighting and marking as set out in Volume III, Appendix 25.6: Lighting and Marking Plan will also apply for both Project Design Options.

15.10.4.4 Due to the qualitative and quantitative similarity between the two project designs in terms of their effect on allision risk, the assessment of the allision risk impact for Project Design Option 1 is considered directly applicable to Project Design Option 2; see Section 15.9.4.

15.10.5 Impact 5 – Cable Interaction Risk

15.10.5.1 Cable burial/protection and cable lengths will be very similar between the two Project Design Options. On this basis, the assessment of the cable interaction risk impact for Project Design Option 1 is considered directly applicable to Project Design Option 2; see Section 15.9.5. In particular, the mitigation of a CBRA applies.

15.10.5.2 Impacts associated with fishing gear interaction are assessed within Volume II, Chapter 14: Commercial Fisheries.

15.10.6 Impact 6 – Diminished Emergency Response Capability

15.10.6.1 It is expected that there will be similar levels of project vessel traffic between the two Project Design Options, and therefore similar impact on emergency incident rates. As per Volume III, Appendix 15.1: Navigation Risk Assessment, there would not be expected to be a large change in incident rates based on consideration of known incidents recorded occurring at offshore wind farms in the UK.

15.10.6.2 On this basis, the assessment of the diminished emergency response capability impact for Project Design Option 1 is considered directly applicable to Project Design Option 2; see Section 15.9.6.

15.10.6.3 In particular, the same mitigations in terms of additional project vessel resource will apply.

15.11 Cumulative impacts assessment methodology

15.11.1 Methodology

- 15.11.1.1 The CIA takes into account the impacts associated with the Proposed Development together with other proposed and reasonably foreseeable projects, plans and existing and permitted projects. The projects and plans selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise (see Volume III, Appendix 3.2: CIA Screening). Each project and plan has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon, effect-receptor pathways and the spatial/temporal scales involved. The tiers relating to stages of development for projects and/or plans is set out in Volume III, Appendix 3.2: CIA Screening.
- 15.11.1.2 The specific projects scoped into this cumulative impact assessment, and the tiers into which they have been allocated is presented in Table 15.11. Further details of offshore wind farm screening for shipping and navigation are provided in Volume III, Appendix 15.1: NRA.
- 15.11.1.3 Due to the commitments made by the Developer in respect of the Foreshore Licence FS007339 and Foreshore Licence Application FS007555 (Table 15.10), FS007339 and FS007555 have been screened out of the cumulative impact assessment.

Table 15.11: List of other projects and plans considered within the cumulative impact assessment

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project/Plan	Dates of Construction	Dates of Operation	Justification for screening in
Tier 1							
Arklow Bank Wind Park 2 Operations and Maintenance Facility (OMF)	Proposed	11.8	4.3	Development of an OMF to support the Proposed Development, located at Arklow Port.	2026 - 2030	2030	Potential impacts on port access
Tier 3							
ABWP1 Decommissioning	Reasonably foreseen project / plan	0	0	Decommissioning of the 7 existing WTGs at ABWP1	Decommissioning over a period of 4 months between 2025-2027	2025-2027	Potential for temporal overlap with Proposed Development construction phase.
Phase 1 Projects							
Codling Wind Park (formerly known as Codling I and Codling II)	Proposed	18.2	17.3	Phase 1 Concept/Early Planning (Maritime Area Consent (MAC) awarded)	2027	2029	Potential for temporal overlap with Proposed Development construction and operational and maintenance phases.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project/Plan	Dates of Construction	Dates of Operation	Justification for screening in
Dublin Array (formerly known as Bray and Kish Offshore Wind Farms)	Proposed	25.8	24.9	Phase 1 Concept/Early Planning (MAC awarded)	2028	2033	Potential for temporal overlap with Proposed Development construction and operational and maintenance phases.

15.11.1.4 Table 15.12 presents the potential impacts, development phase, and the list of projects / plans with which the two Project Design Options have been cumulatively assessed.

Table 15.12: Cumulative assessment impacts, phases, scenarios, and projects to be considered cumulatively

Potential cumulative impact	Phase			Projects considered cumulatively	Justification for projects considered cumulatively
	C	O	D		
Displacement of vessel traffic (displacement of established commercial vessel routes resulting in increased journey times and distances)	✓	✓	✓	Project parameters associated with Project Design Option 1 or 2 plus the following projects: Tier 1 - Screened out due to no displacement impact. Tier 2 - n/a (no screened in Tier 2 developments) Tier 3 - ABWP1 Decommissioning Phase 1 Projects - Codling Wind Park; and - Dublin Array.	The ABWP1 decommissioning, Codling Wind Park, and Dublin Array may displace vessel traffic.
Port access restrictions (restricted access in and out of ports in proximity to the Proposed Development)	✓	✓	✓	Project parameters associated with Project Design Option 1 or 2 plus the following projects: Tier 1 - ABWP2 OMF Tier 2 - n/a (no screened in Tier 2 developments) Tier 3 - ABWP1 Decommissioning Phase 1 Projects - Codling Wind Park; and - Dublin Array.	Tier 1 development may lead to additional impacts on port access The ABWP1 decommissioning, Codling Wind Park and Dublin Array may lead to additional impacts on port access
Increased collision risk (displacement of established commercial vessel routes resulting in an increased	✓	✓	✓	Project parameters associated with Project Design Option 1 or 2 plus the following projects: Tier 1 Screened out due to no collision impact. Tier 2	The ABWP1 decommissioning, Codling Wind Park, and Dublin Array may displace vessel traffic which may

Potential cumulative impact	Phase			Projects considered cumulatively	Justification for projects considered cumulatively
	C	O	D		
number of vessel to vessel encounters and consequently an increased risk of a vessel to vessel collision)				- n/a (no screened in Tier 2 developments) Tier 3 - ABWP1 Decomissioning Phase 1 Projects - Codling Wind Park; and - Dublin Array.	lead to increased collision risk.
Increased allision risk (increased risk of a vessel to structure allision, either involving a powered or drifting vessel)	✓	✓	✓	Project parameters associated with Project Design Option 1 or 2 plus the following projects: Tier 1 <i>Screened out due to no allision impact.</i> Tier 2 - n/a (no screened in Tier 2 developments) Tier 3 - ABWP1 Decomissioning Phase 1 Projects - Codling Wind Park; and - Dublin Array.	There will be increased allision risk associated with Codling Wind Park and Dublin Array, and there may be allision risk during the ABWP1 Decomissioning.
Diminished emergency response capability	✓	✓	✓	Project parameters associated with Project Design Option 1 or 2 plus the following projects: Tier 1 - ABWP2 OMF Tier 2 - n/a (no screened in Tier 2 developments) Tier 3 - ABWP1 Decomissioning Phase 1 Projects - Codling Wind Park; and - Dublin Array.	Additional cumulative development may lead to increased incident rates.

15.12 Cumulative impact assessment

15.12.1.1 A description of the significance of cumulative effects upon shipping and navigation arising from each identified impact is given below.

15.12.2 Project Design Option 1 and 2 - Impact 1 - Displacement of Vessel Traffic

Construction phase

15.12.2.1 There is considered unlikely to be any additional displacement associated with Tier 3 (ABWP1 decommissioning) given works will be undertaken within the buoyed construction area surrounding the Array Area.

15.12.2.2 Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements are considered to be captured within the vessel movements already assessed for the Proposed Development.

15.12.2.3 For Phase 1 Projects, as per the project alone Array Area assessments on displacement (Sections 15.9.1 and 15.10.1), any displacement associated with the Proposed Development is anticipated to be very low. Therefore, while vessels passing the Array Area may experience additional minor deviation from the presence of Phase 1 Projects (Codling Wind Park and Dublin Array), overall deviation is unlikely to be significantly higher than the Array Area alone cases. In this regard it is noted that both Dublin Array and Codling Wind Park are situated over shallow banks similar to the Arklow Bank, and therefore associated deviations are expected to be low.

FREQUENCY OF OCCURRENCE

15.12.2.4 Note that, as per Section 15.9.1 and Section 15.10.1, frequency of occurrence for both Project Design Option 1 and 2 alone during construction phase was assessed to be reasonably probable.

15.12.2.5 On this basis, the cumulative frequency of occurrence of vessel displacement during construction phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. reasonably probable.

SEVERITY OF CONSEQUENCE

15.12.2.6 As per Section 15.9.1 and Section 15.10.1, severity of consequence for both Project Design Option 1 and 2 alone during construction phase was assessed to be minor. The consequences of vessel displacement resulting from the Proposed Development cumulatively are considered to be the same as for the Proposed Development alone i.e. Minor.

SIGNIFICANCE OF EFFECT

15.12.2.7 Overall, the cumulative frequency of occurrence is deemed **Reasonably Probable** for both Project Design Options. The severity of consequence was deemed to be **Minor**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** which is **not significant** in EIA terms.

Operational and maintenance phase

15.12.2.8 By the operational and maintenance phase, any minor deviations arising during the construction phase will be well established. The same construction phase assumptions in terms of limited displacement associated with Phase 1 Projects will apply during the operational and maintenance phase.

FREQUENCY OF OCCURRENCE

15.12.2.9 Note that, as per Section 15.9.1 and Section 15.10.1, frequency of occurrence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be remote.

15.12.2.10 On this basis, the cumulative frequency of occurrence of vessel displacement during operational and maintenance phase for both Project Design Options is considered to be the same as for the Proposed Development alone i.e. Remote.

SEVERITY OF CONSEQUENCE

15.12.2.11 As per Section 15.9.1 and Section 15.10.1, severity of consequence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be minor. The consequences of vessel displacement resulting from the Proposed Development cumulatively are considered to be the same as for the Proposed Development alone i.e. Minor.

SIGNIFICANCE OF EFFECT

15.12.2.12 Overall, the cumulative frequency of occurrence is deemed **Remote** for both Project Design Options. The severity of consequence was deemed to be **Minor**. The effect for both Project Design Options will therefore be **Broadly Acceptable** and **not significant** in EIA terms.

Decommissioning phase

15.12.2.13 The same construction phase assumptions in terms of limited displacement associated with Phase 1 Projects will apply during the decommissioning phase.

FREQUENCY OF OCCURRENCE

15.12.2.14 Note that, as per Section 15.9.1 and Section 15.10.1, frequency of occurrence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be Reasonably Probable.

15.12.2.15 On this basis, the cumulative frequency of occurrence of vessel displacement during decommissioning phase for both Project Design Options is considered to be the same as for the Proposed Development alone i.e. Reasonable Probable.

SEVERITY OF CONSEQUENCE

15.12.2.16 As per Section 15.9.1 and Section 15.10.1, severity of consequence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be minor. The consequences of vessel displacement resulting from the Proposed Development cumulatively are considered to be the same as for the Proposed Development alone i.e. Minor.

SIGNIFICANCE OF EFFECT

15.12.2.17 Overall, the cumulative frequency of occurrence is deemed **Reasonably Probable** for both Project Design Options. The severity of consequence was deemed to be **Minor**. The cumulative effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms.

15.12.3 Project Design Option 1 and 2 - Impact 2 – Port Access Restrictions

Construction phase

- 15.12.3.1 Noting that project vessel movements have already been considered within the project alone Array Area displacement assessments (Section 15.9.1 and Section 15.10.1), there is not considered to be any port access impact associated with Tier 1 development. Given existing vessel access routes into Arklow Harbour already avoid the Array Area, the only potential consequence is minor and temporary restriction associated with project vessel movements to and from Arklow and installation of the offshore export cables. There is not anticipated as being a scenario whereby port access is prevented, with minor deviations/waits for non-commercial traffic the most likely consequence.
- 15.12.3.2 For Tier 3, there is not anticipated to be any impact on port access from the ABWP1 decommissioning works given they will be within the buoyed construction area surrounding the Array Area. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements are considered to be captured within the vessel movements already assessed for the Proposed Development.
- 15.12.3.3 The structures associated with Phase 1 Projects will likewise not prevent port access, noting minor deviations to routes may occur (see Sections 15.9.1 and Section 15.10.1). Ports used for other Phase 1 Projects are unknown, however all vessels associated with offshore wind farm development will be required to comply with Irish Law, international flag state regulations (including COLREGs and SOLAS).

FREQUENCY OF OCCURRENCE

- 15.12.3.4 Note that, as per Section 15.9.2 and Section 15.10.2, frequency of occurrence for both Project Design Option 1 and 2 alone during construction phase was assessed to be remote.
- 15.12.3.5 On this basis, the cumulative frequency of occurrence of vessel displacement during construction phase for both Project Design Options is considered to be the same as for the Proposed Development alone i.e. Remote.

SEVERITY OF CONSEQUENCE

- 15.12.3.6 As per Section 15.9.2 and Section 15.10.2, severity of consequence for both Project Design Option 1 and 2 alone during construction phase was assessed to be minor. The consequences of port restriction resulting from the Proposed Development cumulatively are considered to be the same as for the Proposed Development alone i.e. Minor.

SIGNIFICANCE OF EFFECT

- 15.12.3.7 Overall, the cumulative frequency of occurrence is deemed **Remote** for both Project Design Options. The severity of consequence was deemed to be **Minor**. The effect for both Project Design Options will therefore be **Broadly Acceptable** and **not significant** in EIA terms.

Operational and maintenance phase

- 15.12.3.8 The presence and operation of the Proposed Development, together with the ABWP2 OMF, may result in port access restrictions, with additional project traffic and associated transits in and out of the port affecting access for third party vessels.
- 15.12.3.9 Assuming the compliance of project vessels with Irish Law, international flag state regulations (including COLREGs and SOLAS) and the presence of marine coordination as set out in Volume III, Appendix 25.7: Vessel Management Plan, it is considered that vessel movement in and out of

Arklow Harbour can be managed such that port access is not unduly restricted. It is also noted that based on the description of the baseline and consultation, third party traffic associated with Arklow largely comprises small craft as opposed to larger commercial vessels.

- 15.12.3.10 Given existing vessel access routes into Arklow already avoid the Array Area, the only potential consequence is minor and temporary restriction associated with project vessel movements to and from Arklow and any operational monitoring or maintenance of the offshore export cables. There is not anticipated as being a scenario whereby port access is prevented, with minor deviations/waits for non-commercial traffic the most likely consequence.
- 15.12.3.11 The structures associated with Phase 1 Projects will not prevent port access, noting minor deviations to routes may occur (see Sections 15.9.1 and Section 15.10.1). Ports used for other Phase 1 Projects are unknown, however all vessels associated with offshore wind farm development will be required to comply with Irish Law, international flag state regulations (including COLREGs and SOLAS).

FREQUENCY OF OCCURRENCE

- 15.12.3.12 Note that, as per Section 15.9.2 and Section 15.10.2, frequency of occurrence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be extremely unlikely.
- 15.12.3.13 On this basis, the cumulative frequency of occurrence of vessel displacement during operational and maintenance phase for both Project Design Options is considered to be the same as for the Proposed Development alone i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

- 15.12.3.14 As per Section 15.9.2 and Section 15.10.2, severity of consequence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be minor. The consequences of port restriction resulting from the Proposed Development cumulatively are considered to be the same as for the Proposed Development alone i.e. Minor.

SIGNIFICANCE OF EFFECT

- 15.12.3.15 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Minor**. The effect for both Project Design Options will therefore be **Broadly Acceptable** and **not significant** in EIA terms.

Decommissioning phase

- 15.12.3.16 Any cumulative impact on port access during the decommissioning phase is likely to be similar to the construction phase given similar activities in terms of increased vessel presence.

FREQUENCY OF OCCURRENCE

- 15.12.3.17 Note that, as per Section 15.9.2 and Section 15.10.2, frequency of occurrence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be remote.
- 15.12.3.18 On this basis, the cumulative frequency of occurrence of vessel displacement during decommissioning phase for both Project Design Options is considered to be the same as for the Proposed Development alone i.e. Remote.

SEVERITY OF CONSEQUENCE

- 15.12.3.19 As per Section 15.9.2 and Section 15.10.2, severity of consequence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be minor. The

consequences of port restriction resulting from the Proposed Development cumulatively are considered to be the same as for the Proposed Development alone i.e. Minor.

SIGNIFICANCE OF EFFECT

15.12.3.20 Overall, the cumulative frequency of occurrence is deemed **Remote** for both Project Design Options. The severity of consequence was deemed to be **Minor**. The effect for both Project Design Options will therefore be **Broadly Acceptable** and **not significant** in EIA terms.

15.12.1 Project Design Option 1 and 2 - Impact 3 – Increased Collision Risk

Construction phase

15.12.1.0 For Tier 3, there is not anticipated to be any impact on collision risk from the ABWP1 decommissioning works given they will be within the buoyed construction area surrounding the Array Area. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements are considered to be captured within the vessel movements already assessed for the Proposed Development.

15.12.1.1 For Phase 1 Projects, as per the project alone Array Area assessments on collision (Sections 15.9.3 and 15.10.3), any increase in collision risk associated with the Proposed Development is anticipated to be low. Therefore, while vessels passing the Array Area may experience additional minor deviation (and by extension collision risk) from the presence of Phase 1 Projects (Codling Wind Park and Dublin Array), overall collision risk is unlikely to be significantly higher than the risk present in respect of the Proposed Development alone. In terms of project vessels for all developments, all must comply with COLREGS ensuring any encounter situations can be safely managed.

FREQUENCY OF OCCURRENCE

15.12.1.2 Note that, as per Section 15.9.3 and Section 15.10.3, frequency of occurrence for both Project Design Option 1 and 2 alone during construction phase was assessed to be extremely unlikely.

15.12.1.3 On this basis, the cumulative frequency of occurrence of vessel collision during construction phase for both Project Design Options is considered to be the same as the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.1.4 As per Section 15.9.3 and Section 15.10.3, severity of consequence for both Project Design Option 1 and 2 alone during construction phase was assessed to be serious. The consequences of vessel collision resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.1.5 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms.

Operational and maintenance phase

15.12.1.6 By the operational and maintenance phase, any minor deviations (leading to potential for increased collision risk) arising during the construction phase will be well established. The same construction phase assumptions in terms of limited displacement associated with Phase 1 Projects will apply during the operational and maintenance phase. It is also likely that vessel numbers will be lower than during the construction phase.

FREQUENCY OF OCCURRENCE

15.12.1.7 Note that, as per Section 15.9.3 and Section 15.10.3, frequency of occurrence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be extremely unlikely.

15.12.1.8 On this basis, the cumulative frequency of occurrence of vessel collision during operational and maintenance phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.1.9 As per Section 15.9.3 and Section 15.10.3, severity of consequence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be serious. The consequences of vessel collision resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.1.10 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms.

Decommissioning phase

15.12.1.11 Any cumulative impact on collision risk during the decommissioning phase is likely to be similar to the construction phase given similar scenarios in terms of increased vessel presence.

FREQUENCY OF OCCURRENCE

15.12.1.12 Note that, as per Section 15.9.3 and Section 15.10.3, frequency of occurrence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be extremely unlikely.

15.12.1.13 On this basis, the cumulative frequency of occurrence of vessel collision during decommissioning phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.1.14 As per Section 15.9.3 and Section 15.10.3, severity of consequence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be serious. The consequences of vessel collision resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.1.15 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms.

15.12.2 Project Design Option 1 and 2 – Impact 4 – Increased Allision Risk

15.12.2.1 For Tier 3, there is not anticipated to be any additional impact on allision risk from the ABWP1 decommissioning works given they will be within the buoyed construction area surrounding the

Array Area. Once the ABWP1 WTGs are decommissioned, overall cumulative allision risk will decrease (due to removal of ABWP1 structures).

15.12.2.2 For Phase 1 Projects, there is in excess of 5 nm of searoom between the Array Area and Codling Wind Park, meaning there is sufficient space to accommodate vessel transits in between the two projects without notably increasing allision risk. Irish Lights noted during consultation that there may be a need for a cardinal mark in between these two projects to manage any risk. This is discussed in Volume III, Appendix 25.6: Lighting and Marking Plan. Dublin Array is located in excess of 10 nm north and as such any cumulative allision risk is unlikely.

15.12.2.3 All Phase 1 Projects will be required to implement lighting and marking (during all phases) in agreement with Irish Lights to ensure allision risk is managed.

Construction phase

FREQUENCY OF OCCURRENCE

15.12.2.4 Note that, as per Section 15.9.4 and Section 15.10.4, frequency of occurrence for both Project Design Option 1 and 2 alone during construction phase was assessed to be extremely unlikely.

15.12.2.5 On this basis, the cumulative frequency of occurrence of vessel allision during construction phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.2.6 As per Section 15.9.4 and Section 15.10.4, severity of consequence for both Project Design Option 1 and 2 alone during construction phase was assessed to be serious. The consequences of vessel allision resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.2.7 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable** and **ALARP** (given no additional mitigation is required) and **not significant** in EIA terms.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.12.2.8 Note that, as per Section 15.9.4 and Section 15.10.4, frequency of occurrence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be extremely unlikely.

15.12.2.9 On this basis, the cumulative frequency of occurrence of vessel allision during operational and maintenance phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.2.10 As per Section 15.9.4 and Section 15.10.4, severity of consequence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be serious. The consequences of vessel allision resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.2.11 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable** and **ALARP** (given no additional mitigation is required) and **not significant** in EIA terms.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.12.2.12 Note that, as per Section 15.9.4 and Section 15.10.4, frequency of occurrence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be extremely unlikely.

15.12.2.13 On this basis, the cumulative frequency of occurrence of vessel allision during decommissioning phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.2.14 As per Section 15.9.4 and Section 15.10.4, severity of consequence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be serious. The consequences of vessel allision resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.2.15 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable** and **ALARP** (given no additional mitigation is required) and **not significant** in EIA terms.

15.12.3 Project Design Option 1 and 2 – Impact 5 – Diminished Emergency Response Capability

15.12.3.1 There is not considered to be any likely notable requirement for offshore SAR resource associated with developments screened into Tier 1 given that the OMF itself would not require a marine based emergency response.

15.12.3.2 For Tier 3, there is not anticipated to be any notable impact on emergency response capability from the ABWP1 decommissioning works. Vessel movements associated with Proposed Development are precautionary and therefore any associated vessel movements are considered to be captured within the vessel movements already assessed for the Proposed Development.

15.12.3.3 All Phase 1 Projects will be required to develop emergency response procedures similar to those detailed in Volume III, Appendix 25.5: Emergency Response Cooperation Plan. The presence of additional resources associated with the developers of Phase 1 Projects (e.g., additional vessels, personnel) is also likely to be beneficial from a SAR perspective, with the presence of well equipped vessels with well trained crew meaning additional resource may be available in liaison with IRCG.

Construction phase

FREQUENCY OF OCCURRENCE

15.12.3.4 Note that, as per Section 15.9.6 and Section 15.10.6, frequency of occurrence for both Project Design Option 1 and 2 alone during construction phase was assessed to be extremely unlikely.

15.12.3.5 On this basis, the cumulative frequency of occurrence of diminished emergency response capability during construction phase for both Project Design Options is considered to be the same as for the project alone assessment i.e., Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.3.6 As per Section 15.9.6 and Section 15.10.6, severity of consequence for both Project Design Option 1 and 2 alone during construction phase was assessed to be Serious. The consequences of diminished emergency response capability resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.3.7 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms assuming application of the additional mitigation (for the Proposed Development) stated for the equivalent impact in Sections 15.9.6 and 15.10.6.

Operational and maintenance phase

FREQUENCY OF OCCURRENCE

15.12.3.8 Note that, as per Section 15.9.6 and Section 15.10.6, frequency of occurrence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be extremely unlikely.

15.12.3.9 On this basis, the cumulative frequency of occurrence of diminished emergency response capability during operational and maintenance phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.3.10 As per Section 15.9.6 and Section 15.10.6, severity of consequence for both Project Design Option 1 and 2 alone during operational and maintenance phase was assessed to be Serious. The consequences of diminished emergency response capability resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.3.11 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms assuming application of the additional mitigation (for the Proposed Development) stated for the equivalent impact in Sections 15.9.6 and 15.10.6.

Decommissioning phase

FREQUENCY OF OCCURRENCE

15.12.3.12 Note that, as per Section 15.9.6 and Section 15.10.6, frequency of occurrence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be extremely unlikely.

15.12.3.13 On this basis, the cumulative frequency of occurrence of diminished emergency response capability during decommissioning phase for both Project Design Options is considered to be the same as for the project alone assessment i.e. Extremely unlikely.

SEVERITY OF CONSEQUENCE

15.12.3.14 As per Section 15.9.6 and Section 15.10.6, severity of consequence for both Project Design Option 1 and 2 alone during decommissioning phase was assessed to be serious. The consequences of diminished emergency response capability resulting from the Proposed Development cumulatively are considered to be the same as for the project alone assessment i.e. Serious.

SIGNIFICANCE OF EFFECT

15.12.3.15 Overall, the cumulative frequency of occurrence is deemed **Extremely unlikely** for both Project Design Options. The severity of consequence was deemed to be **Serious**. The effect for both Project Design Options will therefore be **Tolerable and ALARP** and **not significant** in EIA terms assuming application of the additional mitigation stated for the equivalent impact in Sections 15.9.6 and 15.10.6.

15.13 Transboundary effects

15.13.1.1A screening of transboundary impacts has been carried out and any potential for significant transboundary effects with regard to shipping and navigation from the Proposed Development upon the interests of other states are considered to have been assessed as part of the project alone Array Area and cumulative assessments. The potential transboundary impacts assessed within Section 15.9 and Section 15.10 are summarised below:

- Displacement of vessel traffic (including impacts on vessel routing to and from international ports) during the construction, operational and maintenance and decommissioning phases. Overall, the effect will be broadly acceptable, which is not significant in EIA terms.

15.14 Summary of effects

- 15.14.1.1 Information on shipping and navigation within the Study Area was collected via dedicated vessel -based vessel traffic surveys, additional desktop studies of historical incident data, nautical charts, and the local Sailing Directions (Pilot Book), in addition to consultation with key stakeholders via Hazard Workshops.
- 15.14.1.2 Table 15.13 and Table 15.14 present a summary of the potential impacts, mitigation measures and residual effects in respect to shipping and navigation for Project Design Option 1 and Project Design Option 2, respectively. The impacts assessed include vessel displacement, port access, collision risk, allision risk, cable interaction, diminishment of emergency response, and interference with marine navigational equipment. Overall, it is concluded that there will be no significant effects arising from the Proposed Development during the construction, operational and maintenance or decommissioning phases for either Project Design Options.
- 15.14.1.3 Table 15.15 presents a summary of the potential cumulative impacts, mitigation measures and residual effects in respect to shipping and navigation for both Project Design Options. The impacts assessed include vessel displacement, port access restrictions, vessel to vessel collision, allision, cable interaction and diminished emergency response capability. Overall, it is concluded that there will be no significant cumulative effects arising from the Proposed Development alongside other projects/plans for either Project Design Options.
- 15.14.1.4 Potential transboundary impacts have been identified in relation to displacement of vessel traffic. Overall, it is concluded that there will be no significant transboundary effects arising from the Proposed Development.

Table 15.13: Summary of potential environmental impacts, mitigation and monitoring for Project Design Option 1

Description of impact	Phase			Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
Displacement of Routeing Vessel Traffic	✓	✓	✓	- Charting of all structures - Implementation of a buoyed construction/decommissioning area - Implementation of VMP - Implementation of MPCP - Circulation of information	C: Reasonably Probable O: Remote D: Reasonably Probable	C: Minor O: Minor D: Minor	C: Tolerable O: Broadly Acceptable D: Tolerable	N/A	C: Tolerable and ALARP O: Broadly Acceptable D: Tolerable and ALARP	Traffic Monitoring
Port Access Restrictions	✓	✓	✓	- Circulation of information - Marine coordination - Implementation of VMP	C: Remote O: Extremely Unlikely D: Remote	C: Minor O: Minor D: Minor	Broadly Acceptable	N/A	Broadly Acceptable	Traffic Monitoring
Increased Collision Risk	✓	✓	✓	- Circulation of information - Marine coordination - COLREGs / SOLAS compliance - Implementation of VMP - Implementation of MPCP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	N/A	Tolerable and ALARP	Traffic Monitoring

Description of impact	Phase C O D			Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
				Implementation of ERCoP						
Increased Allision Risk	✓	✓	✓	- Advisory safety zones - Circulation of information - Charting of all structures - Lighting and marking - Implementation of VMP - Implementation of MPCP - Implementation of ERCoP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	N/A	Tolerable and ALARP	Traffic Monitoring
Cable Interaction Risk	✓	✓	✓	- Circulation of information - CBRA - Implementation of CBRA - Implementation of MPCP	C: Remote O: Extremely Unlikely D: Extremely Unlikely	C: Minor O: Minor D: Minor	Broadly Acceptable	N/A	Broadly Acceptable	Cable burial and cable protection surveys
Diminished Emergency Response Capability	✓	✓	✓	- Provision of self-help capability - Implementation of ERCoP - Implementation of MPCP	C: Extremely Unlikely O: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	Consultation with IRCG on SAR access	Tolerable and ALARP	Traffic Monitoring

Description of impact	Phase	Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C O D							
			D: Extremely Unlikely					

Table 15.14: Summary of potential environmental impacts, mitigation and monitoring for Project Design Option 2

Description of impact	Phase	Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C O D							
Displacement of Routeing Vessel Traffic	✓ ✓ ✓	- Charting of all structures - Implementation of a buoyed construction/decommissioning area - Implementation of VMP - Implementation of MPCP - Circulation of information	C: Reasonably Probable O: Remote D: Reasonably Probable	C: Minor O: Minor D: Minor	C: Tolerable O: Broadly Acceptable D: Tolerable	N/A	C: Tolerable and ALARP O: Broadly Acceptable D: Tolerable and ALARP	Traffic Monitoring
Port Access Restrictions	✓ ✓ ✓	- Circulation of information - Marine coordination - Implementation of VMP	C: Remote O: Extremely Unlikely D: Remote	C: Minor O: Minor D: Minor	Broadly Acceptable	N/A	Broadly Acceptable	Traffic Monitoring

Description of impact	Phase			Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
Increased Collision Risk	✓	✓	✓	- Circulation of information - Marine coordination - COLREGs / SOLAS compliance - Implementation of VMP - Implementation of MPCP - Implementation of ERCoP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	N/A	Tolerable and ALARP	Traffic Monitoring
Increased Allision Risk	✓	✓	✓	- Advisory safety zones - Circulation of information - Charting of all structures - Lighting and marking - Implementation of VMP - Implementation of MPCP - Implementation of ERCoP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	N/A	Tolerable and ALARP	Traffic Monitoring
Cable Interaction Risk	✓	✓	✓	- Circulation of information - CBRA	C: Remote O: Extremely Unlikely D: Minor	C: Minor O: Minor D: Minor	Broadly Acceptable	N/A	Broadly Acceptable	Cable burial and cable protection surveys

Description of impact	Phase			Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
				- Implementation of CBRA - Implementation of MPCP	D: Extremely Unlikely					
Diminished Emergency Response Capability	✓	✓	✓	- Provision of self-help capability - Implementation of ERCoP - Implementation of MPCP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	Consultation with IRCG on SAR access	Tolerable and ALARP	Traffic Monitoring

Table 15.15: Summary of potential cumulative environmental impacts, mitigation and monitoring for Project Design Option 1 and Project Design Option 2

Description of impact	Phase			Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
Displacement of Routeing Vessel Traffic	✓	✓	✓	- Charting of all structures - Implementation of a buoyed construction/decommissioning area - Implementation of VMP	C: Reasonably Probable O: Remote D: Reasonably Probable	C: Minor O: Minor D: Minor	C: Tolerable O: Broadly Acceptable D: Tolerable	N/A	C: Tolerable and ALARP O: Broadly Acceptable D: Tolerable and ALARP	Traffic Monitoring

Description of impact	Phase C O D			Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
				- Implementation of MPCP - Circulation of information						
Port Access Restrictions	✓	✓	✓	- Circulation of information - Marine coordination - Implementation of VMP	C: Remote O: Extremely Unlikely D: Remote	C: Minor O: Minor D: Minor	Broadly Acceptable	N/A	Broadly Acceptable	Traffic Monitoring
Increased Collision Risk	✓	✓	✓	- Circulation of information - Marine coordination - COLREGs / SOLAS compliance - Implementation of VMP - Implementation of MPCP - Implementation of ERCoP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	N/A	Tolerable and ALARP	Traffic Monitoring
Increased Allision Risk	✓	✓	✓	- Advisory safety zones - Circulation of information - Charting of all structures - Lighting and marking	C: Extremely Unlikely O: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	N/A	Tolerable and ALARP	Traffic Monitoring

Description of impact	Phase	Factored in measures	Frequency of Occurrence	Severity of Consequence	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C O D							
		- Implementation of VMP - Implementation of MPCP - Implementation of ERCoP	D: Extremely Unlikely					
Diminished Emergency Response Capability	✓ ✓ ✓	- Provision of self-help capability - Implementation of ERCoP - Implementation of MPCP	C: Extremely Unlikely O: Extremely Unlikely D: Extremely Unlikely	C: Serious O: Serious D: Serious	Tolerable	Consultation with IRCG on SAR access	Tolerable and ALARP	Traffic Monitoring

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