Environmental Impact Assessment Report

NISA

North Irish Sea Array

Volume 3: Offshore Chapters

Chapter 17
Shipping and Navigation

Statkraft

CIP
Copenhagen Infrastructure Partners

GoBe
APEM Group

ARUP

Contents

Tables

17. Shipping and Navigation

17.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of likely significant effects from the North Irish Sea Array (NISA) Offshore Wind Farm (hereafter referred to as the 'proposed development') in relation to shipping and navigation during the construction, operational and decommissioning phases.

This chapter sets out the methodology followed (Section17.2), describes the baseline environment (Section 17.3) and summarises the main characteristics of the proposed development which are of relevance to shipping and navigation (Section 17.4), including any embedded mitigation (Section 17.4.5). Potential impacts and relevant receptors are identified, and an assessment of likely significant effects on shipping and navigation is undertaken, details of which are provided (Section 17.5).

Any additional mitigation measures proposed to mitigate and monitor these effects are outlined (Section 17.6) and any residual likely significant effects are then described (Section 17.7). Transboundary effects are considered (Section 17.8), and cumulative effects are considered in Section 17.9 and are summarised in Volume 6, Chapter 38 Cumulative and Inter-Related Effects (hereafter referred to as the 'Cumulative and Inter-Related Effects Chapter'). The chapter then provides a reference section (Section 17.10).

The EIAR also includes the following:

- Detail on the competent experts that have prepared this chapter is provided in Appendix 1.1 in Volume 8
- Detail on the extensive consultation that has been undertaken with a range of stakeholders during the development of the EIAR is set out in Appendix 1.2
- A glossary of terminology, abbreviations and acronyms is provided at the beginning of Volume 2 of the EIAR; and
- A detailed description of the proposed development including construction, operation and decommissioning is provided in Volume 2, Chapter 6: Description of the Proposed Development – Offshore (hereafter referred to as the 'Offshore Description Chapter'), and Volume 2, Chapter 8: Construction Strategy – Offshore (hereafter referred to as the 'Offshore Construction Chapter').

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

- Chapter 16: Commercial Fisheries (hereafter referred to as the 'Commercial Fisheries Chapter')
- Chapter 19: Aviation and Radar; and
- Chapter 20: Infrastructure and Other Users.

This chapter should also be read alongside the following appendices:

- Volume 9, Appendix 17.1: Navigational Risk Assessment (hereafter referred to as the 'NRA')
- Volume 9, Appendix 17.2: Vessel Management Plan (hereafter referred to as the 'VMP'); and
- Volume 9, Appendix 17.3: Lighting and Marking Plan (hereafter referred to as the 'LMP').

All figures referred to in this chapter are provided in Volume 7A.

17.2 Methodology

17.2.1 Introduction

The assessments of shipping and navigation diverges from the EIAR methodology presented in Volume 2, Chapter 2: EIA and Methodology for the preparation of an EIAR (hereafter referred to as the 'EIAR Methodology Chapter'), and instead follows the Formal Safety Assessment (FSA) (International Maritime Organization (IMO), 2018) which is the internationally recognised approach for assessing impacts on shipping and navigation receptors, as required by Marine Guidance Note (MGN) 654.

17.2.2 Study Area

The shipping and navigation study area was initially identified at the proposed development scoping stage, in line with Department of Communications, Climate Action and Environment (DCCAE) (now the Department of the Environment, Climate and Communications; DECC) Guidance (DCCAE, 2017) (See Appendix 2.1: Scoping Report).

The extent of the shipping and navigation study area has been defined so as to incorporate the proposed development area seaward of the high water mark, consisting of the array area and offshore export cable corridor (ECC) collectively referred to as the offshore development area. The shipping and navigation study area consists of a 10 nautical mile (nm) buffer of the array area. This is a standard study area for shipping and navigation for offshore wind farm developments given it will typically capture routeing in the surrounding area which may be affected whilst still remaining site specific to the development being studied. In the case of the proposed development, this includes all vessels inshore of the array area in addition to the north/southbound traffic that passes further offshore and is therefore considered appropriate for the purposes of EIA and NRA.

It is standard for the offshore export cable corridor (ECC) to be assessed within a 2nm buffer of the ECC but noting that the ECC is fully encompassed by the shipping and navigation study area, no additional assessment or study area is required, and assessment of the ECC is carried out along with the array area.

The shipping and navigation study area is shown relative to the array area and ECC in Figure 17.1 of Volume 7A.

17.2.3 Relevant Guidance and Policy

This section outlines guidance and policy specific to shipping and navigation, including best practice guidelines. Overarching guidance on EIAR is presented in the EIAR Methodology Chapter. Furthermore, policy applicable to the proposed development is detailed in Volume 2, Chapter 3: Legal and Policy Framework.

The assessment of likely significant effects upon shipping and navigation has been made with specific reference to the following identified relevant guidelines and guidance.

The Marine Survey Office (MSO), Commissioners for Irish Lights (Irish Lights) and Irish Coast Guard (IRCG) have been consulted with respect to the appropriate guidance applicable for undertaking an NRA. At that time, comprehensive Irish guidance was not in place and therefore use of the United Kingdom's (UK) MGN 654 (MCA, 2021) was agreed, with upcoming Irish guidance expected to closely resemble MGN 654. MGN 654 requires the use of the IMO FSA (IMO, 2018) and therefore the FSA has been used to assess impacts to shipping and navigation users. Further details are provided within the NRA.

The draft Irish guidance was published by the Department of Transport (DoT) for consultation in January 2024 consisting of the main document – Marine Navigational Safety & Emergency Response Risk of Offshore Renewable Energy Installations (OREI) (DoT, 2024) – and annexes covering the NRA methodology and Search and Rescue (SAR). The draft Irish guidance is based on the principles of MGN 654, with the introduction stating that the MCA gave permission for MGN 654 to be used when compiling the draft Irish guidance. Therefore, it remains appropriate to apply the principles of MGN 654 in the assessment of shipping and navigation.

Other key guidance documents specific to shipping and navigation considered are as follows (noting this includes certain UK guidance where directed by MGN 654 as above):

- Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects (DCCAE, 2017)
- MGN 372 Amendment 1 (Merchant and Fishing) OREIs: Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2022)
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 and Guidance (G1162) on the Marking of Man-Made Offshore Structures (IALA, 2021b/2021a); and
- The Royal Yachting Association's (RYA's) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy. 5th Edition - (RYA, 2019).

As required under the Department of Communications, Climate Action and Environment (DCCAE) Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (DCCAE, 2017), the shipping and navigation assessment has been informed by a Navigational Risk Assessment (NRA).

The key National Marine Planning Framework (NMPF) policy that is applicable to the assessment of shipping and navigation is summarised in Table 17.1. NMPF policies are addressed in their entirety in Appendix 3.1: NMPF Compliance Report.

Table 17.1 Key policies relevant to the assessment

Policy Name	Policy Description	Where addressed
National Marine Planning Framework (2021)	**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 Section 17.5. An NRA has been drafted in support of this chapter as required, this is provided in Appendix 17.1. The assessment of likely significant effects in Section 1.5 determined that the significance of effect for each impact is broadly acceptable or tolerable with mitigation which is not significant in EIA terms, i.e., no significant interference is anticipated, and so no additional mitigation and monitoring measures are identified in Section 1.6.
	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.	Impacts associated with safety of port operations and access are assessed in Section 17.5 with no significant effects identified.
	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.	Impacts associated with safety of port operations and access are assessed in Section 17.5 with no significant effects identified.
	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; • have carried out an NRA including an analysis of maritime traffic in the area; and • have consulted the Department of Transport, MSO and Irish Lights. Applicants must continue to engage parties identified in pre-application processes as appropriate during the decision-making process.	As noted in Section 17.1, feedback from consultation with key stakeholders has been undertaken and is included within Section 4 of the NRA. This includes the MSO, Irish Lights, IRCG, Irish Chamber of Shipping, and Dublin Port Company and Drogheda Port Company as local ports. The NRA also includes analysis of vessel traffic in the area based on multiple data sources.

Policy Name	Policy Description	Where addressed
	Safety at Sea Policy 1: Proposals for installation, operation, and decommissioning of Offshore Wind Farms must demonstrate how they will: • Minimise navigational risk between commercial vessels arising from an increase in the density of vessels in maritime space as a result of wind farm layout; and • Allow for recreational vessels within the Offshore Wind Farm (including consideration of turbine height) or redirect recreational vessels, minimising navigational risk arising between recreational and commercial vessels.	Impacts to commercial and recreational vessels are assessed in Section 17.5 including in relation to changes in navigable sea room and WTG blade air gap, with no significant effects identified.
	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) mitigate adverse impacts, or (d) if it is not possible to mitigate significant adverse impacts, proposals should set out the reasons for proceeding.	Impacts associated with under keel clearance are assessed in Section 17.5 with no significant effects identified.
	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 17.6, lighting and marking as directed by Irish Lights and in compliance with the IALA G1162 (IALA, 2021a) has been assumed as a mitigation and monitoring measure.
	Safety at Sea Policy 4: Establishing, changing or disestablishing Aids to Navigation (AtoN) must be sanctioned, in advance of works, by Irish Lights.	As per Section 17.6, lighting and marking as directed by Irish Lights and in compliance with IALA G1162 (IALA, 2021a) has been committed to as a mitigation and monitoring measure, as has marking on relevant nautical charts.
	Safety at Sea Policy 5: Proposals must identify their potential impact, if any, on Maritime Emergency Response (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 Section 17.5 with no significant effects identified.

17.2.4 Data Collection and Collation

17.2.4.1 Site-specific Surveys

To provide site specific and up to date information on which to base the impact assessment, three seasonal shore-based vessel traffic surveys were conducted, consisting of one summer survey (14 days in July 2022) and two winter surveys (14 days in December 2021 and 14 days in December 2023). Vessel traffic data from the winter 2021 survey have been superseded by the winter 2023 vessel traffic data and will not be included as a primary dataset in the baseline analysis. However, this data provides data validation of the winter 2023 vessel traffic data. To ensure that vessels which are not required to broadcast Automatic Identification System (AIS) were captured, the Developer has undertaken surveys which include the collection of AIS, radio detection and ranging (Radar), and visual observations. Surveys were carried out in agreement with the MSO and the IRCG. The data collected from the July 2022 and December 2023 surveys have formed the primary input for characterising the vessel traffic baseline, as per the requirements of MGN 654.

Both the summer vessel traffic survey and winter vessel traffic survey were undertaken at the same shore-based location in Skerries on the east coast of Ireland. The survey site is estimated to be approximately 5 to 10 metres (m) above sea level. Radar activity and visual observations very close to the coastline south of Skerries may have been slightly obscured by rocky terrain; however, this is unlikely to have had any notable effect on coverage of the array area. The full log of visual observation is included in the NRA (Appendix 17.1).

Several vessel tracks recorded during the survey periods were classified as temporary (non-routine), such as the tracks from a cable survey vessel during the winter survey period to the north of the array area and several vessels involved in geophysical surveys associated with the proposed Lir and Clogher Head Offshore Wind Farms during the summer survey period. These vessels have therefore been excluded from the analysis.

17.2.4.2 Desk-based Review

Other sources that have been used to inform the assessment are listed in Table 17.2.

Table 17.2 Other available data and information sources

Data Set	Spatial Coverage	Year	Notes
12 Months AIS Data (Long-Term Dataset)	Shipping and navigation study area.	2022	Allowed for long term assessment including capture of seasonal or low use routeing. Does not include non-AIS vessels.
Royal National Lifeboat Institution (RNLI) incident data	Shipping and navigation study area.	2012-2021	Captures any incidents responded to by the RNLI.
Marine Casualty Investigation Board (MCIB) database	Shipping and navigation study area.	2002-2022	Not all incident reports provide precise location details.
United Kingdom Hydrographic Office (UKHO) Admiralty Charts	International dataset providing coverage throughout the Irish Sea.	2022/23	Admiralty charts 44-0, 1121-0, 1411-0, 1415-0, and 1431-0. Analysis based on latest chart information available.
Admiralty Sailing Directions	International dataset providing coverage throughout the Irish Sea.	2019	Irish Coast Pilot NP40.
Anatec ShipRoutes database	Shipping and navigation study area.	2023	Regularly updated based on vessel traffic data throughout the Irish Sea.

Data Set	Spatial Coverage	Year	Notes
Weather data from Light Detection and Ranging (LiDAR) buoys deployed for NISA	Two buoys at locations in proximity to the proposed development covering the shipping and navigation study area.	2019-2022	Weather data used as an input to the collision and allision1 risk modelling. Further details of the modelling including scenarios considered, is provided in Section 17 of the NRA
Visibility data provided in Admiralty Sailing Directions	International dataset providing coverage throughout the Irish Sea.	2019	Irish Coast Pilot NP40.
Tidal data provided by UKHO Admiralty Charts	International dataset providing coverage throughout the Irish Sea.	2022/23	Charts 44-0 and 1141-0.

17.2.4.3 Data Limitations

The carriage of AIS is required on board all vessels of greater than 300 Gross Tonnage (GT) engaged on international voyages, cargo vessels of more than 500GT not engaged on international voyages, passenger vessels irrespective of size built on or after 1 July 2002, and fishing vessels over 15m length overall (LOA).

Therefore, for the vessel traffic surveys larger vessels were recorded on AIS, while smaller vessels without AIS installed (including fishing vessels under 15m LOA and recreational craft) were recorded, where possible, on the automatic Radar plotting aid (ARPA). A proportion of smaller vessels also carry AIS voluntarily, typically utilising a Class B AIS device.

The long-term dataset is AIS-only and assumes that vessels under legal obligation to broadcast on AIS will do so. However, not all vessels are legally obligated to broadcast on AIS (in particular fishing vessels under 15m LOA and recreational craft) and therefore these vessels may be underrepresented within this dataset. Within each relevant dataset it has been assumed that the details broadcast via AIS are accurate unless there is clear evidence to the contrary.

It should be considered that traffic volumes and routeing may have been affected by Brexit within the vessel traffic data sources assessed, particularly in relation to fishing vessel movements given the gradual and partial transfer of European Union (EU) fishing quota share to the UK. There may also be effects from the COVID pandemic, in particular for the 2021 dataset, noting that this is not part of the primary data sources for the baseline analysis.

The Royal National Lifeboat Institution (RNLI) incident data cannot be considered comprehensive of all incidents in the study area. Although hoaxes and false alarms are excluded, any incident to which an RNLI resource was not mobilised has not been accounted for in this dataset. The data analysed is the most recent available at the time of collating the baseline environment.

Similarly, the Marine Casualty Investigation Board (MCIB) incident data only accounts for completed investigations. Any incident that has not been investigated or whose investigation has been ongoing at the time of writing has not been accounted for. In addition, precise location data is not available for all incidents within the dataset.

The United Kingdom Hydrographic Office (UKHO) admiralty charts are updated periodically and therefore the information shown may not reflect the real time features within the region with total accuracy. However, during consultation, input has been sought from relevant stakeholders regarding the navigational features baseline.

17.2.4.4 Methodology for Assessment of Effects

EIA significance criteria for shipping and navigation follows IMO guidance:

[1] Collision refers to the act or process of one moving object striking another moving object; allision refers to the act or process of a moving object striking a stationary object.

- IMO (2018). Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process. MSC-MEPCC.2/Circ.12/Rev.2. London: IMO.

The impact assessment methodology applied within this chapter is bespoke to shipping and navigation. In particular, the IMO Assessment FSA methodology – which is the internationally recognised approach for assessing shipping and navigation impacts – has been applied, in line with stakeholder preference and the requirements of MGN 654 (MCA, 2021). It is noted that the methodology approach has been set out to consultees, including at dedicated meetings and the Hazard Workshop (see Appendix 1.2). The Hazard Workshop was a meeting of local and national marine stakeholders gathered to identify and discuss potential shipping and navigation hazards. Further details pertaining to the Hazard Workshop are provided in Section 4.3 of the NRA.

The FSA is a structured and systematic methodology based upon risk analysis and Cost Benefit Analysis (CBA) (if applicable) to reduce effects to As Low As Reasonably Practicable (ALARP). The frequency and consequence of each impact is determined based on the findings of the NRA, with significance then being determined via an effect matrix approach.

The following sections describe the methods used to assess the likely significant effects on shipping and navigation.

17.2.4.5 Definitions

There are differences between standard EIAR terminology applied for other offshore topics and FSA terminology applied for shipping and navigation. This chapter adapts the standard EIA terminology where possible (whilst maintaining the overarching IMO FSA methodology), whilst the NRA uses FSA terminology throughout. The key differences in terminology are summarised in Table 17.3.

Table 17.3 Summary of differences in terminology between EIAR and NRA

EIAR term	NRA term	Definition
Impact	Hazard	A potential threat to human life, health, property, or the environment.
Effect	Risk	The combination of frequency of occurrence and severity of consequence of an impact.
Receptor	User	Sufferer of effect.
Embedded mitigation measure / mitigation and monitoring measures	Embedded mitigation measure	A commitment made by the Developer to reduce and/ or eliminate the potential for significance effects.

For each potential impact the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors based on two key factors – the frequency of occurrence and severity of consequence. The definitions of frequency of occurrence and severity of consequence for the purpose of the shipping and navigation assessment are provided in Table 17.4 and Table 17.5, respectively.

Table 17.4 Definition of frequency of occurrence of impacts for shipping and navigation

Frequency of Occurrence	Definition
Frequent	Yearly.
Reasonably Probable	One occurrence per 1 to 10 years.
Remote	One occurrence per 10 to 100 years.
Extremely Unlikely	One occurrence per 100 to 10,000 years.
Negligible	Less than one occurrence per 10,000 years.

Table 17.5 Definition of severity of consequence of impacts for shipping and navigation

Severity of Consequence	Definition
Major	More than one fatality, total loss of property, national assistance required and international reputational effects.
Serious	Multiple serious injuries or single fatality, damage resulting in critical impact on operations, regional assistance required, and national reputational effects.
Moderate	Multiple minor or single serious injury, damage not critical to operations, limited external assistance required, and local reputational effects.
Minor	Slight injury to people, minor damage to property, local assistance required, and minor reputational effects limited to receptors.
Negligible	No perceptible risk to people, property, environment, or business.

17.2.4.6 Defining the significance of effect

The assessment of significance of an effect is informed by the frequency of occurrence (Table 17.4) and severity of consequence (Table 17.5). The determination of significance is guided by the use of a shipping and navigation significance of effect matrix, as shown in Table 17.6.

The significance of effect of an impact is defined as broadly acceptable (low effect), tolerable (moderate effect), or unacceptable (high effect). Impacts that are deemed to be of unacceptable significance are not within ALARP parameters and are considered to be significant in EIA terms. Impacts deemed to be broadly acceptable or tolerable with mitigation are ALARP are not significant in EIA terms.

Table 17.6 Shipping and navigation significance of effect matrix

		Frequency of Occurrence				
		Negligible	Extremely Unlikely	Remote	Reasonably Probable	Frequent
Severity of Consequence	Major	Tolerable with mitigation	Tolerable with mitigation	Unacceptable	Unacceptable	Unacceptable
	Serious	Broadly acceptable	Tolerable with mitigation	Tolerable with mitigation	Unacceptable	Unacceptable
	Moderate	Broadly acceptable	Broadly acceptable	Tolerable with mitigation	Tolerable with mitigation	Unacceptable
	Minor	Broadly acceptable	Broadly acceptable	Broadly acceptable	Tolerable with mitigation	Tolerable with mitigation
	Negligible	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable	Tolerable with mitigation

Where relevant, mitigation measures that are incorporated as part of the proposed development design process and/ or can be considered to be industry standard practice (referred to as 'embedded mitigation') are considered throughout the chapter and are reflected in the outcome of the assessment of effects, described in Section 17.4.5. Additional mitigation measures that are not embedded and are considered as part of the residual effects assessment are described separately (Section 17.6).

17.3 Baseline Environment

17.3.1 Navigational features

The key navigational features identified in proximity to the offshore development area are illustrated in Figure 17.2 of Volume 7A, noting that a full detailed description of all navigational features are provided within the NRA.

Drogheda Port is the closest commercial port to the offshore development area. Situated on the River Boyne, the entrance to the port, at the mouth of the river, is approximately 9nm west of the array area. The Admiralty Sailing Directions state that Drogheda Port "is a commercial port catering for regional industry and agriculture and also acts as a relief port for Dublin" (UKHO, 2019). Pilotage can be obtained at Drogheda Port and is compulsory for all vessels entering the River Boyne. The pilot boarding station is located on the boundary of Drogheda's outer anchorage area, situated approximately 6nm to the west of the array area.

Important to shipping and navigation and vessel traffic movements in the region, Dublin Port is situated 20nm south-west of the array area. Dublin Port handles almost 50% of all trade in Ireland (Dublin Port Company, 2022) and is equipped to facilitate Roll-On/Roll-Off cargo (RoRo) and passenger (RoPax) vessels as well as Lift-On/Lift-Off cargo (LoLo) and liquid cargo, and is the Irish terminus for vehicle and passenger ferries from certain UK ports (UKHO, 2019).

Several other harbours utilised by small craft and emergency responders are also located in proximity to the offshore development area.

The closest IMO routeing measure is the North and South Burford Traffic Separation Scheme (TSS) at the entrance to Dublin Bay. There are several other TSSs in the Irish Sea relevant to traffic movements in the region and are detailed further in the NRA.

Various aids to navigation (AtoN) are located in proximity to the array area including on the shoreline and at the entrance to ports, harbours, and marinas. The closest AtoN to the array area is the Rockabill Lighthouse located approximately 2.9nm to the south-west, situated on the larger of the two islands that form Rockabill.

Details of navigational features including military areas, spoil grounds, subsea cables, pipelines, and charted wrecks is provided in the NRA.

17.3.2 Historical maritime incidents

A plot of the locations of the incidents reported to the RNLI between 2012 and 2021 (inclusive) within the shipping and navigation study area, colour-coded by incident type, is presented in Figure 17.3 of Volume 7A.

A total of 251 incidents were responded to by the RNLI within the study area between 2012 and 2021, corresponding to an average of 24 incidents per year, noting approximately 82% occurred within 2nm of the Irish east coast, including a large proportion clustered near Skerries Harbour.

The most common incident type is machinery failure, accounting for 36% of the data. This is followed by unspecified incidents and person in danger incidents which accounted for 27% and 20%, respectively. The most frequent casualty type is powered recreational vessels (26%), followed by fishing vessels (23%). It is noted that no incidents occurred within the array area and six incidents occurred within the ECC. The closest RNLI station to the offshore development area is the Skerries RNLI Station at approximately 6nm from the array area which responded to 62% of all incidents within the study area over the 10-year period.

There were two documented MCIB incidents within the study area during the same period assessed (2012 to 2021). These incidents occurred close to the coast and are as follows:

- an incident in 2016 involving a fishing vessel which foundered
- an incident in 2017 involving a fishing vessel which capsized resulting in one fatality.

17.3.3 Vessel traffic movements

A plot of the vessel traffic recorded via AIS and Radar over the winter survey period within the shipping and navigation study area is colour-coded by vessel type and presented in Figure 17.4 of Volume 7A. A plot of the vessel traffic recorded via AIS and Radar over the summer survey period within the shipping and navigation study area is colour-coded by vessel type and presented in Figure 17.5 of Volume 7A.

Throughout the winter survey, approximately 83% of vessel tracks were recorded via AIS with the remaining 17% recorded via Radar. Throughout the summer survey, approximately 90% of vessel tracks were recorded via AIS with the remaining 10% recorded via Radar.

For the 14 days analysed in summer, there was an average of 39 unique vessels per day recorded within the shipping and navigation study area, ten unique vessels per day intersecting the array area, and six unique vessels per day intersecting the ECC. The busiest day recorded 60 unique vessels within the shipping and navigation study area. Throughout the summer survey period, approximately 27% of vessel traffic recorded within the study area intersected the array area, and 14% intersected the ECC. The main vessel types within the shipping and navigation study area were fishing vessels (38%), recreational vessels (32%), and cargo vessels (11%).

For the 14 days analysed in winter, there was an average of 17 unique vessels per day recorded within the shipping and navigation study area, three unique vessels per day intersecting the array area, and three unique vessels per day intersecting the ECC. The busiest day recorded 28 unique vessels within the shipping and navigation study area. Throughout the winter survey period approximately 18% of vessel traffic recorded within the study area intersected the array area, and 17% intersected the ECC. The main vessel types within the shipping and navigation study area were cargo vessels (46%), fishing vessels (27%), and other vessels (11%) which were mainly pilot vessels associated with Drogheda Port, RNLI lifeboats, and one buoy laying vessel.

Vessel LOA was available for approximately 81% of vessels recorded throughout the two 14-day survey periods for the shipping and navigation study area and ranged from 7m recreational and SAR vessels to a 291m Liquified Natural Gas (LNG) tanker. Excluding the proportion of vessels for which length was not available, the average LOA within the shipping and navigation study area throughout the summer and winter survey periods was 37m and 89m, respectively.

Vessel draught was available for approximately 39% of vessels recorded throughout the two 14-day survey periods for shipping and navigation study area and ranged from 1m for a pilot vessel to 11.6m for a LNG tanker, the same LNG tanker with the greatest LOA.

Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the shipping and navigation study area throughout the summer and winter survey periods was 4.3m and 5.2m, respectively.

A methodology for identifying vessels at anchor is provided in the NRA. During the 28-days of vessel traffic data, 44 unique instances of a vessel recorded on AIS was deemed as being at anchor across the shipping and navigation study area, based on track behaviour and navigation status. No vessels were at anchor within the array area or the ECC. It is noted that 52% of anchored vessels were within the Drogheda outer anchorage area. The location of all anchored vessels is provided in Figure 10.15 in the NRA.

Main commercial routes have been identified using the principles set out in MGN 654 (MCA, 2021). A total of ten main commercial routes were identified within the shipping and navigation study area. A plot of the main commercial routes and corresponding 90th percentiles is presented in Figure 17.6 of Volume 7A. It is noted that the Off Smalls TSS referenced in Table 17.7 is located approximately 105nm south of the array area, off the southwest coast of Wales, and thus is not displayed in Figure 17.6 of Volume 7A (it can be seen in Figure 7.3 in the NRA).

Descriptions for each of the main commercial routes are provided in Table 17.7.

Table 17.7 Details of the main commercial routes identified within the shipping and navigation study area

Route number	Average vessels per week	Description
1	10 to 11	Warrenpoint to ports within Bristol Channel. Generally used by cargo vessels (83% of traffic transiting the route).
2	9 to 10	Dublin to Belfast. Generally used by cargo vessels (59%), passenger vessels (21%), and tankers (15%).
3	6 to 7	Drogheda to Off Smalls TSS. Used by cargo vessels (100%)
4	1	Drogheda to Off Smalls TSS. Used by cargo vessels (100%).
5	1 to 2	Dublin to Douglas. Generally used by passenger vessels (60%) and tankers (40%).
6	1	Belfast to Wicklow. Used by cargo vessels (100%).
7	1	Drogheda to Mersey. Used by cargo vessels (100%).
8	1	Drogheda to Belfast. Used by cargo vessels (100%).
9	1	Drogheda to Warrenpoint. Used by cargo vessels (100%).
10	3 to 4	Warrenpoint to Off Smalls TSS. Mainly used by cargo vessels (87%).

17.4 Characteristics of the Proposed Development

This section outlines the characteristics of the proposed development that are relevant to the identification and assessment of effects on shipping and navigation during each phase of the proposed development. In this chapter this is limited to activities and infrastructure occurring in the offshore environment and it considers both Project Option 1 and Project Option 2 (the key characteristics of which are provided in Table 17.8 and are detailed in full in the Offshore Description Chapter).

Only one of the two project options will be progressed to construction.

Table 17.8 Key characteristics of Project Option 1 and Project Option 2

Project Option 1	Project Option 2
Array area during construction/ decommissioning: • Construction/ decommissioning phase of approximately three years. • 49 Wind Turbine Generators (WTG) on monopiles with sea surface dimensions of 12.5m diameter. • One offshore substation platform (OSP) with topside dimensions of 45×45m located on the western periphery of the array area. • Buoyed construction/ decommissioning area encompassing the maximum extent of the array area. • Maximum of 49 construction/ decommissioning vessels on-site simultaneously and 3,008 return trips to port.	**Array area during construction/ decommissioning:** • Construction/ decommissioning phase of approximately three years. • 49 Wind Turbine Generators (WTG) on monopiles with sea surface dimensions of 12.5m diameter. • One offshore substation platform (OSP) with topside dimensions of 45×45m located on the western periphery of the array area. • Buoyed construction/ decommissioning area encompassing the maximum extent of the array area. • Maximum of 47 construction/ decommissioning vessels on-site simultaneously and 2,530 return trips to port.
ECC during construction/ decommissioning: • Two offshore export cables each of 9.7nm length. • Separation of 50m – 200m between offshore export cables. • Maximum of 49 construction/ decommissioning vessels on-site simultaneously and 3,008 return trips to port.	**ECC during construction/ decommissioning:** • Two offshore export cables each of 9.7nm length. • Separation of 50m – 200m between offshore export cables. • Maximum of 47 construction/ decommissioning vessels on-site simultaneously and 2,530 return trips to port.
Array area during operation: • Operational life of 35 years. • 49 Wind Turbine Generators (WTG) on monopiles with sea surface dimensions of 12.5m diameter. • One offshore substation platform (OSP) with topside dimensions of 45×45m located on the western periphery of the array area. • Single line of orientation (SLoO)2 in array layout. • WTG air draft of 3m above Lowest Astronomical Tide (LAT) • 60nm of inter–array cables. • Trench depths for inter-array cables of 1m – 3m. • Proportion of inter-array cable protection requirement of 20%. • Five potential cable or pipeline crossings for inter-array cables. • Maximum of 12 operational vessels on-site simultaneously and 1,261 annual round trips to port.	**Array area during operation:** • Operational life of 35 years. • 35 WTG on monopiles with sea surface dimensions of 12.5m diameter. • One OSP with topside dimensions of 45×45m located on the western periphery of the array area. • SLoO in array layout. • Lowest WTG air draft of 35m above LAT. • 49nm of inter–array cables. • Trench depth for inter-array cables of 1m -3m. • Proportion of inter-array cable protection requirement of 20%. • Five potential cable or pipeline crossings for inter-array cables. • Maximum of 12 operational vessels on-site simultaneously and 1,055 annual round trips to port.

[2] An array layout which includes one consistent bearing for which SAR lanes may be defined between rows of surface piercing structures in compliance with MGN 654.

Project Option 1	Project Option 2
ECC during operation: • Operational life of 35 years. • Two offshore export cables each of 9.7nm length. • Separation of 50m – 200m between offshore export cables. • Trench depth for offshore export cables of 1m-3m. • Proportion of export cable protection requirement of 20%. • No anticipated cable or pipeline crossings for any offshore export cable.	**ECC during operation:** • Operational life of 35 years. • Two offshore export cables each of 9.7nm length. • Separation of 50m-200m between offshore export cables. • Trench depth for offshore export cables of 1m–3m. • Proportion of export cable protection requirement of 20%. • No anticipated cable or pipeline crossings for any offshore export cable.

A presentation of the potential impacts in relation to Project Option 1 and Project Option 2 is provided, and the severity of consequence of those impacts in relation to the size and scale of the proposed development parameters. This enables the identification of the project option that will result in the greatest severity of consequence on receptors and will therefore present the greatest potential for a likely significant effect (Table 17.10).

To determine the severity of consequence, modelling, calculations and mapping have been undertaken for the project option with the greatest severity of consequence, for all impacts for the relevant receptor/s.

The significance of effect assessment has then been undertaken for both project options, which considers both frequency of occurrence and the severity of consequence and is detailed in Section 17.5. Given the similarity of the project options, in most instances the frequency of occurrence and severity of consequence are the same.

In relation to the WTG layout, no surface infrastructure, inclusive of blade overfly, will be present within 3nm of Rockabill, with the portion of the array area within 3nm of Rockabill defined as the Structure Exclusion Zone. This is captured as an embedded mitigation measure in Section 1.4.5 and is illustrated in Figure 17.8.

The layout for Project Option 1 is displayed in Figure 17.7 of Volume 7A. In the interest of shipping and navigation, the WTG layout deemed to have the greatest severity of consequence is associated with Project Option 1. This is due to Project Option 1 including the maximum number of structures, thus maximising vessel exposure to allision risk. The minimum spacing between WTGs (measured centre-to-centre) is 910m subject to Limits of Deviation (LoD). Both Project Option 1 and Project Option 2 have a 500m LoD, with this parameter defined to allow flexibility with WTG siting following further detailed site investigations, detailed design and consultation with stakeholders. The WTG layout for Project Option 1 also includes a SLoO. This layout is considered to be compliant with the requirements of MGN 654 (MCA, 2021), noting that (as stated in Section 1.2.3) the draft DoT guidance is closely aligned. The proposed development (including the layout options) has been subject to a comprehensive NRA as required by the methodology agreed with shipping regulators, notably the MSO, prior to the NRA process commencing. No specific national guidance on NRA currently exists, but the assessment undertaken has taken account of international best practice and precedent in respect of offshore wind developments in the UK. The Developer is aware that draft specific national guidance is currently under review and that engagement with the IRCG, if required, upon publication of the final guidance documents (which is not expected to be published until later this year) may result in the requirement for a safety justification for the layout to be undertaken. This would be specifically for the IRCG's own access assessment and to ensure requirements within the guidance are complied with.

17.4.1 Parameters for Assessment

The below activities, infrastructure and key design parameters have been considered within this chapter when determining the potential impacts. Further detail on the offshore elements of the proposed development is provided in the Offshore Description chapter and Offshore Construction chapter. These parameters apply to both project options and any differences in values that may require consideration have been identified in Table 17.10.

17.4.2 Construction Phase

During construction the following activities and infrastructure have the potential to impact on shipping and navigation:

- Duration of the construction phase
- Extent of the array area built out
- Total length of inter-array cables
- Number of offshore export cables
- Total length of offshore export cables
- Separation distance between adjacent offshore export cables

- Number of construction vessels on-site simultaneously; and
- Number of construction vessel return trips to port.

17.4.3 Operational Phase

During operation, the following activities and infrastructure have the potential to impact on shipping and navigation:

- Duration of the operational phase
- Extent of the array area built out
- Layout of surface piercing structures (including lines of orientation)
- Number of surface piercing structures
- Size of surface piercing structures at the water line
- WTG air draft
- Total length of inter-array cables
- Number of offshore export cables
- Total length of offshore export cables
- Separation distance between adjacent offshore export cables
- Proportion of inter-array cables and offshore export cables with protection requirement
- Number of operational vessels on-site simultaneously; and
- Number of operational vessel return trips to port.

17.4.4 Decommissioning Phase

During decommissioning, the following activities and infrastructure have the potential to impact on shipping and navigation:

- Duration of the decommissioning phase
- Extent of the array area built out
- Number of offshore export cables
- Total length of offshore export cables
- Separation distance between adjacent offshore export cables
- Number of decommissioning vessels on-site simultaneously; and
- Number of decommissioning vessel return trips to port.

17.4.5 Embedded Mitigation Measures

The following embedded mitigation measures in Table 17.9 have been identified through the design and consultation process and are incorporated as part of the proposed development. The embedded mitigation measures will not be considered again at the residual effect stage.

Table 17.9 Embedded mitigation measures relating to Shipping and Navigation

Measure	Mitigation detail
Construction	
Advisory safe passing distances	Advisory safe passing distances may be deployed around ongoing work being undertaken by a construction or maintenance vessel with notice of these promulgated through Notices to Mariners and Marine Notices (where deemed appropriate).
Buoyed construction area	A buoyed construction area around the array will be implemented during the appropriate phases in agreement with Irish Lights and as outlined in Appendix 17.3: Lighting and Marking Plan (LMP).
Cable protection	Cable protection (burial or external protection) will be implemented and monitored, as determined by a cable burial risk assessment post consent.
Compliance with relevant regulator guidance	The proposed development will be compliant with the relevant regulator guidance noting that the draft version published by DoT is generally aligned with UK Marine Guidance Note (MGN) 654.
Guard vessel(s)	Where appropriate, guard vessels will be used to ensure adherence with advisory passing distances.
Liaison with IRCG in relation to SAR resources	The Developer will liaise with the IRCG in relation to SAR resources to ensure the Emergency Response Cooperation Plan (ERCoP) is in place post consent.
Lighting and marking	Lighting and marking of the array in agreement with Irish Lights and in line with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162. A separate LMP is provided in Appendix 17.3.
Marine coordination for proposed development vessels	Marine coordination will be implemented to manage proposed development vessels. A separate Vessel Management Plan (VMP) is provided in Appendix 17.2.
Marking on nautical charts	There will be appropriate marking of all offshore infrastructure associated with the offshore development area on UKHO Admiralty charts.
Proposed development compliance with international marine regulations	All proposed development vessels will comply with international marine regulations as adopted by the Flag State including International Regulations for Preventing Collisions at Sea (COLREGs) and International Convention for the Safety of Life at Sea (SOLAS). A separate VMP is provided in Appendix 17.2.
Promulgation of information	Information relating to the proposed development will be circulated via Notices to Mariners and other appropriate media including via the project Fisheries Liaison Officer (FLO) and Marine Notices (where deemed appropriate).
Structure Exclusion Zone	An area within the array area within which no surface piercing structure will be located inclusive of blade overfly. This area will ensure that a minimum 3nm gap between the Rockabill islands and the array is maintained.
Operation	
Advisory safe passing distances	Advisory safe passing distances may be deployed around ongoing work being undertaken by a maintenance vessel with notice of these promulgated through Notices to Mariners and Marine Notices (where deemed appropriate).
Cable protection	Cable protection (burial or external protection) will be implemented and monitored, as determined by a cable burial risk assessment post consent.
Compliance with relevant regulator guidance	The proposed development will be compliant with the relevant regulator guidance noting that the draft version published by DoT is generally aligned with UK Marine Guidance Note (MGN) 654.
Guard vessel(s)	Where appropriate, guard vessels will be used to ensure adherence with advisory passing distances.
Lighting and marking	Lighting and marking of the array in agreement with Irish Lights and in line with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162. A separate LMP is provided in Appendix 17.3.
Marine coordination for proposed development vessels	Marine coordination will be implemented to manage proposed development vessels during operation. A separate VMP is provided in Appendix 17.2.
Marking on nautical charts	There will be appropriate marking of all offshore infrastructure associated with the offshore development area on UKHO Admiralty charts.
Minimum blade clearance	There will be a minimum blade clearance of more than 22 m above highest Astronomical Tide (HAT) in line with industry good practice and MGN 654. The lowest minimum blade clearance associated with the proposed development is 35m above LAT associated with selected WTGs for Project Option 2.

Measure	Mitigation detail
Proposed development vessel compliance with international marine regulations	All proposed development vessels will comply with international marine regulations as adopted by the Flag State including COLREGs and SOLAS.
Promulgation of information	Information relating to the proposed development will be circulated via Notices to Mariners and other appropriate media including via the FLO and Marine Notices (where deemed appropriate).
Structure Exclusion Zone	An area within the array area within which no surface piercing structure will be located inclusive of blade overfly. This area will ensure that a minimum 3nm gap between the Rockabill islands and the array is maintained. See Figure 17.8.
WTG design and layouts	Consideration will be given to navigational safety and SAR with respect to WTG and layout design (with respect to the 500m LoD), including acceptable levels of SCADA systems.
Decommissioning	
Advisory safe passing distances	Advisory safe passing distances may be deployed around ongoing work being undertaken by a decommissioning vessel with notice of these promulgated through Notices to Mariners and Marine Notices (where deemed appropriate).
Buoyed decommissioning area	A buoyed construction decommissioning area around the array area will be implemented during the appropriate phases in agreement with Irish Lights as outlined in the LMP in Appendix 17.3.
Compliance with relevant regulator guidance	The proposed development will be compliant with the relevant regulator guidance noting that the draft guidance published by the DoT is generally aligned with UK Marine Guidance Note (MGN) 654.
Guard vessel(s)	Where appropriate, guard vessels will be used to ensure adherence with advisory passing distances.
Liaison with IRCG in relation to SAR resources	The Developer will liaise with the IRCG in relation to SAR resources to ensure the ERCoP is in place post consent.
Marine coordination for proposed development vessels	Marine coordination will be implemented to manage proposed development vessels. A separate VMP is provided in Appendix 17.2.
Proposed development vessel compliance with international marine regulations	All proposed development vessels will comply with international marine regulations as adopted by the Flag State including COLREGs and SOLAS.
Promulgation of information	Information relating to the proposed development will be circulated via Notices to Mariners and other appropriate media including via the project FLO and Marine Notices (where deemed appropriate).

17.4.6 Potential Impacts

The identification of potential impacts has been undertaken by considering the relevant characteristics from both project options (refer to Section 17.4.1) and the potential for a pathway for direct and indirect effects on known receptors (as identified in Section 17.3). Each identified impact relevant to shipping and navigation is presented in Table 17.10.

For each impact, the relevant project characteristics of Project Option 1 and Project Option 2 are presented to determine the severity of consequence of the potential impact, in line with the approach detailed in Section 17.2. A comparison of the project options has then been undertaken to determine which project option has the greatest severity of consequence.

Table 17.10 Potential impact and severity of consequence per project option. The project option that has the greatest severity of consequence is identified in blue

Potential impact	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest severity of consequence
Construction			
Vessel displacement and increased vessel to vessel collision risk (array area)	**Construction phase:** Approximately three years **Construction vessels:** Maximum of 49 construction vessels simultaneously and 3,008 return trips to port **Array area:** Buoyed construction area encompassing full array area	**Construction phase:** Approximately three years **Construction vessels:** Maximum of 47 construction vessels simultaneously and 2,530 return trips to port **Array area:** Buoyed construction area encompassing full array area	The greatest likely significant effect for vessel displacement and increased vessel to vessel collision risk due to the array area results from activities associated with the installation of structures as well as the presence of surface structures within the array area. Project Option 1 has a greater number of simultaneous construction vessels and return trips and therefore presents the greatest severity of consequence.
Vessel displacement and increased vessel to vessel collision risk (ECC)	**Construction phase:** Approximately three years **Cable laying vessels:** Maximum of 49 construction vessels simultaneously and 3,008 return trips to port **Export cable installation:** Installation of two 9.7nm offshore export cables.	**Construction phase:** Approximately three years **Cable laying vessels:** Maximum of 47 construction vessels simultaneously and 2,530 return trips to port **Export cable installation:** Installation of two 9.7nm offshore export cables.	The greatest likely significant effect for vessel displacement and increased vessel to vessel collision risk within the ECC results from activities associated with the installation of export cables within the ECC. Two 9.7nm export cables will be installed. A maximum of 18 vessels associated with export cable installation. Project Option 1 and Project Option 2 have the same relevant parameters and therefore present equal severity of consequence.
Third-party to proposed development vessel collision risk (array area)	**Construction phase:** Approximately three years **Construction vessels:** Maximum of 49 construction vessels simultaneously and 3,008 return trips to port **Array area:** Buoyed construction area encompassing full array area	**Construction phase:** Approximately three years **Construction vessels:** Maximum of 47 construction vessels simultaneously and 2,530 return trips to port **Array area:** Buoyed construction area encompassing full array area	The greatest likely significant effect for third-party to proposed development vessel collision risk within the array area results from the presence of proposed development vessels associated with construction activities. Project Option 1 has a greater number of simultaneous construction vessels and return trips and therefore presents the greatest severity of consequence.
Third-party to proposed development vessel collision risk (ECC)	**Construction phase:** Approximately three years **Cable laying vessels:** Maximum of 49 construction vessels simultaneously and 3,008 return trips to port	**Construction phase:** Approximately three years **Cable laying vessels:** Maximum of 47 construction vessels simultaneously and 2,530 return trips to port	The greatest likely significant effect for third-party to proposed development vessel collision risk within the ECC results from the presence of proposed development vessels associated with construction activities. Project Option 1 and Project Option 2 have the same maximum numbers of proposed development vessels associated with cable installation activities and therefore present equal severity of consequence.

Potential impact	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest severity of consequence
	Export cable installation: Installation of two 9.7nm export cables.	**Export cable installation:** Installation of two 9.7nm export cables.	
Reduced access to local ports (array area)	**Construction phase:** Approximately three years **Construction vessels:** Maximum of 49 construction vessels simultaneously and 3,008 return trips to port **Array area:** Buoyed construction area encompassing full array area	**Construction phase:** Approximately three years **Construction vessels:** Maximum of 47 construction vessels simultaneously and 2,530 return trips to port **Array area:** Buoyed construction area encompassing full array area	The greatest likely significant effect for reduced access to local ports within the array area results from restriction in port access due to construction within the array area as well as the presence of proposed development vessels. Project Option 1 has a greater number of simultaneous construction vessels and return trips and therefore presents the greatest severity of consequence.
Reduced access to local ports (ECC)	**Construction phase:** Approximately three years **Cable laying vessels:** Maximum of 49 construction vessels simultaneously and 3,008 return trips to port **Export cable installation:** Installation of two 9.7nm export cables.	**Construction phase:** Approximately three years **Cable laying vessels:** Maximum of 47 construction vessels simultaneously and 2,530 return trips to port **Export cable installation:** Installation of two 9.7nm export cables.	The greatest likely significant effect for reduced access to local ports within the ECC results from restriction in port access due to cable installation activities within the ECC. Installation activities within the ECC are the same for Project Option 1 and Project Option 2 and therefore both projects present equal severity of consequence.
Operation			
Vessel displacement and increased vessel to vessel collision risk (array area)	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Array area:** 49 WTGs, one OSP	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and annual 1,055 round trips to port **Array area:** 35 WTGs, one OSP	The greatest likely significant effect for vessel displacement and increased vessel to vessel collision risk due to the array area results from the necessary deviation around surface structures within the array area. Project Option 1 has a greater number of surface infrastructure (49 WTGs) therefore presents the greatest severity of consequence.
Vessel displacement and increased vessel to vessel collision risk (ECC)	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Export cables:** Two 9.7nm export cables	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,055 annual round trips to port **Export cables:** Two 9.7nm export cables	The greatest likely significant effect for vessel displacement and increased vessel to vessel collision risk within the ECC results from necessary deviation around activities associated with the maintenance of export cables within the ECC. Project Option 1 and Project Option 2 have the same parameters and therefore present equal severity of consequence.

Potential impact	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest severity of consequence
Third-party to proposed development vessel collision risk (array area)	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Array area:** 49 WTGs, one OSP	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,055 annual round trips to port **Array area:** 35 WTGs, one OSP	The greatest likely significant effect for third-party to proposed development vessel collision risk within the array area results from the presence of maintenance vessels within the array area. Project Option 1 has a greater number of vessel return trips and therefore presents the greatest severity of consequence.
Third-party to proposed development vessel collision risk (ECC)	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Export cables:** Two 9.7nm export cables.	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,055 annual round trips to port **Export cables:** Two 9.7nm export cables.	The greatest likely significant effect for third-party to proposed development vessel collision risk within the ECC results from the presence of maintenance vessels within the ECC. Project Option 1 and Project Option 2 have the same maximum numbers of proposed development vessels associated with maintenance activities and therefore present equal severity of consequence.
Reduced access to local ports (array area)	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Array area:** 49 WTGs, one OSP	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,055 annual round trips to port **Array area:** 35 WTGs, one OSP	The greatest likely significant effect for reduced access to local ports within the array area results from the presence of surface structures and maintenance activities within the array area. Project Option 1 has a greater abundance of infrastructure (49 WTGs) and presents the greatest severity of consequence.
Reduced access to local ports (ECC)	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Export cables:** Two 9.7nm export cables.	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,055 annual round trips to port **Export cables:** Two 9.7nm export cables.	The greatest likely significant effect for reduced access to local ports within the ECC results from maintenance activities associated with the ECC. Project Option 1 and Project Option 2 have the same maximum numbers of proposed development vessels on-site associated with maintenance activities and therefore present equal severity of consequence.
Creation of vessel to structure allision risk (array area)	**Operational phase:** 35 years **Array area:** 49 WTGs, one OSP, SLoO layout	**Operational phase:** 35 years **Array area:** 35 WTGs, one OSP, SLoO layout	The greatest likely significant effect for creation of vessel to structure allision risk within the array area result from the presence of surface structures. Project Option 1 has a greater abundance of infrastructure (49 WTGs) and presents the greatest severity of consequence.

Potential impact	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest severity of consequence
Reduction in under keel clearance (array area)	**Operational phase:** 35 years **Inter-array cables:** 60nm of inter-array cables, trench depths for inter-array cables of 1m - 3m, 20% of inter-array cables requiring protection	**Operational phase:** 35 years **Inter-array cables:** 49nm of inter-array cables, trench depths for inter-array cables of 1m - 3m, 20% of inter-array cables requiring protection	The greatest likely significant effect for reduction in under keel clearance within the array area results from the presence of cable protection. Project Option 1 has a greater length of inter-array cables and presents the greatest severity of consequence.
Reduction in under keel clearance (ECC)	**Operational phase:** 35 years **Export cables:** Two 9.7nm export cables, trench depths for inter-array cables of 1m – 3m, 20% of export cables requiring protection	**Operational phase:** 35 years **Export cables:** Two 9.7nm export cables, trench depths for inter-array cables of 1m - 3m, 20% of export cables requiring protection	The greatest likely significant effect for reduction in under keel clearance within the array area results from the presence of cable protection. ECC infrastructure is the same for Project Option 1 and Project Option 2, and therefore both projects present equal severity of consequence.
Anchor interaction with inter-array cables (array area)	**Operational phase:** 35 years **Inter-array cables:** 60nm of inter-array cables, trench depths for inter-array cables of 1m - 3m, 20% of inter-array cables requiring protection	**Operational phase:** 35 years **Inter-array cables:** 49nm of inter-array cables, trench depths for inter-array cables of 1m - 3m, 20% of inter-array cables requiring protection	The greatest likely significant effect for anchor interaction results from the presence of inter-array cables. Project Option 1 has a greater length of inter-array cables and presents the greatest severity of consequence.
Anchor interaction with export cables (ECC)	**Operational phase:** 35 years **Export cables:** Two 9.7nm export cables, trench depths for inter-array cables of 1m - 3m, 20% of export cables requiring protection	**Operational phase:** 35 years **Export cables:** Two 9.7nm export cables, trench depths for inter-array cables of 1m - 3m, 20% of export cables requiring protection	The greatest likely significant effect for anchor interaction with cables within the ECC results from the presence of cables. ECC infrastructure is the same for Project Option 1 and Project Option 2, and therefore both projects present equal severity of consequence.
Reduction of emergency response capability	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,261 annual round trips to port **Array area:** 49 WTGs, one OSP, SLoO layout **Export cables:** Two 9.7nm export cables.	**Operational phase:** 35 years **Maintenance vessels:** Maximum of 12 vessels simultaneously and 1,055 annual round trips to port **Array area:** 35 WTGs, one OSP, SLoO layout **Export cables:** Two 9.7nm export cables.	The greatest likely significant effect for reducing emergency response capability within the array area results from the overall WTG layout, as well as the presence of surface structures and operational activities. Project Option 1 has a greater number of surface structures (49 WTGs) and presents the greatest severity of consequence, noting that parameters associated with the ECC are equal for both projects.

Potential impact	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest severity of consequence
Decommissioning			
Vessel displacement and increased vessel to vessel collision risk (array area)	**Decommissioning phase:** Approximately three years **Decommissioning vessels:** Maximum of 49 decommissioning vessels simultaneously and 3,008 return trips to port **Array area:** Buoyed decommissioning area encompassing full array area	**Decommissioning phase:** Approximately three years **Decommissioning vessels:** Maximum of 47 decommissioning vessels and 2,530 return trips to port **Array area:** Buoyed decommissioning area encompassing full array area	The greatest likely significant effect for vessel displacement and increased vessel to vessel collision risk due to the array area results from the presence of decommissioning vessels as well as the total buoyage decommissioning area. Project Option 1 has a greater number of simultaneous decommissioning vessels and return trips and therefore presents the greatest severity of consequence.
Vessel displacement and increased vessel to vessel collision risk (ECC)	**Decommissioning phase:** Approximately three years **Cable removal vessels:** Maximum of 49 decommissioning vessels simultaneously and 3,008 return trips to port **Export cable removal:** Removal of two 9.7nm offshore export cables	**Decommissioning phase:** Approximately three years **Cable removal vessels:** Maximum of 47 decommissioning vessels and 2,530 return trips to port **Export cable removal:** Removal of two 9.7nm offshore export cables	The greatest likely significant effect for vessel displacement and increased vessel to vessel collision risk within the ECC results from activities associated with the removal of export cables within the ECC. Two 9.7nm export cables will be removed. A maximum of 18 vessels associated with export cable removal. Project Option 1 and Project Option 2 have the same relevant parameters and therefore present equal severity of consequence.
Third-party to proposed development vessel collision risk (array area)	**Decommissioning phase:** Approximately three years **Decommissioning vessels:** Maximum of 49 decommissioning vessels simultaneously and 3,008 return trips to port **Array area:** Buoyed decommissioning area encompassing full array area	**Decommissioning phase:** Approximately three years **Decommissioning vessels:** Maximum of 47 decommissioning vessels and 2,530 return trips to port **Array area:** Buoyed decommissioning area encompassing full array area	The greatest likely significant effect for third-party to proposed development vessel collision risk within the array area results from proposed development vessels associated with decommissioning activities. Project Option 1 has a greater number of simultaneous decommissioning vessels and return trips and therefore presents the greatest severity of consequence.
Third-party to proposed development vessel collision risk (ECC)	**Decommissioning phase:** Approximately three years **Cable removal vessels:** Maximum of 49 decommissioning vessels simultaneously and 3,008 return trips to port **Export cable removal:** Removal of two 9.7nm offshore export cables	**Decommissioning phase:** Approximately three years **Cable removal vessels:** Maximum of 47 decommissioning vessels and 2,530 return trips to port **Export cable removal:** Removal of two 9.7nm offshore export cables	The greatest likely significant effect for third-party to proposed development vessel collision risk within the ECC results from the presence of proposed development vessels associated with decommissioning activities. Project Option 1 and Project Option 2 have the same maximum numbers of proposed development vessels associated with cable removal activities and therefore present equal severity of consequence.

Potential impact	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest severity of consequence
Reduced access to local ports (array area)	**Decommissioning phase:** Approximately three years **Decommissioning vessels:** Maximum of 49 decommissioning vessels simultaneously and 3,008 return trips to port **Array area:** Buoyed decommissioning area encompassing full array area	**Decommissioning phase:** Approximately three years **Decommissioning vessels:** Maximum of 47 decommissioning vessels and 2,530 return trips to port **Array area:** Buoyed decommissioning area encompassing full array area	The greatest likely significant effect for reduced access to local ports due to the array area results from restriction due to the presence of vessels associated with decommissioning activities and the buoyage decommissioning area. Project Option 1 has a greater number of simultaneous decommissioning vessels and return trips and therefore presents the greatest severity of consequence.
Reduced access to local ports (ECC)	**Decommissioning phase:** Approximately three years **Cable removal vessels:** Maximum of 49 decommissioning vessels simultaneously and 3,008 return trips to port **Export cable removal:** Removal of two 9.7nm offshore export cables	**Decommissioning phase:** Approximately three years **Cable removal vessels:** Maximum of 47 decommissioning vessels and 2,530 return trips to port **Export cable removal:** Removal of two 9.7nm offshore export cables	The greatest likely significant effect for reduced access to local ports within the ECC results from restriction in port access due to cable removal activities within the ECC. Removal activities within the ECC are the same for Project Option 1 and Project Option 2 and therefore both projects present equal severity of consequence.

17.5 Potential Effects

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

17.5.1 Do-Nothing Scenario

In the event that the proposed development is does not proceed, an assessment of future conditions for shipping and navigation has been carried out and is described within this section.

Without the presence of the proposed development the baseline environment as described in Section 17.3 is largely expected to remain unchanged.

There is uncertainty associated with long-term predictions of vessel traffic growth including the potential for any other new developments in Irish or transboundary ports and the long-term effects of Brexit. Noting that port developments (which may be associated with commercial vessels) are discussed separately below, two independent scenarios of potential growth in commercial vessel movements of 10% and 20% have been estimated throughout the lifetime of the proposed development.

There is similar uncertainty associated with long-term predictions for commercial fishing vessel and recreational vessel transits given the limited reliable information on future trends upon which any firm assumption could be made. There are no known major developments which would increase commercial fishing or recreational vessel activity in the region. Therefore, a conservative potential growth in commercial fishing vessel and recreational vessel movements of 10% and 20% has been estimated throughout the lifetime of the proposed development. Changes in fishing activity are considered further in Volume 3, Chapter 16: Commercial Fisheries.

The proposed Bremore Port development was identified during consultation and is described in detail in the NRA. As part of this consultation, the Drogheda Port Company has identified four indicative main commercial routes in/ out of the proposed Bremore Port although there is significant uncertainty regarding the specific vessel volumes, types, and sizes which may feature on these routes. Therefore, the Bremore Port development has been accounted for as part of the cumulative assessment rather than specifically through the future case scenarios (it is noted that a planning application for the proposed Bremore Port development has not yet been submitted for consent).

Should the proposed Bremore Port be developed, the volume of potential users of the gap between Rockabill islands and the array area (the Rockabill gap) is expected to increase, although some larger vessels may favour a passage north of the array area. The Developer has committed to a Structure Exclusion Zone, an area within the array area which excludes all surface infrastructure (inclusive of blade overfly) and enables a 3nm separation between surface infrastructure and the Rockabill Islands to be maintained (see Figure 17.8). With the Structure Exclusion Zone being implemented and with the development of Bremore Port in regard to the Rockabill gap, the Drogheda Port Company are satisfied with the future case scenarios being carried out for the Bremore Port development.

The Dublin Port Masterplan 2040 was identified during consultation and is described in detail in the NRA. The masterplan provides best estimates for the growth of various cargo types in terms of gross tonnage but does not offer analysis of growth for numbers of vessels which is the parameter of relevance to navigational risk. The potential growth of 20% in commercial vessel movements throughout the lifetime of the proposed development is considered a conservative approach, noting that only a fraction of the total traffic associated with Dublin Port is considered relevant to the proposed development.

With this predicted future baseline accounted for it can be expected that third-party collision risk may marginally increase due to the increase in volumes of vessel traffic in the shipping and navigation study area. However, in the absence of the proposed development, the sea room availability would not be compromised and so significant changes in collision risk are not anticipated. Additionally, without the presence of proposed development vessels the impact associated with third-party to proposed development vessel collision risk would not exist.

Likewise, without the presence of surface infrastructure, subsea cables, and cable protection the impacts associated with allision risk, anchor interaction, and under keel clearance, respectively, would not exist.

Similarly, to third-party collision risk, the predicted future baseline may marginally increase effects on emergency response capabilities, but the absence of the proposed development would likely prevent the change from being significant.

17.5.2 Construction Phase

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

17.5.2.1 Impact 1 - Vessel displacement and increased vessel to vessel collision risk (array area)

Activities associated with the installation of structures and cables as well as the presence of surface structures within the array area may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels. Project Option 1 presents the greatest severity of consequence given the greater number of construction vessel movements.

The subject of vessel displacement and its potential consequences was raised by multiple stakeholders during consultation including at the Hazard Workshop and by IRCG, Irish Chamber of Shipping, Warrenpoint Harbour Authority, and Drogheda Port Company.

The elements of this impact which are considered include:

- vessel displacement from main commercial routes
- increased third-party to third-party vessel collision risk
- adverse weather routeing; and
- small craft displacement and collision risk.

Vessel displacement from main commercial routes

During the construction phase, a buoyed construction area will be deployed around the array area. No restrictions on entry will be enforced for the buoyed construction area. However, based on experience at previously under construction offshore wind farms, it is anticipated that commercial vessels will choose not to navigate internally within the buoyed construction area. These assumptions have been supported during consultation with stakeholders and Regular Operators including the Irish Chamber of Shipping, CLdN, and the Drogheda Port Company. Therefore, some displacement of main commercial routes is expected during the construction phase. Given the reduction in navigable sea room there will be some displacement of main commercial routes expected.

The volume of vessel traffic passing within or in proximity to the array area has been established using vessel traffic data collected during dedicated surveys (28 days over summer 2022 and winter 2023) and from coastal receivers (12 months in 2022) as well as Anatec's ShipRoutes database, noting that the vessel traffic data has been agreed as appropriate by the MSO. The combination of datasets used addresses the concerns raised during the Hazard Workshop by the Irish Chamber of Shipping and Warrenpoint Harbour Authority, with the long-term vessel traffic data ensuring that any periods of adverse weather and associated vessel movements are detected.

As part of the future baseline considerations, increases of 10% and 20% for all commercial traffic identified in the baseline is assumed.

These datasets were interrogated to identify main routes using the principles set out in MGN 654 (MCA, 2021). The full methodology for main route deviations is provided within the NRA. A deviation will be required for four of the ten main routes identified within the shipping and navigation study area (shown in Figure 16.2 of the NRA) for the construction phase of the proposed development. The level of deviation ranging from 0.4nm increase for Route 6 (Belfast to Wicklow) to an 11nm increase for Route 3 (Drogheda to Off Smalls TSS), noting that vessel traffic levels on the deviated option for Route 3 (identified as Route 3A passing around the north and east of the array) are very low as only a small proportion of vessels on the route are anticipated to require this deviation. Route 3A sees the maximum percentage change in total route length at 8%, again noting this route has very low traffic levels and the route start/ end point is calculated for this assessment as the Off Smalls TSS. However, the destinations of vessels on this route will be located at a greater distance and therefore any displacement will be a smaller overall percentage change[3]. Stakeholders agreed that in practical terms the route deviations taken by vessels would have fewer waypoints applied earlier in the approach to the array area resulting in shorter overall routes than what is conservatively identified within the assessment.

The deviation associated with Route 3A has been considered for assessment due to consultation feedback during the Hazard Workshop from Drogheda Port Company, Warrenpoint Harbour Authority and Irish Chamber of Shipping regarding sensitive cargos, i.e., tankers and larger deadweight tonnage (DWT) cargo vessels for which passing between Rockabill and the array area may be considered unfavourable due to less manoeuvrability in restricted sea room. Consultation with the Drogheda Port Company following inclusion of the Structure Exclusion Zone indicated that there are safe and viable options for base case and future case shipping inclusive of routeing passing between the array area and Rockabill.

The most likely consequence of vessel displacement will be increased journey times and distances for affected third-party vessels, as indicated by the Drogheda Port Company during consultation. The impact will occur over a regional spatial extent given that the buoyed construction area will be deployed around the maximum extent of the array area. Vessels are expected to comply with international and flag state regulations (including the COLREGs and SOLAS) and will be able to passage plan in advance given the promulgation of information relating to the proposed development and relevant nautical charts. This high level of awareness will assist with ensuring that vessels make smooth deviations which minimise journey increases.

As part of the scenario deemed to have the greatest potential for a likely significant effect, there could be disruption to schedules, particularly for commercial ferry operators. However, given that no deviations are anticipated for these routes, and the international nature of routeing in the region alongside the ability to passage plan, disruptions to schedule are expected to be minimal. Moreover, the MSO have acknowledged during consultation that there is no expectation of major issues for commercial vessel navigation due to the proposed development.

Increased third-party to third-party vessel collision risk

Post wind farm modelling of collision risk (with the presence of the array) for Project Option 1 using the main commercial route deviations as input gives an estimated collision return period[4] of one in 2,814 years for base case traffic levels, rising to one in 1,910 years for the higher tier of future case traffic levels (20%). The higher level of collision risk is due to the high volume of vessel traffic in concentrated areas, particularly to the east and south-east of the array area. The base case collision result represents a 39% increase compared to the pre wind farm base case result indicating that the influence of the array area on the overall collision risk for commercial traffic is moderate. However, the collision risk return period of one in 2,814 years post wind farm (and one in 1,910 years for the future case) is still considered to be very low, especially in comparison to the available results of other NRAs for many UK offshore wind farms. This result reflects the low traffic levels within the study area.

[3] Vessels on some routes have a wide variety of potential destinations, and therefore determining an overall route length (to/from a specific port) beyond the Irish Sea is not feasible, and the start/ end destination used (usually a TSS) is the shared and fixed location for all vessels on these routes.

[4] Where return periods are reported, these relate to the expected number of years between occurrences.

A low collision risk return period rating is also considered appropriate for the proposed development in reflection of historical incident data from the UK (the closest jurisdiction with operating OWF's) which indicates that no collision incidents between third-party vessels have occurred directly as a result of an offshore wind farm.

Stakeholders including Drogheda Port Company, Warrenpoint Harbour Authority, CLdN, and the Irish Chamber of Shipping, raised concern over the sea room available at the Rockabill gap and how vessels on passage may be at an increased risk of collision due to the limited sea room for passing. Following assessment and in response to this, the Developer has committed to a Structure Exclusion Zone within the array area which increases sea room to 3nm between the array and Rockabill Island, and this forms part of the proposed development design.

Limited active fishing occurs in proximity to the Rockabill gap as most fishing occurs in the nephrop fishing grounds to the north-east (refer to the Commercial Fisheries Chapter for more details on fishing grounds). Recreational vessel activity is most prominent east of the Rockabill gap and consists of transits to and from Dublin Bay. Accounting for the lower temporal exposure and committed sea room available, it is again anticipated that potential users of the Rockabill gap will be able to safely navigate in the presence of fishing and recreational activity.

The most likely consequences in the event of an encounter between two or more third-party vessels is the implementation of avoidance action in line with the COLREGs, with the vessels involved able to resume their respective passages with no long-term consequences.

Should an encounter develop into a collision incident, it is most likely to involve minor contact resulting in minor damage to the vessels with no harm to people and no substantial reputational effects. As part of the scenario deemed to have the greatest likely significant effect one of the vessels could receive substantial damage or founder with Potential Loss of Life (PLL) and pollution, with this outcome more likely where one of the vessels is a small craft (e.g., fishing vessel, recreational vessel or crew transfer vessel (CTV)). However, the likelihood of such an event occurring is very low with the mitigation in place.

Adverse weather routeing

The need to consider adverse weather routeing has been highlighted by the Irish Chamber of Shipping and Warrenpoint Harbour Authority during consultation in the Hazard Workshop.

From the vessel traffic survey data and the 12 month long-term vessel traffic data it was identified that various commercial vessels, including commercial ferries, were exhibiting waiting behaviour. These were north-south transits and turning within the array area while waiting for berth availability at Dublin Port, as confirmed by CLdN during consultation. CLdN also noted that this activity occurs periodically, usually in winter, and a reduction in sea room from the presence of the array may make it harder for vessels to turn in bad weather. From the most recent vessel traffic survey data and the long-term vessel traffic data this activity does not routinely occur in proximity to the array area, noting that the standard routeing it is associated with is located south of the shipping and navigation study area. The refinement of the array area within the original Maritime Area Consent (MAC) boundary (refer to Chapter 5: Alternatives) has assisted with minimising the interaction by increasing the sea room available to the south, such that it is anticipated that this routeing may safely continue. No other adverse weather routeing has been identified for the main commercial routes within the study area.

The most likely consequences of displacement of adverse weather routeing are similar to that of displacement of standard weather routeing, i.e., increased journey times and distances for affected third-party vessels with the impact occurring over a regional spatial extent given that the buoyed construction area and infrastructure will be deployed around the maximum extent of the array area.

As part of the scenario deemed to have the greatest likely significant effect, the passage undertaken by a deviated vessels may be considered unsafe for navigation in adverse weather conditions resulting in the vessel being unable to make the transit. It is considered highly unlikely that the vessel would undertake an unsafe transit and therefore effects to the vessel or crew are negligible due to the very low frequency of occurrence.

Promulgation of information and passage planning

All vessels operating in the area are expected to comply with international flag state regulations (including COLREGs and SOLAS) and will have a raised level of awareness of construction activities given the promulgation of information relating to the proposed development including the charting of the construction area and structure locations on relevant nautical charts prior to the commencement of construction works, as well as the publication of Notices to Mariners, which may be issued as Marine Notices if deemed appropriate by the MSO. The buoyed construction area will also serve to maximise awareness, allowing vessels to passage plan effectively.

SOLAS Chapter V states that "*the voyage plan shall identify a route which… anticipates all known navigational hazards and adverse weather conditions*" (IMO, 1974). The promulgation of information relating to the proposed development will assist such passage planning.

Small craft displacement and collision

From the vessel traffic survey data (which incorporates Radar and visual observations in addition to AIS) regular transits by commercial fishing vessels and recreational vessels through the array area are common but are highly seasonal, with higher levels recorded for both vessel types during the summer months. Active fishing occurs within the array area and recreational vessels are noted on transit north-east south-west to/ from Dublin.

Limited feedback in relation to shipping and navigation has been provided by commercial fisheries and recreational operators via the Hazard Workshop. Based on Anatec's experience at previously under-construction offshore wind farms, it is anticipated that fishing vessels and recreational vessels will also choose not to routinely navigate internally within the buoyed construction area. Therefore, some displacement of transits by small craft will be required during the construction phase. Displacement of active commercial fishing is assessed separately in Volume 5, Chapter 16: Commercial Fisheries.

For regular transits through the array area, there is sufficient sea room available for deviations to the east and west, and due to the refinement of the array area from the original MAC boundary area, this gives more sea room to the south.

It has been raised by the Irish Chamber of Shipping and CLdN during consultation that vessels on passage through the Rockabill gap are of greater concern when small craft vessels are involved. From the datasets, fishing vessels and recreational vessels do transit over the area on occasion but it is highly seasonal and limited. Recreational vessels are most prominent seasonally east of the Rockabill gap transiting to/ from Dublin Bay. These transits may be displaced further east by the array area – particularly when the construction/ decommissioning area is present – thus providing additional sea room for maintaining safe passing distances between vessels. Where this is not the case, the temporal exposure will be minimal given that the users of the Rockabill gap and recreational vessels will be passing perpendicular and thus the likelihood of an encounter is very low.

Overall, the relevant embedded mitigation measures are advisory safe passing distances, buoyed construction area, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for vessel displacement and increased vessel to vessel collision risk for the array area during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.2.2 Impact 2 - Vessel displacement and increased vessel to vessel collision risk (ECC)

Activities associated with the installation of export cables within the ECC may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

Two export cables each with a length of 9.7nm will be installed within the ECC.

It is anticipated that only one main vessel will be involved in the cable laying activities, only one main vessel involved in the cable burial and only one main support vessel – an overall maximum of three vessels on-site at any one time.

The spatial extent of the impact will be limited to where installation activities are ongoing, with routeing vessels required to make deviations to pass around installation works. These deviations will only be small and will be short-term. Disruption to vessel traffic is anticipated to be minimal given the length of the ECC and the small volume of traffic that routinely transit over the area of the ECC. Only two main commercial routes are expected to cross the ECC (Route 3 and Route 4), and both of these routes feature low vessel volumes. For the areas in which these routes pass the ECC, there is sufficient sea room available for the temporary minor deviations that may need to occur. This is also relevant to small craft that transit north-south across the ECC which are low volume and highly seasonal with ample sea room available for minor deviations as required.

Mariners navigating in proximity to the ECC will have a raised level of awareness of the area given the proximity to the coast and this will be heightened by the promulgation of information relating to the proposed development including the publication of Notices to Mariners as export cable installation progresses.

The consequences of vessel displacement due to installation activities for the ECC that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect, are generally analogous to those outlined for the array area, although the likelihood of disruption to vessel schedules is likely to be considerably lower given the low frequency of vessel traffic in the area and the extent of the ECC. However, as part of the scenario deemed to have the greatest likely significant effect, there is also potential for increased encounters and congestion at areas of the ECC where there is less available sea room (i.e., near landfall and in the path of traffic on passage to/ from the Rockabill gap) and subsequently a risk of collision with PLL, pollution and vessel damage.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for vessel displacement and increased vessel to vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.2.3 Impact 3 – Third-party to proposed development vessel collision risk (array area)

Proposed development vessels associated with construction activities may increase encounters and collision risk for other third-party vessels already in the area. Project Option 1 presents the greatest severity of consequence given the greater number of construction vessel movements.

The construction phase may last for approximately three years and a maximum of 49 construction vessels may be located on site simultaneously, in turn making a maximum of 3,008 return trips to port. Some proposed development vessels may be Restricted in Ability to Manoeuvre (RAM) and it is anticipated that proposed development vessels will generally undertake construction works associated with the array area within the buoyed construction area, within which third-party vessels are generally expected to avoid.

From historical incident data, there has been one instance of a third-party vessel colliding with a proposed development vessel associated with a UK offshore wind farm. In this incident, occurring in 2011, moderate vessel damage was reported with no harm to persons. Since then, awareness of offshore wind farm developments and the application of the measures outlined has improved or been refined considerably, with no further collision incidents reported since.

Proposed development vessel movements will be managed by the Developer's marine coordination and any associated procedures implemented, which may include designated entry and exit points to and from the array area, will account for those areas where collision risk is assessed as greatest (where regular commercial routeing passes close to the array area). Additionally, proposed development vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs, and information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via an appointed Fisheries Liaison Officer (FLO). A guard vessel may also be deployed based on a risk assessment.

Although there are no current offshore wind farms at any stage of construction in Ireland, shipping is international and the majority of vessels present within the datasets are on routes to/from areas where under construction offshore wind farms are present, including the east Irish Sea. Therefore, mariners will likely be experienced in working around offshore wind farm activities. This will be less common for local fishing and recreational users. The majority of commercial fishing vessels present within the datasets were of Irish Flag registration and so may only be used to navigating within Irish coastal waters. To help aid local and international mariner knowledge, details of authorised minimum advisory safe passing distances, as defined by a risk assessment, may be applied, with advanced warning and accurate locations of any minimum advisory passing distances provided by Notices to Mariners and Kingfisher Bulletins. This information promulgated alongside the details of any ongoing activity will maximise awareness for all third-party users, including in both day and night conditions. There has been no concern for proposed development vessel collision with any vessel type during the consultation process.

In poor visibility, third-party vessels may experience limitations regarding visual identification of proposed development vessels entering and exiting the buoyed construction area; however, this impact will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and AIS carriage by proposed development vessels.

Should an encounter occur between a third-party vessel and a proposed development vessel, it is likely to be very localised and occur for only a short duration and so the most likely consequence would be collision avoidance action implemented in line with the COLREGs. The vessels involved will likely be able to resume their respective passages and/ or activities with no long-term consequences.

Should an encounter develop into a collision incident, the most likely consequences will be similar to that outlined for the case of a collision between two third-party vessels. As part of the scenario deemed to have the greatest likely significant effect, one of the vessels could founder resulting in PLL and pollution, with this outcome more likely where one of the vessels is a small craft (e.g., fishing vessel, recreational vessel or CTV) with comparatively weaker structural integrity given hull materials. However, the likelihood of such an event occurring is very low given the mitigation in place.

Relevant embedded mitigation measures are advisory safe passing distances, buoyed construction area, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for third-party to proposed development vessel collision risk for the array area during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.2.4 Impact 4 - Third-party to proposed development vessel collision risk (ECC)

Proposed development vessels associated with construction activities may increase encounters and collision risk for other third-party vessels already in the area. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

Two export cables each with a length of 9.7nm will be installed within the ECC.

It is anticipated that only one main vessel will be involved in the cable laying activities, only one main vessel involved in the cable burial and only one main support vessel – an overall maximum of three vessels on-site at any one time. The spatial extent of the impact will be limited to where installation activities are ongoing, and the temporal extent will be limited to the duration of these activities.

Although this impact is more likely to occur than a third-party to third-party collision (given that there need only be one passing third-party vessel present), the overall effect is still low.

The level of exposure to this impact for third-party vessels will depend upon the location of export cable installation at any given time. The portions of the ECC that are considered to have higher exposure are those areas in which these routes passing on either side of Rockabill Island (Route 3 and Route 4) intersect. Both of these routes feature low vessel volumes and the ECC is far enough away from Rockabill Island for vessels on each route to have sufficient sea room to amend their passage as required, noting that such deviations will be relatively small. This is also relevant to small craft that transits north-south across the ECC; this is again low volume and highly seasonal with sea room available. The majority of these vessels are passing perpendicular across the ECC, and this will also reduce exposure time in periods of proposed development vessel activity.

Mariners navigating in proximity to the ECC will have a raised level of awareness of the area and this will be further heightened by the promulgation of information relating to the proposed development including the publication of Notices to Mariners as export cable installation progresses as required.

Details of ongoing installation activities will be promulgated, thus maximising awareness for third-party users, including in both day and night conditions. A guard vessel may also be deployed based on a risk assessment.

The consequences of an encounter between a third-party and proposed development vessel associated with the ECC that are most likely as well as those associated with the scenario deemed to have the greatest likely significant effect, are generally analogous to those outlined for the array area.

Relevant embedded mitigation measures are advisory safe passing distances, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for third-party to proposed development vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.2.5 Impact 5 - Reduced access to local ports (array area)

Construction activities within the array area may result in reduced access to local ports and harbours for vessels. Project Option 1 presents the greatest severity of consequence given the greater number of construction vessel movements.

There are numerous ports and harbours located on the east Irish coast in proximity to the array area.

These includes Drogheda Port which is located directly west of the array area. The presence of the buoyed construction area may affect the preferred approach to both Drogheda and Warrenpoint Harbour for vessels on some of the main commercial routes.

Given the size of main commercial route deviations due to the presence of the buoyed construction area as outlined in the vessel displacement impact, and the volume of vessels on each of these routes, the effects on any port/ pilot arrivals times are expected to be limited and therefore schedules will not be affected.

Access to Drogheda Port, in particular for larger vessels, has been raised as a concern by multiple stakeholders during consultation including Drogheda Port Company, Warrenpoint Harbour Authority, the MSO, and the Irish Chamber of Shipping. Concerns were raised regarding vessels entering the port as the entrance to the River Boyne is time sensitive due to tidal windows. In the instance a vessel has to wait for ideal conditions, a vessel may wait/ drift in the surrounding area until it can proceed on entering the river. The Irish Chamber of Shipping noted specifically that it may become unclear on where vessels in this instance wait/ anchor as there is a bank upon entrance to the River Boyne.

Anchored vessels in the area were assessed across all datasets and it was found that all anchored vessels associated with Drogheda Port were located within the designated outer anchorage area, within 0.5nm of the outer anchorage area boundary or at anchor between the outer anchorage area and the coast (shown in Figure 10.15 of the NRA). No vessels were deemed to be exhibiting waiting behaviour in proximity to the array area while waiting for entrance to Drogheda Port.

The Drogheda Port Company highlighted that traffic on an east-west route to/from the port are at the greatest risk of missing tidal windows, but the effect was not a concern when accounting for the levels of increased time and distance. The inclusion of the Structure Exclusion Zone also mitigates the effect in the case of east-west routeing displaced south of the array area.

For the pilot boarding station on the southern boundary of the outer anchorage area, pilot vessel movements were only recorded in proximity to the boarding station and to the west. Likewise, marine aggregate dredging activity associated with Drogheda Port occurs only in proximity to the River Boyne and the outer anchorage area. Therefore, no interactions with the pilotage or dredging of the port would be affected by the presence of the buoyed construction area. The Drogheda Port Company have also noted in consultation that the presence of the buoyed construction area will have no impact on the Drogheda Port leading lights and there have been no concerns raised.

Given its location within Dublin Bay, access to Dublin Port is not directly affected by the presence of the buoyed construction area. The only interaction that could cause any effect to the access of the port may be the waiting behaviour displayed by commercial vessels in periods of bad weather or when waiting to berth. These behaviours were discussed with CLdN in the Hazard Workshop and although the presence of the buoyed construction area will reduce the sea room available for such routeing, this behaviour is minimal and from the analysis of long-term vessel traffic data (as requested by stakeholders), most waiting vessels utilise sea room to the south of the array area. This again is aided by the reduction in the extent of the array area with more sea room available to the south.

Skerries Harbour located to the south-west of the array area was identified to only be used by small craft (i.e., fishing and recreational). Vessels may have to alter their approach to the harbour due to the buoyed construction area as it is anticipated that small craft will not enter or choose to transit through the area but any deviations (as outlined for the vessel displacement impact) are minimal and the presence of the buoyed construction area during the construction phase will not materially affect the overall harbour access, noting there is sufficient distance between the harbour and array area to allow vessels to choose a safe approach.

The most likely consequences of reduced port access in relation to the array area will be limited effects on port schedules. As part of the scenario deemed to have the greatest likely significant effect, there could be disruption to port schedules and a vessel may have to enter port (specifically Dublin Bay) in unreasonable weather conditions.

Relevant embedded mitigation measures are advisory safe passing distances, buoyed construction area, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be minor.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduced access to local ports for the array area during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.2.6 Impact 6 - Reduced access to local ports (ECC)

Installation activities associated with the ECC may result in reduced access to local ports and harbours for vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

Ports and harbours in proximity to the ECC include Drogheda Port and Skerries Harbour, as the majority of vessels transiting over the ECC are on routes to/ from these destinations.

As there is no buoyed construction area associated with the ECC, disruption to port access will be limited to where installation activities are ongoing, and the temporal extent will be limited to the duration of these activities. Reduced access to these locations will be limited during the construction phase of the development as it is anticipated (as mentioned for the collision impacts) that an overall maximum of three vessels will be on-site at any one time for the ECC and deviations around works will be small and short-term. Therefore, limited effects on port arrival and berth times are anticipated.

Additionally, mariners navigating in proximity to the ECC will have a raised level of awareness of the area and this will be heightened by the promulgation of information relating to the proposed development including the publication of Notices to Mariners as export cable installation progresses as required, allowing for reviewed passage planning if needed.

This is also relevant to small craft that transit north-south across the ECC to/ from Skerries Harbour, this is again low volume and highly seasonal. It is anticipated – noting available sea room – that such vessels will be able to adjust course to avoid activities associated with the ECC without any effect on access to the harbour.

The consequences of reduced port access due to installation activities for the ECC that are most likely, as well as those associated with the scenario deemed to have the greatest likely significant effect, are generally analogous to those outlined for the array area.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be negligible. The severity of consequence is deemed to be negligible.

Therefore (as per the matrix in Table 17.6) with the frequency of occurrence and the severity of consequence, the significance of effect for reduced access to local ports for the ECC for both Project Option 1 and Project Option 2 during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.3 Operational Phase

17.5.3.1 Impact 7 – Vessel displacement and increased vessel to vessel collision risk (array area)

Activities associated with the operation of structures and cables as well as the presence of surface structures within the array area may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels. Project Option 1 presents the greatest severity of consequence given the greater number of surface infrastructure.

The same elements of the equivalent construction phase impact are relevant and considered for this impact.

Based on experience at existing operational offshore wind farms, it is anticipated that commercial vessels will choose not to navigate internally within the operational array. This assumption has been supported during consultation with stakeholders and Regular Operators including the Irish Chamber of Shipping, CLdN, and the Drogheda Port Company. Therefore, some displacement of main commercial routes is expected during the operational phase and will be broadly similar to that anticipated for the construction phase.

All consultation feedback regarding vessel displacement is also relevant to the operational phase as well as construction.

As no additional route deviations are anticipated from the construction phase, the post wind farm modelling of collision risk for Project Option 1, collision risk, and adverse weather routeing outlined during the construction phase (Section 1.5.2.1) are also relevant for vessel displacement and increased vessel to vessel collision risk for the operational phase. Likewise, expected compliance with international flag state regulations (including COLREGs and SOLAS) and marking on relevant nautical charts are noted and operational activity notifications will also be given where relevant. Although the buoyed construction area will no longer be present, the operational lighting and marking of the array as per the LMP provided in Appendix 17.3 will serve to maximise awareness, allowing vessels to passage plan effectively.

For the operational phase, based on experience at existing operational offshore wind farms, it is anticipated that commercial fishing vessels and recreational vessels may choose to navigate internally within the operational array area, particularly in favourable weather conditions and as awareness of the array area increases throughout the operational phase. In situations where small craft do navigate internally, the level of displacement is considered negligible.

In poor visibility, third-party vessels may experience limitations regarding visual identification of other third-party vessels due to the presence of surface infrastructure. During consultation the MSO noted the potential for the array to obscure the view of vessels approaching each other from differing sides of the array area, giving rise to additional collision risk.

As part of the scenario deemed to have the greatest likely significant effect, consideration is given to the WTG dimensions at the sea surface (12.5m diameter associated with monopile foundations) and OSP topside dimensions (45×45m) alongside the minimum vessel dimensions based on vessel traffic survey data (around 8×2m). Should the WTG surface dimensions be reduced, or the size of vessel involved in such a scenario be greater, it is expected that the potential for visual interference would be reduced. This will also be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions.

Situations where the passing vessels may be visually obscured from each other by a structure are limited given the considerable spacing between WTGs (910m subject to LoD) which maintains large open areas of sea room where there are no visual obtrusions.

Additionally, given the size of the structures, the duration for which any visual obtrusion may occur would be very low and most sizes of vessel would not be fully obscured at any point. The effect would be heightened when the obscuring structure is the OSP given its greater size but would remain negligible. Therefore, increased collision risk due to visual interference is expected to be minimal.

There is also potential for multiple structures together to create more prolonged visual interference (due to the optical illusion of the multiple structures being one continuous entity). However, given the minimum spacing between structures this would require a very specific positioning of the two vessels involved and would only be effective where the vessels are far apart, e.g., at opposite ends of a row of structures. Subsequently, collision risk associated with the vessels would be minimal given the need for close proximity for an encounter and collision event to develop.

The consequences associated with the various elements of this impact that are most likely, and those that are associated with the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

The relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, lighting and marking, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for vessel displacement and increased vessel to vessel collision risk for the array area for both Project Option 1 and Project Option 2 during the operational phase is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms.

17.5.3.2 Impact 8 - Vessel displacement and increased vessel to vessel collision risk (ECC)

Activities associated with the maintenance of export cables within the ECC may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

During the operational phase of the proposed development, the presence of the export cables will not directly result in vessel displacement (noting that impacts associated with port/ harbour access and under keel clearance are assessed separately) and so is only assessed in relation to operational activities where required.

During the operational phase, export cables will be inspected annually for the first three years, then every three years by survey vessels or unmanned surface vessels.

The spatial extent of the impact will be limited to where maintenance activities are ongoing, with routeing vessels required to make deviations to pass around maintenance works. These deviations will only be small and will be short-term, similar to the installation works during the construction phase. Noting that post wind farm routeing is expected to be broadly similar during the operational phase to the construction phase, disruption to vessel traffic is again anticipated to be minimal and feature temporary minor deviations which there is sufficient sea room to accommodate.

Mariners navigating in proximity to the ECC will have a raised level of awareness of the area given the proximity to the coast and this will be heightened by the promulgation of information relating to the proposed development including the publication of Notices to Mariners as maintenance activities are required.

The consequences of vessel displacement due to maintenance activities for the ECC that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect, are generally analogous to those outlined for the array area, although as with the equivalent construction phase impact the likelihood of disruption to vessel schedules is likely to be considerably lower given the low frequency of vessel traffic in the area and the extent of the ECC. However, as part of the scenario deemed to have the greatest likely significant effect, there is also potential for increased encounters and congestion at areas of the ECC where there is less available sea room (i.e., near landfall and in the path of traffic on passage to/ from the Rockabill gap) and subsequently a risk of collision with PLL, pollution and vessel damage.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for vessel displacement and increased vessel to vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.3.3 Impact 9 - Third-party to proposed development vessel collision risk (array area)

Proposed development vessels associated with operational activities may increase encounters and collision risk for other third-party vessels already in the area. Project Option 1 presents equal severity of consequence given the greater number of operational vessel return trips.

The operational phase will last for 35 years with maximum of 12 operational vessels located on-site simultaneously, in turn making 1,261 return trips to port. Some proposed development vessels may be RAM and it is anticipated that proposed development vessels will generally undertake operational works associated with the proposed development within the operational array area, which third-party vessels are generally expected to avoid. This is similar to the equivalent construction phase impact.

Historical incident data outlined for the equivalent construction phase impact is also relevant to the operational phase.

As per the construction phase, proposed development vessel movements during operation will be managed by the Developer's marine coordination and any associated procedures implemented will account for those areas where collision risk is assessed as greatest (where regular commercial routeing passes close to the array area). Additionally, proposed development vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs, and information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via the project FLO. A guard vessel may also be deployed based on a risk assessment.

By the time the proposed development becomes operational, mariners will be experienced in working around offshore wind farm activities, including those relevant to the construction of the proposed development, within the Irish Sea, and internationally.

Aids to help local and international mariner knowledge will be the same as those issued during the construction phase; this information promulgated alongside the details of any ongoing activity will maximise awareness for all third-party users, including in both day and night conditions.

Should an encounter occur between a third-party vessel and a proposed development vessel, it is likely to be very localised and occur for only a short duration and so the most likely consequence would be collision avoidance action implemented in line with the COLREGs. The vessels involved will likely be able to resume their respective passages and/ or activities with no long-term consequences.

Should an encounter develop into a collision incident, the most likely consequences will be similar to that outlined for the case of a collision between two third-party vessels. As part of the scenario deemed to have the greatest likely significant effect, one of the vessels could founder resulting in PLL and pollution, with this outcome more likely where one of the vessels is a small craft (e.g., fishing vessel, recreational vessel or CTV) with comparatively weaker structural integrity given hull materials.

Relevant embedded mitigation measures are advisory safe passing distances, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, lighting and marking, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be negligible. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for third-party to proposed development vessel collision risk for the array area during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.3.4 Impact 10 - Third-party to proposed development vessel collision risk (ECC)

Proposed development vessels associated with operational activities for the ECC may increase encounters and collision risk for other third-party vessels already in the area. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

Once installed the presence of the export cables will not directly result in third-party with proposed development vessel collision risk. Therefore, this impact is considered only in relation to export cable maintenance activities.

During the operational phase, export cables will be inspected annually for the first three years, then every three years by survey vessels or unmanned surface vessels. The spatial extent of the impact will be limited to where maintenance activities are ongoing, and the temporal extent will be limited to the duration of these activities. Although this impact is more likely to occur than a third-party to third-party collision (given that there need only be one passing third-party vessel present), the overall risk is still low.

Similarly, to the construction phase, the level of exposure to this impact for third-party vessels will depend upon the location of export cable maintenance at any given time. The portions of the ECC that are considered to have higher exposure are the same as those described during the construction phase. However, mariners navigating in proximity to the ECC will have a raised level of awareness of the area, and this will be further heightened by the promulgation of information relating to the proposed development including the publication of Notices to Mariners as export cable installation maintenance activities will be promulgated, thus maximising awareness for third-party users, including in both day and night conditions. A guard vessel may also be deployed based on a risk assessment, particularly should there be a cable exposure requiring reburial.

The consequences of an encounter between a third-party and proposed development vessel associated with the ECC that are most likely, and those that are associated with the scenario deemed to have the greatest likely significant effect, are generally analogous to those outlined for the array area.

Relevant embedded mitigation measures are advisory safe passing distances, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be negligible. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for third-party to proposed development vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during the construction phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.3.5 Impact 11 - Reduced access to local ports (array area)

The presence of surface structures within the array area may result in reduced access to local ports and harbours for vessels. Project Option 1 presents the greatest severity of consequence given the greater number of surface infrastructure.

The presence of the operational array area may affect the preferred approach to both Drogheda and Warrenpoint Harbour for vessels on some of the main commercial routes. However, no additional routes to those outlined during the construction phase are anticipated to be deviated by the operational array area, given that routes will already be displaced during construction. As no further routes are expected to be displaced, there will be limited effects on any port/ pilot arrivals times and therefore schedules will not be additionally affected during the operational phase. Any impacts that do occur on the access to local ports will be similar to those outlined during the construction phase, noting that effects on small craft may be less significant since navigation through the operational array area may be considered.

The most likely consequences of reduced port access in relation to the array area will be limited effects on port schedules. As part of the scenario deemed to have the greatest likely significant effect, there could be disruption to port schedules and a vessel may have to enter port in unreasonable weather conditions.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be minor.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduced access to local ports for the array area during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.3.6 Impact 12 – Reduced access to local ports (ECC)

Maintenance activities associated with the ECC may result in reduced access to local ports and harbours for vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

As there are no surface piercing structures associated with the ECC, disruption to port access will be limited to where maintenance activities are ongoing, and the temporal extent will be limited to the duration of these activities. Deviations around works will be small and short-term. Therefore, limited effects on port arrival and berth times are anticipated.

Additionally, as per the equivalent construction phase impact, mariners navigating in proximity to the ECC will have a raised level of awareness of the area and this will be heightened by the promulgation of information relating to the proposed development including the publication of Notices to Mariners as export cable maintenance activities are required, allowing for reviewed passage planning if needed.

The consequences of reduced port access due to maintenance activities for the ECC that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect, are generally analogous to those outlines for the array area.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be negligible. The severity of consequence is deemed to be negligible.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduced access to local ports for the ECC for both Project Option 1 and Project Option 2 during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.3.7 Impact 13 - Creation of vessel to structure allision risk (array area)

The presence of surface structures within the array area may result in the creation of a risk of allision for vessels. Project Option 1 presents the greatest severity of consequence given the greater number of surface infrastructure.

This impact is considered only in relation to the array area since there are no surface structures associated with the ECC (underwater allision risk due to under keel clearance is considered separately).

The main commercial route deviations and future case considerations described for the vessel displacement impact have also been assumed for this impact, noting that internal navigation by commercial vessels is not anticipated. However, commercial fishing vessels and recreational vessels may choose to navigate internally within the array area, particularly in favourable weather conditions.

Although there is limited experience of operational offshore wind farms in Ireland, shipping is international in nature and the majority of vessels present within the datasets are on routes to/from areas where offshore wind farms are present, including the east Irish Sea. Therefore, mariners will likely be experienced in working around offshore wind farm installations. This will be less common for local fishing and recreational users. The majority of the fishing vessels present within the datasets were of Irish Flag registration and so may only be used to navigating within Irish coastal waters. To help aid local and international mariner knowledge, details of authorised minimum advisory safe passing distances, as defined by a risk assessment, may be applied, with advanced warning and accurate locations of any minimum advisory passing distances provided by Notices to Mariners and Kingfisher Bulletins. These will be particularly effective in the event of smaller craft such as commercial fishing vessels and recreational vessels choosing to navigate internally within the operational array. This information promulgated alongside the details of any ongoing activity will maximise awareness for all third-party users, including in both day and night conditions. There has been limited concern for structure allision with any vessel type throughout consultation.

However, it is acknowledged that the presence of new surface structures does introduce new allision risk which can be considered across three forms, all of which are localised in nature given that a vessel must be in close proximity to a structure for an allision incident to occur:

- powered allision risk
- drifting allision risk; and
- internal allision risk.

Powered allision risk

Post wind farm modelling of powered allision risk using the main commercial route deviations as input with Project Option 1 gives an estimated powered allision return period of one in 1,049 years for base case traffic levels, rising to one in 862 for future case traffic levels (20%). The extent of the array area avoids busier routes to/from Dublin to the south; surrounding routes carry relatively low traffic volumes. The greatest allision risk has been associated with structures on the east, particularly the south-eastern extent of the array, where a higher volume of traffic from multiple main commercial routes including those associated with vessel deviations pass in the closest proximity to the array (minimum mean distance of 1nm from the array) when compared to other routes.

From historical incident data, there have been three instances of a third-party vessels alliding with an operational wind farm structure in the UK, with one of these instances occurring in the Irish Sea. These incidents all involved a fishing vessel, with a RNLI lifeboat attending on each occasion and a helicopter deployed in one case. Given the volume of vessel traffic in the area and subsequent heightened mariner alertness, it is unlikely that such an incident will occur at the offshore development area.

Additionally, vessels are expected to comply with international flag state regulations (including COLREGs and SOLAS) and will be able to effectively passage plan a route which minimises effects given the promulgation of information relating to the proposed development including the charting of infrastructure on relevant nautical charts. On approach, the operational lighting and marking of the array (as outlined in the LMP in Appendix 17.3) will also assist in maximising marine awareness.

During consultation, Irish Lights indicated that an additional cardinal mark may be necessary to the east of the array area to mitigate effects and keep vessel traffic passing at a safe distance on the eastern boundary; this is conservatively not included in the LMP provided in Appendix 17.3 but will be further discussed with Irish Lights when finalising the lighting and marking plans, noting that precise buoyage locations will be directed by Irish Lights. It is not anticipated that the presence of a cardinal mark would substantially affect the likelihood of an allision incident given that, based on the main commercial route deviations, vessels passing at the east of the array would primarily be doing so in a north-south direction and thus unlikely to navigate within the sea space formed by the concave shape of the eastern boundary.

Should a powered allision incident occur, the consequences will depend on multiple factors including the energy of the contact, structural integrity of the vessel involved, type of structure contacted, and the sea state at the time of the contact. Small craft including commercial fishing vessels and recreational vessels are considered most vulnerable to the impact given the potential for a non-steel construction and possible internal navigation within the array area. In such cases the most likely consequences will be minor damage with the vessel able to resume passage and undertake a full inspection at the next port. As part of the scenario deemed to have the greatest likely significant effect, the vessel could allide with the OSP, resulting in the vessel foundering with PLL and pollution.

Drifting allision risk

A vessel adrift may only develop into an allision situation where the vessel is in proximity to a structure and the direction of the wind and/ or tide is such as to direct the vessel towards the structure.

With the main commercial route deviations associated with the presence of the array area in place for Project Option 1, an estimated powered allision return period of one in 16,835 years for base case traffic levels, rising to one in 13,877 for future case traffic levels (20%). This is a very low return period and is reflective of the low volume of vessel traffic in the area. The greatest allision risk has been, again, associated with structures on the east, particularly the south-eastern extent of the array. The return period is lower than that for powered allision risk, reflecting the need for a vessel to become adrift in the first instance before an allision situation can develop.

From historical incident data, there have been no instances of a third-party vessel alliding with an operational wind farm structure whilst Not Under Command (NUC). However, there is some potential for a vessel to be adrift; this is reflected in the number of machinery failure incidents reported by the RNLI in proximity to the offshore development area which indicates that machinery failure is the most common incident type (approximately 36%). Although it is noted that an incident reported as a 'machinery failure' may not be so severe as to result in the vessel losing power and becoming NUC. No incidents, and so no machinery failure incidents, occurred within the array area. Two machinery failure incidents occurred within the ECC but the majority of incidents recorded within the study area occurred within 2nm of the coast (82% of all incidents) and were not in proximity to the array area.

In circumstances where a vessel drifts towards a structure, there are actions which may be taken to prevent the incident developing into an allision situation. For a powered vessel, the ideal and likely solution would be regaining power prior to reaching the array (by rectifying any fault). Failing this, the vessel's emergency response procedures would be implemented – this may include an emergency anchoring event following a check of the relevant nautical charts to ensure the deployment of the anchor will not lead to other effects (such as the anchor snagging on a subsea cable).

Where the deployment of the anchor is not possible (such as for small craft) then proposed development vessels, if on-site, may be able to render assistance including under SOLAS obligations (IMO, 1974) and this response will be managed via marine coordination and depends on the type and capability of vessels on site. This would be particularly relevant for sailing vessels whose propulsion is dictated solely by the metocean conditions, although if the vessel becomes adrift in proximity to a structure there may be limited time to render assistance. It has been raised during consultation by Drogheda Port Company that there is no standard emergency tow vessel on the east Irish coast that would be able to assist during an incident.

Should a drifting allision incident occur, the consequences will be similar to those outlined for a powered allision incident, including the determining factors. However, the speed at which the contact occurs will likely be lower than for a powered allision, resulting in the contact energy being lower.

It is acknowledged that as per the assessment of powered allision risk, an allision with an OSP is likely to create higher consequence given the size of the structure although this is unlikely given the lack of main commercial routes passing in proximity to the OSP.

Internal allision risk

As described for the vessel displacement impact, commercial vessels are not anticipated to navigate internally within the array when operational, and therefore the likelihood of an internal allision risk for such vessels is negligible. It is anticipated that commercial fishing and recreational vessels may choose to navigate internally within the operational array, particularly in summer months.

Post wind farm modelling of fishing allision risk using the vessel traffic survey data as input gives an estimated commercial fishing allision return period of one in 3.00 years for base case traffic levels with Project Option 1, rising to one in 2.50 years for future case traffic levels (20%). This is a high return period and is reflective of the high volume of commercial fishing vessel activity within the region and within the array area during the summer months, noting that this is largely characteristic of fishing vessels engaged in fishing rather than in transit. Also, these return periods are very conservative since the model cannot account in detail for how fishing vessels will adapt to the presence of the array.

The minimum spacing between WTGs (910m subject to LoD) is sufficient for safe internal navigation by smaller vessels and is greater than that associated with many UK offshore wind farms, some of which are navigated by commercial fishing vessels in favourable conditions. The layout is compliant with the requirements of MGN 654 (MCA, 2021). The proposed development (including the layout options) has been subject to a comprehensive NRA as required by the methodology agreed with shipping regulators, notably the MSO, prior to the NRA process commencing. No specific national guidance on NRA currently exists, but the assessment undertaken has taken account of international best practice and precedent in respect of offshore wind developments in the UK. The Developer is aware that draft specific national guidance is currently under review and that engagement with the IRCG, if required, upon publication of the final guidance documents (which is not expected to be published until later this year) may result in the requirement for a safety justification to be undertaken for the layout. This would be specifically for the IRCG's own access assessment and to ensure requirements within the guidance are complied with.

As with any passage, a vessel navigating internally within the array is expected to passage plan in accordance with SOLAS Chapter V (IMO, 1974). The lighting and marking of the array and MGN 654 compliant unique identification marking of structures in an easily identifiable pattern will assist with minimising the likelihood of a mariner becoming disoriented whilst navigation internally within the array.

For recreational vessels under sail navigating internally within the array area there is also potential for effects such as a wind shear, masking, and turbulence to occur. From previous studies of offshore wind developments, it has been concluded that WTGs do reduce wind velocity downwind of a WTG (MCA, 2022) but that no negative effects on recreational craft have been reported on the basis of the limited spatial extent of the effect and its similarity to that experienced when passing a large vessel or close to other large structures (such as bridges) or the coastline. In addition, no practical issues have been raised by recreational users to date when operating in proximity to existing offshore wind developments.

An additional allision risk associated with the WTG blades applies for recreational vessels with a mast when navigating internally within the array area. However, the minimum air gap will be 35m above LAT which is greater than the minimum clearance the RYA recommend for minimising allision risk (RYA, 2019) and which is also noted in MGN 654.

Should an internal allision occur, the consequences will be similar to those outlined for a powered allision incident, including the determining factors. However, as with a drifting allision incident, the speed at which the contact occurs will likely be lower than for an external allision, resulting in the contact energy being lower.

Overall, relevant embedded mitigation measures are compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, lighting and marking, marking on nautical charts, minimum blade clearance, promulgation of information and WTG layout/design.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for the creation of vessel to structure allision risk for the array area during the operational phase is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.3.8 Impact 14 – Reduction in under keel clearance (array area)

The presence of cable protection associated with the inter-array cables may result in reductions to water depth and the creation of an under-keel clearance risk for vessels. Project Option 1 presents the greatest severity of consequence given the greater length of inter-array cables.

For the inter-array cables the trench depth is 1m - 3m. Seabed burial will be the primary means of cable burial and the trench depth plus any external cable protection will be determined by the Cable Burial Risk Assessment, which will be conducted post-consent following detailed site investigation surveys and detailed design.

It is anticipated that 20% of inter-array cables may require alternative cable protection. It is noted that there are five potential cable crossings anticipated for the inter-array cables.

Relevant regulator guidance (closely aligned with MGN 654) will be considered, including discussion with MSO and Irish Lights, where the reduction in under keel clearance due to cable protection will be greater than 5% referenced to Chart Datum (CD).

Charted water depths within the array area are between 30m and 60m and with the anticipated water depth reduction along with deep draught vessels not anticipated to transit within the array area, as indicated during consultation, this limits the risk of an underwater allision occurring.

Should a vessel navigate over an area with reduced water depth, the most likely consequence is that no contact occurs and the vessel's passage is able to continue unaffected. As part of the scenario deemed to have the greatest likely significant effect, the vessel could experience an underwater allision, grounding on the cable protection with pollution and vessel damage as potential outcomes.

Relevant embedded mitigation measures include cable protection, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be negligible. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduction of under-keel clearance for the array area during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.3.9 Impact 15 - Reduction in under keel clearance (ECC)

The presence of cable protection associated with the export cables may result in reductions to water depth and the creation of an under-keel clearance risk for vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

Two export cables each with a length of 9.7nm will be installed within the ECC. The cable protection methodology for inter-array cables is again applicable, and there are no cable crossings anticipated for the export cables.

Again, the Cable Burial Risk Assessment will determine the trench depth and any external cable protection. Relevant regulator guidance (closely aligned with MGN 654) will be considered, including discussion with MSO and Irish Lights, where the reduction in under keel clearance due to cable protection will be greater than 5% referenced to CD.

There is a higher risk of an under-keel clearance effect with the export cables when compared to the inter-array cables. This is due to both the cables being more exposed to shallower water depths and increased crossing traffic volumes.

Charted water depths within the ECC range between zero (at landfall nearshore) and 39m below CD. The charted 10m contour in the ECC is approximately 2nm from the coast with the charted 20m contour approximately 5nm from the coast. Vessels at transit within the lower depths are more at risk of an underwater allision. From the vessel traffic data, vessels on transit in these lower depths were primarily commercial fishing vessels on route to/ from Skerries with shallower draughts and thus minimal exposure to under keel clearance effects. Larger draught vessels were noted further offshore with draughts not exceeding 6.3m within the ECC. No vessel with a draught greater than 6m was on transit in waters at a charted depth of less that 20m crossing the ECC, with the frequency of these vessels low.

Overall, vessel traffic on transit through the ECC was low and the majority of vessels cross the ECC perpendicularly thus minimising the overall exposure to any underwater allision risk, noting this will be managed through the Cable Burial Risk Assessment process post consent. This includes routeing traffic which is constrained by the Rockabill gap.

Should a vessel navigate over an area with reduced water depth, the consequences that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect (underwater allision and grounding), are analogous to those outlined for the array area.

Relevant embedded mitigation measures are cable protection, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduction of under-keel clearance for the ECC for both Project Option 1 and Project Option 2 during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.3.10 Impact 16 - Anchor interaction with inter-array cables (array area)

The presence of inter-array cables may result in the creation of a risk of a vessel anchor making contact with an inter-array cable. Project Option 1 presents the greatest severity of consequence given the greater length of inter-array cables.

A total of 60nm of inter-array cables will be located within the array area for Project Option 1 (49nm for Project Option 2). Where available, the primary means of cable protection will be by seabed burial, with a trench depth of 1 to 3m. It is anticipated that 20% of inter-array cables may require alternative cable protection but this will be determined within the Cable Burial Risk Assessment post consent. It is noted that there are five potential cable crossings anticipated for the inter-array cables.

There are three anchoring scenarios which are considered for this impact:

- Planned anchoring – most likely as a vessel awaits a berth to enter port but may also result from adverse weather conditions, machinery failure or subsea operations
- Unplanned anchoring – generally resulting from an emergency situation where the vessel has experienced steering failure; and
- Anchor dragging – caused by anchor failure.

Although the second of these scenarios may involve limited decision-making time if drifting towards a hazard, in all three scenarios it is anticipated that the charting of infrastructure including the inter-array cables will inform the decision to anchor, as per Regulation 34 of SOLAS (IMO, 1974).

Since the inter-array cables will be fully contained within the array area it is considered unlikely that a vessel will choose to anchor in close proximity to an inter-array cable. Moreover, from the site specific surveys, anchoring activity within and in proximity to the array area is limited, with vessels instead choosing to use the designated anchorage area at Drogheda Port.

During the Hazard Workshop, the Irish Chamber of Shipping indicated that additional anchorage areas may be required if any cables associated with the proposed development interfere with common anchoring locations. From the baseline assessment, including the additional long-term vessel traffic data, no cable is intended to be placed in an area of common anchoring activity, but this will be assessed further in the Cable Burial Risk Assessment post consent.

The likelihood of anchor interaction with an inter-array cable is further minimised by the burial of the cables and use of external cable protection where required, which will be informed by the Cable Burial Risk Assessment post consent.

The most likely consequences in the event of a vessel anchoring over an inter-array cable is that no interaction occurs given the protection applied to the cable (by burial or other means). Should an interaction occur, historical incident data suggests that the consequences would be negligible, with no damage caused to the vessel or cable. As part of the scenario deemed to have the greatest likely significant effect, a snagging incident could occur to a commercial fishing vessel with damage cause to the anchor and/ or cable, comprising the stability of the vessel.

Relevant embedded mitigation measures are cable protection, compliance with relevant regulator guidance, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be minor.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for anchor interaction with inter-array cables during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1

17.5.3.11 Impact 17 - Anchor interaction with export cables (ECC)

Two export cables each with a length of 9.7nm will be installed within the ECC. The cable protection methodology for inter-array cables is again applicable, and there are no cable crossings anticipated for the export cables. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

The three anchoring scenarios outlined for the inter-array cables are again applicable.

The ECC avoids and does not overlap with any designated anchorage area. The Drogheda outer anchorage area is located directly north of the ECC at approximately 5nm at its closest point. From the site-specific surveys, anchoring activity in proximity to the ECC is limited with no vessels at anchor within the ECC during the vessel traffic surveys and only one vessel, a tanker, at anchor within the ECC during the 12 month long-term dataset.

Several vessels also anchored off Skerries with single instances of anchoring occurring at undesignated locations within the shipping and navigation study area. Given the undesignated nature of these anchoring events and the available sea room, it is anticipated that such anchoring will be able to move if required following installation of the export cables.

It is anticipated that mariners will check relevant nautical charts to ensure the deployment of the anchor will not lead to any interaction with cables and it is therefore considered unlikely that planned anchoring will occur within the ECC.

With suitable metocean conditions, an anchor dragging event could cause an interaction incident. As for unplanned anchoring, specific locations cannot be pinpointed within the ECC given the nature of this activity. However, the likelihood of anchor interaction with an export cable is further minimised by the burial of the cables and use of external cable protection where required, which will be informed by the Cable Burial Risk Assessment post consent.

If an interaction does occur with an anchor and the export cables, the consequences associated with the scenario deemed to have the greatest likely significant effect are analogous to those outlined for the array area.

Relevant mitigation measures are cable protection, compliance with relevant regulator guidance, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be minor.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for anchor interaction with cables for the ECC for both Project Option 1 and Project Option 2 during the operational phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.3.12 Impact 18 - Reduction of emergency response capability

The presence of surface structures within the array area and operational activities associated with the array area and ECC may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface and/ or air responders, including SAR assets. Project Option 1 presents the greatest severity of consequence given the greater number of surface infrastructure.

The array area and ECC are considered collectively for this impact since the assessment undertaken is considered relevant to the offshore development area as a whole.

Emergency response resources

The operational phase may last for 35 years with a maximum of 12 operational vessels located on-site simultaneously and making 1,261 annual round trips for Project Option 1 (1,055 annual return trips for Project Option 2). With the array area, these vessels will increase the likelihood of an incident requiring an emergency response and subsequently increase the likelihood of multiple incidents occurring simultaneously, diminishing emergency response capability.

Given the distances that may be covered by air-based search and rescue (SAR) support (the SAR helicopter base at Dublin is located approximately 16nm from the array area), but also the national nature of this resource, the spatial extent of this impact is considered reasonably large. Additionally, the array area covers approximately 26 square nautical miles (nm^2) which represents a large area to search. However, it is unlikely that a SAR operation will require the entire array area to be searched; it is much more likely that a search could be restricted to a smaller area within which a casualty is known to be located (inclusive of any assumptions on the drift of the casualty). Though unlikely, as part of the scenario deemed to have the greatest likely significant effect, the consequences of such a situation could include a failure of emergency response to an incident, resulting in a PLL and pollution.

There are other emergency response resources in the regions with multiple RNLI stations in proximity to the offshore development area, and with the distance from the coast, response times will be much shorter when compared to existing offshore wind farms in other jurisdictions, which are located further offshore. It has been noted in the baseline assessment that each of the RNLI stations in proximity to the offshore development area all responded to a proportion of incidents recorded within the study area, which reduces the risk of resource capability being compromised in the event of an emergency response being required.

From historical incident data, there is a moderate rate of incidents in the region, although over a ten year period (2012 to 2021) 82% of incidents recorded by the RNLI occurred within 2nm of the coast with no incidents occurring within the array area. Six incidents occurred within the ECC with the closest of these incidents approximately 4nm from the array area and all relatively close to the coast. Incidents were recorded further offshore, but these were less common, and the majority were instances of machinery failure and the likelihood of an incident related to the proposed development occurring at the same time is low.

Additionally, based on the number of collision and allision incidents[5] associated with UK offshore wind farms reported to date, there is an average of one incident per 1,751 operational WTG years (as of February 2024). Therefore, the proposed development itself is not expected to result in a marked increase in the frequency of incidents requiring an emergency response.

With proposed development vessels to be managed through marine coordination and compliance with Flag State regulations, the likelihood of an incident is minimised. Additionally, should an incident occur, proposed development vessels will be well equipped to assist, either through self-help capability or – for an incident involving a nearby third-party vessel – through SOLAS obligations (IMO, 1974), all in liaison with the IRCG. This is reflected in past UK experience, with 12 known instances of a vessel (or persons on a vessel) being assisted by an industry vessel for a nearby UK offshore wind farm.

The most likely consequences in the event of an incident in the region requiring an emergency response is that emergency responders are able to assist without any limitations on capability. As part of the scenario deemed to have the greatest likely significant effect, there could be a delay to a response request due to a simultaneous incident associated with the proposed development leading to PLL, pollution, and vessel damage. However, this scenario is highly unlikely.

Search and rescue

With the array area, its physical presence may restrict access for SAR responders, either due to the incident in question occurring within the array or the array obstructing the most effective path to the incident (likely further offshore). This is more likely to be an issue in adverse weather conditions. The Developer is committed to working within the parameters of MGN 654, including ID marking as well as lighting and marking in liaison with the IRCG, to minimise impacts.

The total area covered by the array area is 26nm^2 which is moderate in comparison to UK offshore wind farms. The minimum spacing between structures is 910m (subject to 500m LoD), which is greater than most existing UK offshore wind farms. The layout is compliant with the requirements of MGN 654 (MCA, 2021). The proposed development (including the layout options) has been subject to a comprehensive NRA as required by the methodology agreed with shipping regulators, notably the MSO, prior to the NRA process commencing. No specific national guidance on NRA currently exists, but the assessment undertaken has taken account of international best practice and precedent in respect of offshore wind developments in the UK. The Developer is aware that draft specific national guidance is currently under review and that engagement with the IRCG, if required, upon publication of the final guidance documents (which is not expected to be published until later this year) may result in the requirement for a safety justification to be undertaken for the layout. This would be specifically for the IRCG's own access assessment and to ensure requirements within the guidance are complied with.

The most likely consequences in the event of a SAR operation is that SAR assets are able to fulfil their objectives without any limitations on capability. As part of the scenario deemed to have the greatest likely significant effect, it may not be possible to undertake an effective search. However, given compliance with MGN 654 for the layout, this is considered highly unlikely.

Overall, relevant embedded mitigation measures are compliance with relevant regulator guidance, liaison with IRCG in relation to SAR resources, lighting and marking, marine coordination for proposed development vessels, proposed development vessel compliance with international marine regulations and WTG design/layout.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be serious.

[5] Although other types of incident are acknowledged, collision and allision incidents have the potential to be among the most serious and give a reasonable indication of the rate of incidents requiring an emergency response.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduction of emergency response capabilities for the proposed development during the operational phase is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.4 Decommissioning

The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels. The decommissioning duration of the offshore infrastructure may take the same amount of time as construction of the proposed development, approximately three years, although this indicative timing may reduce. The impacts and significance of effect described during the construction phase are much the same for the decommissioning phase but are listed in summary below.

It is noted that the approach to decommissioning in terms of leaving any infrastructure in situ will be determined at the time in line with any relevant guidance and policy. To ensure all likely significant effects during decommissioning are suitably assessed for shipping and navigation, this assessment assumes that all infrastructure will be removed. Information on offshore decommissioning is provided in the Offshore Construction Chapter.

17.5.4.1 Impact 19 - Vessel displacement and increased vessel to vessel collision risk (array area)

Activities associated with the removal of structures and cables within the array area may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels. Project Option 1 presents the greatest severity of consequence given the greater number of decommissioning vessel movements.

The same elements of the equivalent construction phase impact are relevant and considered for this impact.

During the decommissioning phase, a buoyed decommissioning area will be deployed around the array area. No restrictions on entry will be enforced for the buoyed decommissioning area. However, it is anticipated that commercial vessels will choose not to navigate internally within the buoyed decommissioning area. This buoyed decommissioning area is anticipated to be broadly similar to the buoyed construction area and so all route deviations, post wind farm modelling, collision risk, and adverse weather routeing outlined during the construction phase are also relevant for vessel displacement and increased vessel to vessel collision risk for the decommissioning phase.

Therefore, the consequences associated with the various elements of this impact that are most likely, as well as those associated with the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

Relevant embedded mitigation measures are advisory safe passing distances, buoyed decommissioning area, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for vessel displacement and increased vessel to vessel collision risk for the array area during the decommissioning phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.4.2 Impact 20 - Vessel displacement and increased vessel to vessel collision risk (ECC)

Any activities associated with the removal of export cables within the ECC may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

Removal of export cables are anticipated to involve similar types and numbers of vessels to that of the cable installation, with an overall maximum of three vessels expected on-site at any one time.

The spatial extent of the impact will be limited to where decommissioning activities are ongoing, with the same deviations and effects on vessels anticipated as that of the equivalent construction phase impact.

Therefore, the consequences associated with this impact that are most likely, as well as those that are associated with as the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for vessel displacement and increased vessel to vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during the decommissioning phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.4.3 Impact 21 - Third-party to proposed development vessel collision risk (array area)

Proposed development vessels associated with decommissioning activities may increase encounters and collision risk for other third-party vessels already in the area. Project Option 1 presents the greatest severity of consequence given the greater number of decommissioning vessel movements.

The decommissioning phase may last approximately three years and a maximum of 49 decommissioning vessels may be located on site simultaneously, in turn making 3,008 return trips to port. Some proposed development vessels may be RAM and it is anticipated that proposed development vessels will generally undertake decommissioning works associated with the array area within the buoyed decommissioning area, which third-party vessels are generally expected to avoid, similarly to the buoyed construction area.

Proposed development vessel movements are expected to be managed similarly to during construction. By the time of decommissioning, mariners will be experienced in working around offshore wind farm activities internationally and within the Irish Sea. Aids to help local and international mariner knowledge will be the same as those issued during the construction phase; this information promulgated alongside the details of any ongoing activity will maximise awareness for all third-party users, including in both day and night conditions.

Therefore, the consequences associated with this impact that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

Relevant embedded mitigation measures are advisory safe passing distances, buoyed decommissioning area, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for third-party to proposed development vessel collision risk for the array area during the decommissioning phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.4.4 Impact 22 - Third-party to proposed development vessel collision risk (ECC)

Proposed development vessels associated with decommissioning activities may increase encounters and collision risk for other third-party vessels already in the area. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

It is anticipated the same number and type of vessels will be involved in cable removal activities as that of installation. The spatial extent of the impact is limited to where removal activities are ongoing, and the temporal extent will be limited to the duration of these activities.

Although this impact is more likely to occur than a third-party to third-party collision (given that there need only be one passing third-party vessel present), the overall effect is still low.

Similar to the construction phase, the level of exposure to this impact for third-party vessels will depend upon the location of export cable removal at any given time. The portions of the ECC that are considered to have higher exposure are the same as those described during the construction phase.

However, as with the operational phase mariners navigating in proximity to the ECC will have a raised level of awareness of the area, even more so at the time of decommissioning, and this will be further heightened by the measures noted for the earlier phases.

Therefore, the consequences associated with this impact that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

Relevant embedded mitigation measures are advisory safe passing distances, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for third-party to proposed development vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during the decommissioning phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.5.4.5 Impact 23 - Reduced access to local ports (array area)

Decommissioning activities within the array area may result in reduced access to local ports and harbours for vessels. Project Option 1 presents the greatest severity of consequence given the greater number of decommissioning vessel movements.

No additional routes to those outlined during the construction phase are anticipated to be deviated by the buoyed decommissioning area, given that routes will already be displaced during construction and operation. As no further routes are expected to be displaced, there will be limited effects on any port/ pilot arrivals times and therefore schedules will not be additionally affected during the decommissioning phase. Any impacts that do occur on the access to local ports will be similar to those outlined during the construction phase.

Therefore, the consequences associated with this impact that are most likely, as well as those associated with the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

Relevant embedded mitigation measures are advisory safe passing distances, buoyed decommissioning area, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be minor.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduced access to local ports for the array area during the decommissioning phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.5.4.6 Impact 24 - Reduced access to local ports (ECC)

Decommissioning activities associated with the ECC may result in reduced access to local ports and harbours for vessels. Project Option 1 and Project Option 2 are considered to present equal severity of consequence.

As there is no buoyed decommissioning area for the ECC, disruption to port access will be limited to where decommissioning activities are ongoing, and the temporal extent will be limited to the duration of these activities. Any reduction to port access will be the same as what is outlined during the construction phase but limited effects on port arrival and berth times are anticipated, and the measures outlined for the equivalent construction phase impact are again applicable.

Therefore, the consequences associated with this impact that are most likely, as well as those that are associated with the scenario deemed to have the greatest likely significant effect, are broadly similar to the equivalent construction phase impact.

Relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be negligible. The severity of consequence is deemed to be negligible.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the significance of effect for reduced access to local ports for the ECC for both Project Option 1 and Project Option 2 during the decommissioning phase is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.6 Mitigation and Monitoring Measures

Mitigation measures that were identified and adopted as part of the evolution of the proposed development design (embedded into the proposed development design) and that are relevant to shipping and navigation are listed in Table 17.9 and not considered again here. No additional mitigation and monitoring measures specific to shipping and navigation were identified in this assessment.

17.7 Residual Effects

This section presents the residual effects of the proposed development once the mitigation outlined in Section 1.4.5 has been applied.

Since no additional mitigation and monitoring measures have been identified in Section 1.6, the residual effect level (also provided in Table 17.11) is the same as the pre-mitigation likely significant effect for all impacts.

Table 17.11 Residual effects relating to shipping and navigation

Impact	Likely significant effect– Project Option 1	Likely significant effect – Project Option 2	Residual effect – Project Option 1	Residual effect – Project Option 2
Construction				
Vessel displacement and increased vessel to vessel collision risk (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Vessel displacement and increased vessel to vessel collision risk (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Third-party to proposed development vessel collision risk (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Third-party to proposed development vessel collision risk (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduced access to local ports (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduced access to local ports (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Operation				
Vessel displacement and increased vessel to vessel collision risk (array area)	Tolerable with mitigation	Tolerable with mitigation	Tolerable with mitigation	Tolerable with mitigation
Vessel displacement and increased vessel to vessel collision risk (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Third-party to proposed development vessel collision risk (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Third-party to proposed development vessel collision risk (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduced access to local ports (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduced access to local ports (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Creation of vessel to structure allision risk (array area)	Tolerable with mitigation	Tolerable with mitigation	Tolerable with mitigation	Tolerable with mitigation
Reduction in under keel clearance (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduction in under keel clearance (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Anchor interaction with inter-array cables (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Anchor interaction with export cables (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduction in emergency response capabilities	Tolerable with mitigation	Tolerable with mitigation	Tolerable with mitigation	Tolerable with mitigation
Decommissioning				
Vessel displacement and increased vessel to vessel collision risk (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable

Impact	Likely significant effect– Project Option 1	Likely significant effect – Project Option 2	Residual effect – Project Option 1	Residual effect – Project Option 2
Vessel displacement and increased vessel to vessel collision risk (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Third-party to proposed development vessel collision risk (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Third-party to proposed development vessel collision risk (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduced access to local ports (array area)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable
Reduced access to local ports (ECC)	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable

17.8 Transboundary Effects

Transboundary effects are defined as those effects upon the receiving environment of other states, whether occurring from the proposed development alone, or cumulatively with other projects in the wider area.

Vessel traffic movements are transboundary in nature, including vessel routeing within the Irish Sea. Other European Economic Area (EEA) states feature in the main commercial routes as port destinations including the UK and beyond, noting that vessels route to/ from the English Channel and Mediterranean after passing though the Off Smalls TSS. There is potential for vessel routeing to be displaced by the presence of the offshore development area and therefore this was considered for the potential for a likely significant effect.

However, given the international use of AIS transceivers on commercial vessels (the primary data source for characterisation of commercial vessel movements), the baseline characterisation of vessel traffic movements suitably captures both the receptors and the nature of this transboundary effect. Therefore, transboundary effects are considered to be suitably accounted for as part of the baseline assessment and no further assessment has been undertaken, noting that in line with the baseline assessment there are no transboundary effects which are considered to be significant in EIA terms.

17.9 Cumulative Effects

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

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

The assessment specifically considers whether any of the approved developments in the local or wider area have the potential to alter the significance of effects associated with the proposed development based on best scientific knowledge. Developments which are already built and operating, and which are not identified in this chapter, are included in the baseline environment or have been screened out as there is no potential to alter the significance of effects.

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

Given the location and nature of the proposed development, a tiered approach to establishing the list of other existing and/or approved projects has been undertaken in Stage 1 of the cumulative effects assessment. The tiering of projects is based on project relevance to the proposed development and it is not a hierarchical approach nor based on weighting. Further information on the tiers is provided in Section 17.9.2 and in the Cumulative and Inter-Related Effects Chapter.

17.9.1 Shipping and Navigation Cumulative Screening Exercise

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

For the majority of likely significant effects for shipping and navigation, projects were screened into the assessment within a maximum search area of 50nm considered (associated with offshore wind farms) surrounding the array area. This search area is considered adequate for ensuring relevant projects are considered with projects located further away not considered to have a direct impact pathway for shipping and navigation.

For the full list of projects considered, including those screened out, please see the Cumulative and Inter-Related Effects Chapter and Appendix 38.1.

17.9.2 Projects Considered within the Cumulative Effects Assessment

The planned, existing and/or approved projects selected through the screening exercise as potentially relevant to the assessment of impacts to shipping and navigation are presented in Table 17.12.

The tiers for the assessment are:

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

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

Table 17.12 Projects and plans considered within the cumulative effects assessment

Development type	Project	Status	Data confidence	Distance to the proposed development		Justification for screening into the cumulative effects assessment
				Array area	ECC	
Tier 1	OMF	Pre-consent	Low – no documentation available	18nm	21nm	May introduce new commercial routeing
Tier 2						
Phase One Offshore wind farm	Oriel Wind Park	Pre-consent	Medium – Phase One projects have shared data and design information.	9.1nm	12nm	Overlap in construction period, Oriel Wind Park due to construct during 2026-2028
	Dublin Array	Pre-consent	Medium – Phase One projects have shared data and design information.	18nm	20nm	Overlap in construction period, Dublin Array due to construct during 2028-2032
	Codling Wind Park	Pre-consent	Medium – Phase One projects have shared data and design information.	27nm	31nm	Overlap in construction period, with Colding Wind Park due to construct during 2027-2028
	Arklow Bank Phase 2	Pre-consent	Medium – Phase One projects have shared data and design information.	41nm	43nm	Overlap in construction period with Arklow Bank Phase 2 due to construct during 2026-2030
Tier 3						
Port development	Bremore Port	Early development	Medium – information has been gathered through consultation with the Drogheda Port Company but publicly available detailed design information relevant to shipping and navigation is limited.	8.8nm	0.1nm	May influence commercial routeing already affected by the offshore development area and introduce new routeing
	Dublin Port Masterplan 2040	Early development	Medium – information has been gathered through consultation with the Dublin Port Company but publicly available detailed design information relevant to shipping and navigation is limited.	19nm	16nm	May influence commercial routeing already affected by the offshore development area

17.9.3 Project Impacts Included in the Assessment

The identification of potential impacts has been undertaken by considering the relevant characteristics from both project options (refer to Section 17.4.1) and the potential for a pathway for them to have direct and indirect effects on known receptors (as identified in Section 17.3) when combined with other projects. Each identified impact relevant to shipping and navigation is presented in Table 17.13.

The identification of potential impacts has been undertaken by considering the outcome of the residual effects assessment (Section 17.7) and the potential for a pathway for those impacts to have direct and/or indirect effects on known receptors (as identified in Section 17.3) when combined with the impacts from other projects. Each identified impact relevant to the cumulative assessment of shipping and navigation is presented in Table 17.13. As the residual effects for Project Option 1 and Project Option 2 are the same (as identified in Section 17.7), the cumulative effects assessment presented in this section applies to both options.

Table 17.13 Potential cumulative impacts and tiers for assessment

Potential cumulative impact	Phase	Tiers and projects	Justification for inclusion in cumulative effects assessment
1. Vessel displacement and increased vessel to vessel collision risk (array area)	Construction/ Operation/ Decommissioning	Tier 2 – Phase One Projects Tier 3 – Bremore Port, Dublin Port Masterplan 2040	While additional cumulative deviations to affected commercial routes are not expected as per NRA (Appendix 17.1), overall displacement in terms of potential interactions between all vessel types is still considered as requiring to be assessed on a cumulative basis.
2. Vessel displacement and increased vessel to vessel collision risk (ECC)	Construction/ Operation/ Decommissioning	Tier 3 – Bremore Port	While additional cumulative deviations to affected commercial routes are not expected as per NRA (Appendix 17.1), overall displacement in terms of potential interactions between all vessel types is still considered as requiring to be assessed on a cumulative basis.
3. Third-party to proposed development vessel collision risk (array area)	Construction/ Operation/ Decommissioning	Tier 2 – Phase One Projects Tier 3 – Bremore Port, Dublin Port Masterplan 2040	Additional cumulative projects may raise wind farm vessel levels on a cumulative basis.
4. Third-party to proposed development vessel collision risk (ECC)	Construction/ Operation/ Decommissioning	Tier 2 – Phase One Projects Tier 3 – Bremore Port, Dublin Port Masterplan 2040	Additional cumulative projects may raise wind farm vessel levels on a cumulative basis.
5. Reduced access to local ports (array area)	Construction/ Operation/ Decommissioning	Tier 2 – Oriel Wind Park and Dublin Array Tier 3 – Bremore Port	Additional cumulative projects, infrastructure, vessels or operations may increase cumulative effects on port access.
6. Reduced access to local ports (ECC)	Construction/ Operation/ Decommissioning	Tier 2 – Oriel Wind Park Tier 3 – Bremore Port	Additional cumulative projects, infrastructure, vessels or operations may increase cumulative effects on port access.
7. Creation of vessel to structure allision risk (array area)	Operation	Tier 3 – Bremore Port	Additional cumulative projects may raise allision risk in the area on a cumulative basis

Potential cumulative impact	Phase	Tiers and projects	Justification for inclusion in cumulative effects assessment
8. Reduction in under keel clearance (ECC)	Operation	Tier 2 – Oriel Wind Park Tier 3 – Bremore Port	Additional cumulative projects may increase areas where navigable depths are affected on a cumulative basis.
9. Anchor interaction with cables (ECC)	Operation	Tier 3 – Bremore Port	Additional cumulative projects may increase cable locally or increase volumes of traffic exposed to cables which may increase interaction risk on a cumulative basis.
10. Reduction in emergency response capabilities	Operation	Tier 1 – OMF Tier 2 – Phase One Projects Tier 3 – Bremore Port, Dublin Port Masterplan 2040	Additional cumulative project may increase baseline incident rates on a cumulative basis.

17.9.3.1 Cumulative Impact 1 - Vessel displacement and increased vessel to vessel collision risk (array area)

Activities associated with the installation, maintenance and decommissioning of structures and cables as well as the presence of surface structures within the array area may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors. The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development. There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application. Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

Two of the main commercial routes identified from the in isolation impact may potentially interact with Oriel Wind Park with slight deviations required (Route 1 and Route 9).

Route 9 is not displaced by the array area in isolation and the sea room between the array area and Oriel Wind Park (approximately 9.1nm) is sufficient to ensure a deviation around the east of Oriel Wind Park will not result in a passing distance from the array area which compromises navigational safety.

Route 1 is already displaced in the in isolation impact and therefore the additional presence of Oriel Wind Park serves to further increase disruption to passages on the busiest main commercial route identified within the study area. However, the increase in route length for the cumulative impact is very small relative to the in isolation impact (a further increase of less than 0.1nm), and so further increases in journey times and distances and effects on collision risk are anticipated to be negligible.

Two of the main commercial routes identified from the in isolation impact may potentially interact with Dublin Array with slight deviations required (Route 4 and Route 6). Route 4 is not displaced by the array area in isolation while Route 6 is already displaced by the in isolation impact. However, in both instances the increase in route length is low (0.4nm for Route 4 and 0.8nm for Route 6) and corresponds to a maximum 0.8% increase in total route length. Therefore, disruption to journey times and distances and effects on collision risk are anticipated to be negligible.

One of the main commercial routes identified from the in isolation impact may potentially interact with Arklow Bank Wind Park 2 with a slight deviation required (Route 4). The increase in route length for the cumulative impact is very small relative to the in isolation impact (a further increase of 0.3nm), and so further increases in journey times and distances and effects on collision risk are anticipated to be negligible.

Tier 1, 2 and 3 (All tiers)

If taken forward, the proposed Bremore Port development would increase the overall vessel traffic volumes and may introduce larger vessels not currently present in the area to routes in proximity to the array area. This may include increased volumes on Route 3 which – in the case of larger vessels or vessels carrying sensitive cargoes – may result in a large deviation around the array area (Route 3A as detailed in Section 16.5.2 of the NRA). It is noted that Route 3 is not displaced by the Tier 1 and Tier 2 developments.

The presence of Bremore Port may also introduce new routes. These include an indicative route headed to/ from the UK which would need to pass north or south of the array area resulting in a longer passage. Given that Drogheda Port Company stated during consultation that, if taken forward, vessels utilising the proposed Bremore Port are currently expected to approach from the north-east, a passage to the north is more likely.

Bremore Port and its potential increase in vessels may also increase collision risk, especially at the Rockabill gap if some vessels choose to transit to the south of the array area, including from the indicative new route to/ from the UK. However, given the low likelihood of a collision in the Rockabill gap for the base case, the additional effect with Bremore Port related traffic is expected to remain within tolerable levels.

It is noted that the Dublin Masterplan 2040 may reduce traffic levels in the area from local ports, i.e., traffic previously navigating to and from other local ports relocates to Dublin Port. However, there is also potential for those main commercial routes out of Dublin to feature increased traffic volumes (with Route 2 of particularly note). There is adequate sea room offshore of the array area to accommodate future case increased in traffic volume, limiting the creation of additional hotspots for collision risk, particularly in relation to the area at the south-eastern corner of the array area where crossing interaction may occur with potential Bremore Port related traffic. The presence of Tier 2 developments does not affect this assertion.

Across all tiering scenarios the relevant embedded mitigation measures are advisory safe passing distances, buoyed construction/decommissioning area, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be moderate. These rankings have been determined on the basis that the consequences should a collision occur are as per the equivalent in isolation impact, while the likelihood of a collision is slightly greater given the reduction in navigable sea room and potential for increased vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for vessel displacement and increased vessel to vessel collision risk for the array area for both Project Option 1 and Project Option 2 during all phases with Tier 2 and Tier 3 projects is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms.

17.9.3.2 Cumulative Impact 2 - Vessel displacement and increased vessel to vessel collision risk (ECC)

Activities associated with the installation, maintenance and decommissioning of cables within the ECC may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors.

The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development. There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application. Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

For this impact, no Tier 2 developments are anticipated to intersect the ECC as the closest development, Oriel Wind Park, is proposing a landfall location close to Dunany Point which is approximately 14nm north of the closest point of the ECC. Therefore, there is no direct link between the ECC and Tier 2 developments and so no additional assessments of effect have been undertaken.

Tier 1, 2 and 3 (All tiers)

Similar to the array area, if taken forward the Bremore Port development would increase the overall vessel traffic volumes in the area. The development is proposed to be located in proximity with the landfall of the ECC putting its vessels and associated routes in direct line with the ECC resulting in the increased likelihood of deviations during operational and decommissioning activities (no temporal overlap with the construction phase is anticipated).

The presence of operational and decommissioning activities within the ECC may also reduce the available sea room available west of the Rockabill gap leading to increased encounters and congestion resulting in an increased collision risk. However, Drogheda Port Company stated during consultation that, if taken forward, vessels utilising the proposed Bremore Port are currently expected to approach from the north-east and this may reduce the vessel numbers to the south of the ECC. Additionally, there is sea room between the Rockabill gap and the ECC for vessels to adjust course for small deviations which are what may be required for operational and decommissioning activities within the ECC.

Across all tiering scenarios the relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be moderate. These rankings have been determined on the basis that the consequences should a collision occur are as per the equivalent in isolation impact, while the likelihood of a collision is slightly greater given the reduction in navigable sea room and potential for increased vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for vessel displacement and increased vessel to vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during all phases with Tier 3 projects is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.9.3.3 Cumulative Impact 3 - Third-party to proposed development vessel collision risk (array area)

Proposed development vessels associated with construction, operation, and decommissioning activities may increase encounters and collision risk for other third-party vessels already in the area.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors. The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development.

There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application. Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

On-site proposed development vessel activities associated with Tier 2 developments are not expected to create a cumulative effect with the array area. However, at the time of writing, the base ports for the proposed development and Tier 2 developments (for construction/ decommissioning and operation) are not known. If the developments have a common base port (such as the OMF), there may be an increased collision risk when vessels are entering/ exiting the port and enroute to/ from the array area. However, the marine coordinator will take account of this, and it is assumed that a similar role will be in place for Tier 2 developments.

Tier 1, 2 and 3 (All Tiers)

If taken forward, the proposed Bremore Port development would increase the overall vessel traffic volumes in proximity to the array area as well as introducing vessels which will be entering/ exiting the new port, including on new routes. These vessels may increase collision risk from new and existing third-party vessels and proposed development vessels in the area, particularly where proposed development vessel activities associated with Tier 2 developments are ongoing.

The Dublin Masterplan 2040 is expected to create an increase in traffic volumes entering/exiting Dublin Port and so there may be an increase in collision risk. The mitigation and monitoring measures will ensure this risk is ALARP, noting that both Bremore Port and the Dublin Masterplan 2040 would also have suitable mitigation in place.

For this impact, the same points raised for the previous tiering scenarios are again applicable, in particular the potential for increased collision risk associated with common base ports across developments.

Across all tiering scenarios the relevant embedded mitigation measures are advisory safe passing distances, buoyed construction/decommissioning area, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be moderate. These rankings have been determined on the basis that the consequences should a collision occur as per the in isolation impact, while the likelihood of a collision is slightly greater given the reduction in navigable sea room and potential for increased vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for third-party to proposed development vessel collision risk for the array area for both Project Option 1 and Project Option 2 during all phases with Tier 2 and Tier 3 projects is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms.

17.9.3.4 Cumulative Impact 4 - Third-party to proposed development vessel collision risk (ECC)

Proposed development vessels associated with construction, operation, and decommissioning activities may increase encounters and collision risk for other third-party vessels already in the area.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors. The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development.

There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application. Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

For this impact, no Tier 2 developments are anticipated to intersect the ECC as the closest development, Oriel Wind Park, is proposing a landfall location close to Dunany Point which is approximately 14nm north of the closest point of the ECC. Should installation/ removal or maintenance activities for Oriel Wind Park and the proposed development occur at the same time the spatial extent of the impact may be increased but the base ports for the proposed development and Tier 1 developments (for construction/ decommissioning and operation) are not currently known. If the developments have a common base port (such as the OMF), there may be an increased collision risk when vessels are entering/ exiting the port and enroute to/ from the ECCs. However, the marine coordinator will take account of this, and it is assumed that a similar role will be in place for Tier 2 developments.

Tier 1, 2 and 3 (All tiers)

If taken forward, the proposed Bremore Port development would increase the overall vessel traffic volumes in proximity to the array area as well as introducing vessels which will be entering/ exiting the new port, including on new routes. These vessels may increase collision risk from new and existing third-party vessels and proposed development vessels in the area. This is of limited concern during the construction phase and as previously mentioned, the base ports are not currently known for proposed development vessels for the proposed development. It is anticipated that any operational or decommissioning activities associated with the ECC would be undertaken in communication and coordination with the Drogheda Port Company as the future operator for Bremore Port.

On-site activities associated with Tier 3 developments are not expected to create a cumulative effect with the ECC. However, Dublin Masterplan 2040 is expected to create an increase in traffic volumes entering/exiting Dublin Port and so there may be an increase in collision risk between third-party vessels and proposed development vessels. This may be dependent upon the location of the base ports for proposed development vessels which are not currently known. The mitigation and monitoring measures will ensure this effect is ALARP.

For this impact, the same points raised for the previous tiering scenarios are again applicable, in particular the potential for increased collision risk associated with common base ports across developments.

Across all tiering scenarios the relevant embedded mitigation measures are advisory safe passing distances, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, marking on nautical charts, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate. These rankings have been determined on the basis that the consequences should a collision occur as per the in isolation impact, while the likelihood of a collision is slightly greater given the reduction in navigable sea room and potential for increased vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for third-party to proposed development vessel collision risk for the ECC for both Project Option 1 and Project Option 2 during all phases with Tier 2 and Tier 3 projects is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.9.3.5 Cumulative Impact 5 - Reduced access to local ports (array area)

Construction/ decommissioning activities and the presence of surface structures within the array area may result in reduced access to local ports and harbours for vessels.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors. The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development. There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application. Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

The presence of the Tier 2 developments in addition to the proposed development may interfere with mariners planning their preferred approach to local ports and harbours. The presence of Oriel Wind Park will reduce the sea room available for navigation to the north of the array area and may impact port schedules for commercial vessels routeing to/from numerous ports and harbours on the east Irish coast including Drogheda and Warrenpoint/Greenore. The presence of Dublin Array may impact routes to/from the south of the array area.

However, of those commercial routes that may be impacted, all routes feature low traffic volumes and there is ample sea room between developments providing access to local ports and harbours. Therefore, with adequate passage planning the overall effects on port schedules and navigational safety will be minimal.

Tier 1, 2 and 3 (All tiers)

If taken forward, the presence of the proposed Bremore Port may impact the approach of commercial vessels on routes to/from local ports on the east Irish coast. The existing commercial routes that would be impacted by the presence of Bremore Port are of low vessel volume. As previously mentioned, during consultation, concerns over the time sensitive window upon the entrance to the River Boyne were noted but no additional concerns were raised regarding the presence of Bremore Port, with Drogheda Port Company stating that although vessels may be on time sensitive routes, as long as there are deviation options for mariners to passage plan, there should be limited impact on port schedules.

For this impact, the same points raised for the previous tiering scenarios are again, in particular the reduction in navigable sea room affecting port schedules which may be exacerbated by the presence of the Tier 2 developments in addition to Bremore Port.

Across all tiering scenarios the relevant embedded mitigation measures are advisory safe passing distances, buoyed construction/decommissioning area, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be minor. These rankings have been determined on the basis that the consequences should disruption occur are as per the equivalent in isolation impact, while the likelihood of disruption is slightly greater given the reduction in navigable sea room and potential for increased vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for reduced access to local ports for the array area for both Project Option 1 and Project Option 2 during all phases with Tier 2 and Tier 3 projects is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.9.3.6 Cumulative Impact 6 - Reduced access to local ports (ECC)

Installation, maintenance and decommissioning activities associated with the ECC may result in reduced access to local ports and harbours for vessels.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors. The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development. There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application. Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

For this impact, no Tier 2 developments are anticipated to intersect the ECC as the closest development, Oriel Wind Park, is proposing a landfall location close to Dunany Point which is approximately 14nm north of the closest point of the ECC. Should installation/ removal or maintenance activities for Oriel Wind Park and the proposed development occur at the same time the spatial extent of the impact may be increased but the base ports for the proposed development and Tier 2 developments (for construction/ decommissioning and operation) are not currently known. If the developments have a common base port (such as the OMF), there may be an increase in disruption to mariners planning their preferred approach to local ports and harbours.

Tier 1, 2 and 3 (All tiers)

If taken forward, the presence of the proposed Bremore Port may impact the approach of commercial vessels on routes to/from local ports on the east Irish coast. The existing commercial routes that would be impacted by the presence of Bremore Port are of low vessel volume and as there is no buoyed construction/ decommissioning areas or surface structures associated with the ECC, effects will only be relevant during periods of installation/ removal or maintenance activities and limited to the area of these ongoing activities. The Drogheda Port Company have not raised concerns during consultation in relation to these activities, with concerns centred on the presence of the array area.

Across all tiering scenarios the relevant embedded mitigation measures are advisory safe passing distances, compliance with relevant regulator guidance, marine coordination for proposed development vessels and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be minor. These rankings have been determined on the basis that the consequences should disruption occur are as per the equivalent in isolation impact, while the likelihood of disruption is slightly greater given the reduction in navigable sea room and potential for increased vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for reduced access to local ports for the ECC for both Project Option 1 and Project Option 2 during all phases with Tier 2 and Tier 3 projects is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.9.3.7 Cumulative Impact 7 - Creation of vessel to structure allision risk (array area)

The presence of surface structures within the array area may result in the creation of a risk of allision for vessels.

This impact is considered only in relation to the array area since there are no surface structures associated with the ECC.

Tier 1

For this impact there is no direct link between the proposed development and any Tier 1 developments given the lack of close proximity between developments (the OMF will be located on the coast) and therefore no additional assessment of effects has been undertaken.

Tier 1 and 2

For this impact there is no direct link between the proposed development and any Tier 2 developments given the lack of close proximity between developments (Oriel Wind Park is the closest but is located approximately 9.1nm from the array area) and therefore no additional assessment of effects has been undertaken.

Tier 1, 2 and 3 (All tiers)

Although allision risk is localised in nature, there remains a cumulative effect associated with routeing through the Rockabill gap (Route 3), which with the presence of Bremore Port may feature additional routeing vessels. This increases exposure to allision risk with perimeter structures on the south-western extent of the array area. However, the Drogheda Port Company confirmed during consultation that concerns relating to the Rockabill gap were limited to collision risk rather than allision risk. Nevertheless, with the implementation of the Structure Exclusion Zone, the risk of an allision with an isolated structure on the south-west of the array area has been minimised.

There may also be increased exposure to allision risk with perimeter structures on the northern extent of the array area depending on the chosen passage for an indicative new route between the proposed Bremore Port and the UK. The mitigation and monitoring measures will ensure this effect is considered to be ALARP.

Across all tiering scenarios the relevant embedded mitigation measures are compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources, lighting and marking, marking on nautical charts, minimum blade clearance, promulgation of information and WTG layout/design.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be moderate. These rankings have been determined on the basis that the consequences should an allision occur are as per the equivalent in isolation impact, while the likelihood of an allision is not materially greater than for the equivalent in isolation impact when accounting for the distance between the array area and other potential developments with surface piercing infrastructure.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for the creation of vessel to structure allision risk for the proposed development during the operational phase with Tier 3 projects is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.9.3.8 Cumulative Impact 8 - Reduction in under keel clearance (ECC)

The presence of cable protection associated with the export cables may result in reductions to water depth and the creation of an under-keel clearance risk for vessels.

Tier 1

The proposed adaption and leasing of the existing port at Greenore, including the provision of the OMF for the proposed development, will result in the creation of new routeing in the region (featuring wind farm vessels transiting to and from the Greenore location) which may impact on Shipping and Navigation receptors. The proposed development vessel movements are considered in the in isolation impact and therefore no additional effects on vessel displacement and collision risk are anticipated across any phases of the proposed development. There is currently no available information on construction related vessel movements associated with the adaption works at Greenore, which will be subject to a separate planning application.

Additionally, there is no available information on potential future use of the adaption and leasing at Greenore by third parties. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

For this impact, no Tier 2 developments are anticipated to intersect the ECC as the closest development, Oriel Wind Park, is proposing a landfall location close to Dunany Point which is approximately 14nm north of the closest point of the ECC. The spatial extent of the impact may increase, but the base ports for the proposed development and Tier 2 developments (for operation) are not currently known. Vessels involved with Tier 2 developments may route frequently over the ECC, although these are generally not anticipated to have deeper draughts.

Tier 1, 2 and 3 (All tiers)

If taken forward, the proposed Bremore Port development is anticipated to be located at the same location as the ECC will make landfall. The presence of this development will increase the overall vessel traffic volumes in proximity to the ECC as well as introducing vessels which will be entering/ exiting the new port, including the larger vessels that the port is anticipated to attract to the region as highlighted by the Drogheda Port Company during consultation. These vessels may be at a higher risk of an underwater allision although the mitigation and monitoring measures noted for the in isolation impact are again applicable and the Drogheda Port Company have not raised relevant concerns during consultation.

Across all tiering scenarios the relevant embedded mitigation measures are cable protection, compliance with relevant regulator guidance, guard vessel(s) as required, liaison with IRCG in relation to SAR resources and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be extremely unlikely. The severity of consequence is deemed to be moderate. These rankings have been determined on the basis that the consequences should an underwater allision or grounding occur are as per the equivalent in isolation impact, while the likelihood of an allision is not materially greater than for the equivalent in isolation impact when accounting for the distance between the ECC and other potential developments with seabed infrastructure.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for the reduction in under keel clearance for the ECC for both Project Option 1 and Project Option 2 during the operational phase with Tier 1 and Tier 2 and Tier 3 projects is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.9.3.9 Cumulative Impact 9 - Anchor interaction with cables (ECC)

The presence of export cables may result in the creation of a vessel anchor making contact with an array cable.

Tier 1

For this impact there is no direct link between the proposed development and any Tier 1 developments since it is not anticipated that additional wind farm vessels associated with the OMF will anchor in close proximity to the ECC. Therefore, this project has been screened out of this cumulative impact assessment.

Tier 1 and 2

For this impact there is no direct link between the proposed development and any Tier 2 developments and therefore no additional assessment of effects has been undertaken.

Tier 1, 2 and 3 (All tiers)

The Bremore Port development is proposed to be located in conjunction with the landfall of the ECC and therefore if taken forward may create exposure for associated vessels and routes to an anchor interaction effect.

However, the application of good seamanship is anticipated, with mariners checking the relevant nautical charts prior to making the decision to drop the anchor. Dropping the anchor over a cable would only occur as a last resort to prevent an incident with potentially greater consequences such as a collision or allision. Additionally, the likelihood of a vessel requiring to drop anchor at a location where the export cables and other cable developments are in close proximity is very low, with the assessment of vessel traffic data provided for the in isolation impact again applicable.

If taken forward, anchorage areas associated with the proposed Bremore Port may be designated and it is expected that these would account for the export cables accordingly to minimise exposure to anchor interaction effect, noting that out with port limits the Developer should be identified as a stakeholder during consultation.

Across all tiering scenarios the relevant embedded mitigation measures are cable protection, compliance with relevant regulator guidance, marking on nautical charts and promulgation of information.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be minor. These rankings have been determined on the basis that the consequences should an anchor snagging occur are as per the equivalent in isolation impact, while the likelihood of anchor snagging is slightly greater than for the equivalent in isolation impact given the increased presence of seabed infrastructure.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for anchor interaction with cables for the ECC for both Project Option 1 and Project Option 2 during the operational phase with Tier 3 is determined to be broadly acceptable and ALARP, which is not significant in EIA terms.

17.9.3.10 Cumulative Impact 10 - Reduction in emergency response capabilities

The presence of surface structures within the array area and operational activities associated with the array area and ECC may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface air responders, including SAR assets.

The array area and ECC are considered collectively for this impact since the assessment undertaken is considered relevant to the offshore development area as a whole.

Tier 1

The presence and activities associated with Tier 1 developments such as wind farm vessel movements, berthing, bunkering services and storage tanks may further increase the likelihood of incidents requiring an emergency response and could subsequently increase the likelihood of multiple incidents occurring simultaneously, adding additional stress on emergency responders. However, given the locations of the OMF and additional emergency response resources in proximity to each, the accessibility of resources is not expected to be compromised. It is likely that differing emergency response resources (i.e., different RNLI stations) may respond to an incident associated with the OMF compared to those used for the proposed development depending on proximity.

It is anticipated that appropriate emergency response procedures will be in place for the OMF, alongside marine coordination for proposed development vessels (already assumed for the in isolation impact). Furthermore, SOLAS obligations (IMO, 1974) are applicable to the OMF and may have a positive effect on a cumulative level, e.g., a vessel berthed at the OMF may be able to assist with an incident associated with the proposed development and vice-versa.

Given the relative distance between the offshore development area and the OMF, there is not considered to be any cumulative effect associated with SAR access.

Tier 1 and 2

The presence and activities associated with Tier 2 developments may further increase the likelihood of incidents requiring an emergency response and could subsequently increase the likelihood of multiple incidents occurring simultaneously, adding additional stress on emergency responders.

However, given the locations of the Tier 2 developments and additional emergency response resources in proximity to each, the accessibility of resources is not expected to be compromised. It is likely that differing emergency response resources (i.e., different RNLI stations) may respond to an incident associated with Tier 2 developments compared to those used for the proposed development and Tier 1 developments depending on proximity.

As with the proposed development, it is assumed that Tier 2 developments will have suitable mitigations measures in place to reduce the likelihood of a reduction in emergency response capability including marine coordination for proposed development vessels. Furthermore, SOLAS obligations (IMO, 1974) are applicable to all developments and may have a positive effect on a cumulative level, e.g., a proposed development vessel for Oriel Wind Park may be able to assist with an incident associated with the proposed development and vice-versa.

Given that there are no immediately adjacent Tier 2 developments, and the relative distance between the offshore development area and Tier 2 projects, there is not considered to be any cumulative effect associated with SAR access.

Tier 1, 2 and 3 (All tiers)

If taken forward, the activities associated with the development of the proposed Bremore Port and Dublin Port Masterplan 2040 will increase the likelihood of an incident requiring an emergency response and subsequently increase the likelihood of multiple incidents occurring simultaneously, adding additional stress on emergency responders. This is likely to be more prominent for the proposed Bremore Port given its location in the same sea area as the offshore development area and Oriel Wind Park.

SOLAS obligations (IMO, 1974) are again applicable and may have a positive effect on a cumulative level as a proposed development vessel for the proposed Bremore Port may be able to assist with an incident associated with the proposed development. Bremore Port may also, in time, incorporate an emergency response base out of the port and so increase the availability of emergency responders in proximity to the offshore development area and in the region as a whole.

Given the distance from the offshore development area, it is unlikely that SOLAS obligations relating to the Dublin Port Masterplan 2040 would be as relevant for the proposed development in the event of an incident. Moreover, it is likely that differing emergency response resources (i.e., different RNLI stations) may respond to an incident associated with the Dublin Port Masterplan 2040 due to some bases being closer in proximity. Therefore, the likelihood of this impact arising is not substantially higher with the Dublin Port Masterplan 2040 developed.

Across all tiering scenarios the relevant embedded mitigation measures are compliance with relevant regulator guidance, liaison with IRCG in relation to SAR resources, lighting and marking, marine coordination for proposed development vessels, proposed development vessel compliance with international marine regulations and WTG design/layout.

Significance of the effect

The frequency of occurrence is anticipated to be remote. The severity of consequence is deemed to be serious. These rankings have been determined on the basis that the consequences should an effective search not be possible are as per the equivalent in isolation impact, while the likelihood of an effective search not being possible is slightly greater that for the equivalent in isolation impact given the increased presence of offshore infrastructure and vessel movements.

Therefore (as per the matrix in Table 17.6), with the frequency of occurrence and the severity of consequence, the cumulative significance of effect for reduction in emergency response capabilities for the proposed development during the operational phase with Tier 1 and Tier 2 and Tier 3 projects is determined to be tolerable with mitigation and ALARP, which is not significant in EIA terms. Given that Project Option 1 presents the greatest likely significant effects, the significance of effect associated with Project Option 2 is considered to be no greater than that of Project Option 1.

17.10 References

DCCAE (2017). Guidance on Environmental Impact Statements (EISs) and Natura Impact Statements (NISs) Preparation for Offshore Renewable Energy Projects. Ireland: DCCAE.

DoT (2024). Marine Navigational Safety & Emergency Response Risk of Offshore Renewable Energy Installations (OREI). Draft version. Dublin, Ireland: DoT.

Dublin Port (2022). About Dublin Port. Dublin: Dublin Port Company. https://www.dublinport.ie/wpcontent/uploads/2018/07/DPC_Masterplan_2040_Reviewed_2018.pdf (Accessed August 2023).

IALA (2021). IALA Guideline G1162 The marine of Offshore Man-Made Structures. Edition 1.0. Saint Germain en Laye, France: IALA.

IALA (2021). IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures. Edition 3.0. Saint Germain en Laye, France: IALA.

IMO (1972/77). Convention on International Regulations for Preventing Collisions at Sea (COLREGs) – Annex 3. London: IMO.

IMO (1974). International Convention for the Safety of Life at Sea (SOLAS). London: IMO.

IMO (2018). Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process. MSC-MEPCC.2/Circ.12/Rev.2. London: IMO.

MCA (2008). Marine Guidance Note 371 (Merchant and Fishing) Offshore Renewable Energy Installations (OREIs): Guidance on UK Navigational Practice, Safety and Emergency Response Issues. Southampton: MCA.

MCA (2021). Marine Guidance Note 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response. Southampton: MCA.

MCA (2022). Marine Guidance Note 372 Amendment 1 (Merchant and Fishing) Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs. Southampton: MCA.

RYA (2019). The RYA's Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy. 5th revision. Southampton: RYA.

UKHO (2019). Admiralty Sailing Directions Irish Coast Pilot NP40. 21st Edition. Taunton: UKHO.