APPENDIX 14-3

WINTER VESSEL TRAFFIC SURVEY

Sceirde Rocks
Vessel Traffic Survey
Winter 2022

Prepared by	Anatec Limited
Presented to	Xodus on behalf of Corio Generation
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Abbreviations Table

Abbreviation	Definition
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
E	East
EIAR	Environmental Impact Assessment Report
GT	Gross Tonnage
IMO	International Maritime Organization
Kt	Knot(s)
MGN	Marine Guidance Note
MSO	Marine Survey Office
MCA	Maritime and Coastguard Agency
m	Metre(s)
MMSI	Mobile Maritime Service Identity
nm	Nautical Mile(s)
nm²	Nautical Miles Squared
NRA	Navigational Risk Assessment
N	North
NE	Northeast
NW	Northwest
OREIs	Offshore Renewable Energy Installations
OWF	Offshore Wind Farm
Radar	Radio Detection and Ranging
RIB	Rigid Inflatable Boat
S	South
SW	Southwest
UK	United Kingdom
UTC	Coordinated Universal Time
VHF	Very High Frequency
W	West
WGS84	World Geodetic System 1984

1 Introduction

As part of the Navigational Risk Assessment (NRA) process for the proposed site of the Sceirde Rocks offshore windfarm (OWF), vessel traffic survey data is being gathered within a study area around the development. Anatec were commissioned to carry out a winter vessel traffic survey covering the proposed Sceirde Rocks OWF site (from here on referred to as 'the site'), located off the west coast of Ireland in the North Atlantic Ocean. The survey was carried out over 14 x 24 hours from the 16th to 30th November 2022.

The survey was shore based and was carried out using equipment set up at a private property located on Maínis (or Mweenish) island off the Conamara coast on the west coast of Ireland with line-of-sight to the sea area of interest. The data was collected using a combination of Radio Detection and Ranging (Radar), Automatic Identification System (AIS) and visual observations.

To ensure the survey analysis was specific to the site, a study area was defined enclosing the area within ten nautical miles (nm) of the site. The 10nm buffer is recognised as an industry standard radius given it captures relevant traffic while still remaining specific to the site being assessed. This included all the relevant routes and vessel activity within and near the proposed site which are considered relevant to the NRA which will be developed in support of the Environmental Impact Assessment Report (EIAR).

2 Survey Methodology

The vessel traffic survey began at 13:30 Coordinated Universal Time (UTC) on the 16th November 2022 and concluded at 13:30 UTC on the 30th November 2022, giving a full 14 x 24 hours of survey data. Shore based survey equipment was set up at a private property located on Maínis island, approximately 30nm to the west of Galway, Ireland.

The primary objective of the survey was to identify the baseline routeing of vessels and level of vessel activity in the study area to inform the NRA/EIAR process. This was achieved by recording in real-time the positions of the vessels within range of the AIS receiver and Automatic Radar Plotting Aid (ARPA) Radar. This was supplemented by observation of vessels within visual range, to obtain information on type and size, where the information was not available from AIS.

2.1 Survey Location

An overview of the site, located within the North Atlantic and covering an area of approximately 8.5 nautical miles squared (nm²), is presented in Figure 2.1. This also shows the onshore base at coordinates 53° 18.0460' North (N), 009° 51.4260' West (W) (World Geodetic System 1984 (WGS84)). The site boundary is located approximately 3nm at the closest point from the onshore base.

The study area for this report has been defined as a 10nm buffer of the site and is included in Figure 2.1 for reference.

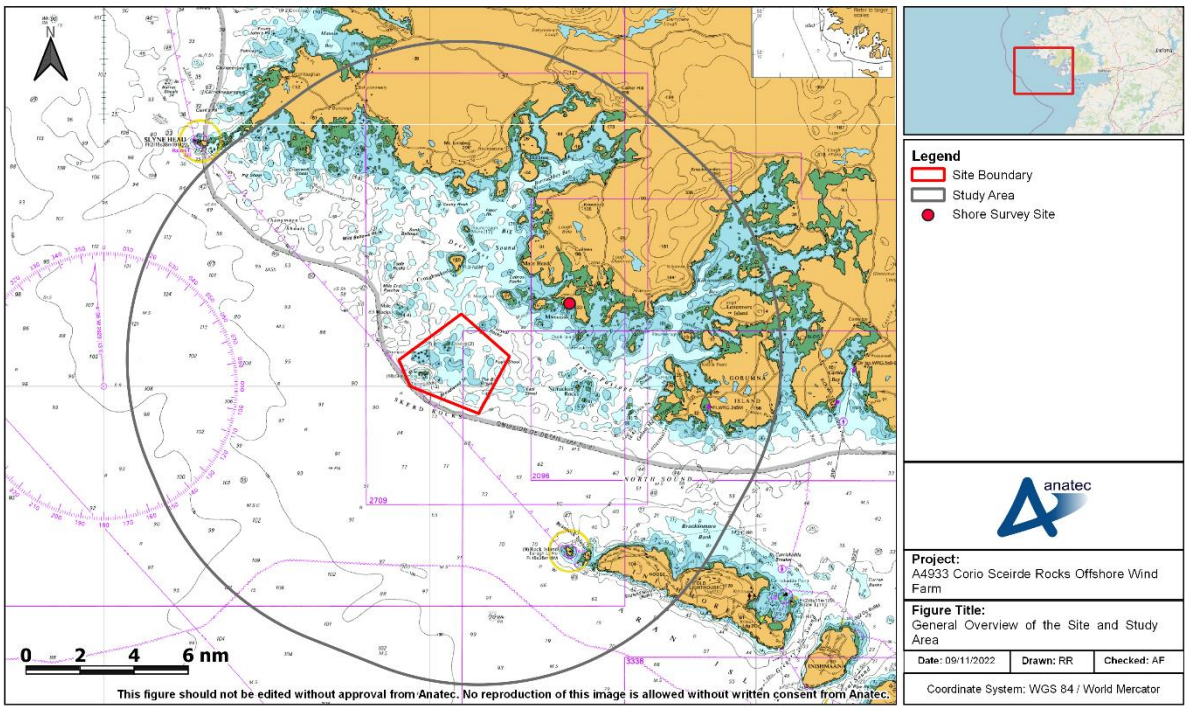

Figure 2.1 General Overview of Site and Study Area relative to Shore Base

The site is situated in waters of depths up to 50 metres (m) with many shallow banks and shoals. It is noted that there are multiple small islands between the site and mainland with the closest being St. Macdara's Island at a distance of 1.5nm from the site boundary. The site itself encompasses small islands including Skedmore Island, Doonguddle Island and Doolick Island. To the northwest of the site there is also Doonpatrick rocks which cover an area of approximately 0.3nm². A detailed overview of the site is presented in Figure 2.2.

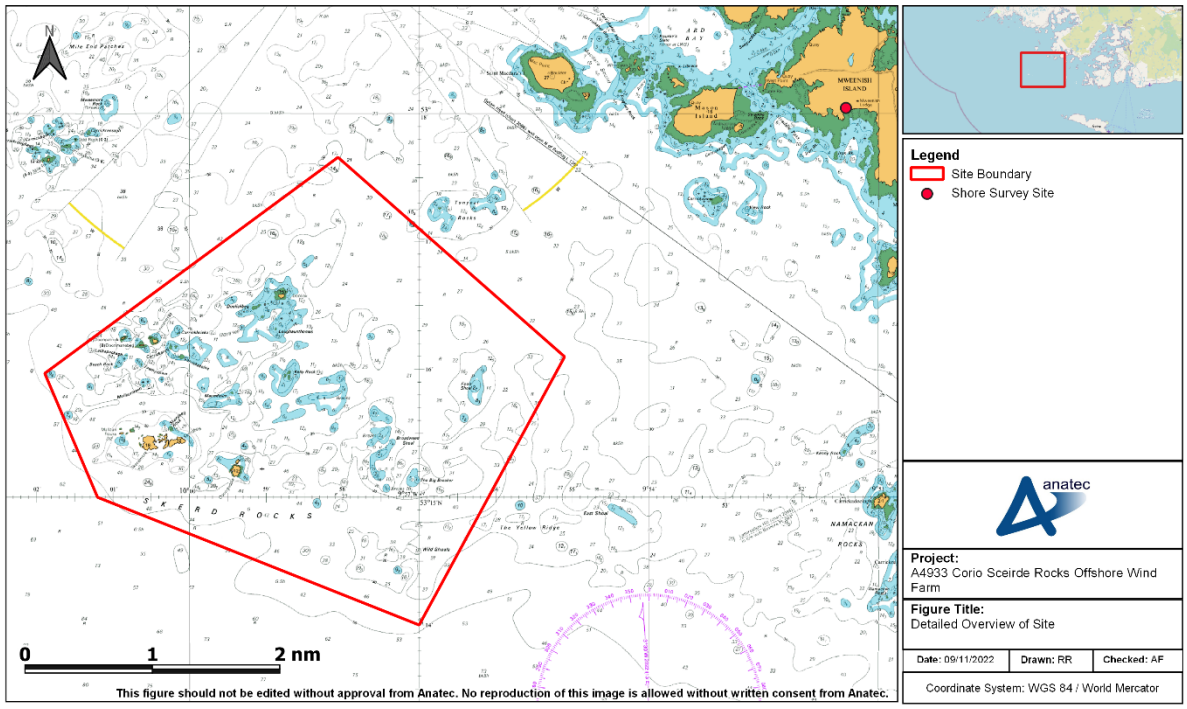

Figure 2.2 Detailed Overview of Site

The closest port or harbour to the site is Galway Port located within Galway Bay, approximately 23nm to the southeast of the site. Positioned west of the bay entrance is the group of islands, the *Aran Islands,* which act as a natural buffer to the bay. The Aran Islands are approximately 7nm southeast of the site and so is situated close to the main transit route for entering/exiting the bay from the north.

2.2 Equipment and Manning

The equipment used to undertake the vessel traffic survey is listed in Table 2.1.

Table 2.1 Equipment utilised in Vessel Traffic Survey

Equipment	Purpose
Furuno FAR-2117 12 kW X-Band Radar with 4ft Scanner	Tracking of targets (manually and automatically) up to 20nm from the survey location.
Furuno GP-32	Global Positioning System used to determine the position of the survey and to input the information to the radar system.

Equipment	Purpose
Compass	Used to verify heading.
Admiralty Charts, dividers and parallel ruler	Used for manual plotting and verification of position.
7 x 50 Marine Binoculars	Visual identification of vessels.
Nikon Telescope	Visual identification of vessels.
Digital Camera	Photographic evidence of targets (when possible)
Comar SLR200 AIS Receiver and VHF Antenna	To receive and record data from vessel's transmitting AIS data. Tracks vessels fitted with AIS (majority of vessels > 300 Gross Tonnage (GT)) within a range of approx. 30-40nm.
Notebook PCs	Connected to radar and AIS receiver for real-time recording of tracked target data. Tracked targets displayed on hydrographic charts and can be replayed at high speed when required.
Logbook	Written log of all manual targets acquired during survey as well as other notes such as visual identification information, weather conditions, etc.

The AIS receiver and Radar scanner were set up at the shore base with the Radar scanner positioned on a frame above ground level as illustrated in Figure 2.3 to give an unobstructed view of the site. Note that the image shown is from the summer survey, but a similar setup was in place during the winter survey.

The AIS receiver automatically tracked targets 24 hours per day during the survey. Radar targets (not duplicated on AIS) were acquired manually by the watchkeepers between 06:30 and 23:30 hrs, with a visual lookout also maintained and all observations recorded in the logbook. Overnight when the site was unattended, an auto-acquire zone was defined on radar, which encompassed the study area. Overnight radar targets were reviewed each day to remove any duplicates with AIS, as well as any spurious tracks, e.g., on land.

Figure 2.3 Radar Scanner Set-Up at Shore Survey Location

2.3 AIS Description

Regulation 19 of the International Convention for the Safety of Life at Sea (SOLAS) Chapter V - Carriage requirements for vessel borne navigational systems and equipment - sets out navigational equipment to be carried on board vessels, according to vessel type. In 2000, the International Maritime Organization (IMO) adopted a new requirement (as part of a revised new chapter V) for vessels to carry AIS. AIS is a system by which vessels transmit data concerning their position, Mobile Maritime Service Identity (MMSI) etc., on two individual Very High Frequency (VHF) channels to the shore and other vessels, at very frequent intervals. The data is transmitted automatically via VHF to other vessels and coastal stations/authorities.

The regulation requires AIS to be fitted aboard all vessels of 300 GT and upwards, engaged on international voyages, cargo vessels of 500GT and upwards, not engaged on international voyages and passenger vessels irrespective of size, built on or after 1st July 2002. It also applies to vessels engaged on international voyages, constructed before 1st July 2002, according to the following timetable:

- Passenger vessels, not later than 1st July 2003;
- Tankers, not later than the first survey for safety equipment on or after 1st July 2003; and
- Vessels, other than passenger vessels and tankers, of 50,000GT and upwards, not later than 1st July 2004.

An amendment adopted by the Diplomatic Conference on Maritime Security in December 2002 states that vessels, other than passenger vessels and tankers, of 300GT and upwards but less than 50,000GT, will be required to fit AIS no later than the first safety equipment survey after 1st July 2004, or by 31st December 2004, whichever occurs earlier. Vessels fitted with AIS shall always maintain AIS in operation, except where international agreements, rules or standards provide for the protection of navigational information.

The regulation requires that AIS shall:

- Provide information – including the vessel's identity, type, position, course, speed, navigational status and other safety-related information – automatically to appropriately equipped shore stations, other vessels and aircraft;
- Automatically receive such information from similarly fitted vessels; exchange data with shore-based facilities.

Fishing vessels of 15m length and over are also required to carry Class A AIS.
Recreational vessels within this report includes sailing and motor craft of between 2.4m and 24m length, with any such vessels over 24m or carrying more than 12 passengers classified as passenger vessels.

Both dynamic and static information are transmitted via AIS. Examples of such information is presented in Table 2.2.

Table 2.2 Vessel Properties Transmitted via AIS

Static	Dynamic
▪ MMSI ▪ IMO Number ▪ Call Sign ▪ Name ▪ Length and Beam ▪ Type of Vessel ▪ Type of Navigation Sensor	▪ Position (Latitude/Longitude) ▪ Time ▪ Course over ground ▪ Speed over ground ▪ Heading ▪ Navigational Status ▪ Rate of Turn ▪ Draught ▪ Hazardous Cargo (type) ▪ Destination ▪ Estimated Time of Arrival ▪ Route Plan

2.4 Weather Data

Weather data was recorded by the surveyors throughout the survey period. A summary is presented in Table 2.3.

Table 2.3 Weather Data during the Winter Survey Period

Date	Time	Wind (Direction & Speed in knots (kt))	Sea State (Douglas Scale)	Visibility (nm)	Additional Comments
16/11/2022	18:00	NE, 10kts	Mod	5	
	23:00	N, 8kts	Mod	Dark	
17/11/2022	06:30	S, 10kts	Rough	Dark	Full cloud cover
	12:00	S, 10kts	Mod	5+	Sunny
	18:00	SE, 19kts	Mod	3	Dark
	23:00	SE, 19kts	Mod	Dark	Dark
18/11/2022	06:30	W/NW, 15kts	Mod	3	Dark
	12:00	NW, 18kts	Mod	8	Sunny/Showers
	18:00	NW, 9kts	Mod	8	Showers
	23:00	NW, 7kts	Mod	5	Dark
19/11/2022	06:30	W/S, 20kts	Rough	5	Dry/Cloudy/Wintry
	12:00	W, 35kts	Rough	2	Rain/Stormy
	18:00	W, 25kts	Rough	3	Rain/Wind
	23:00	W, 21kts	Rough	3	Wind
20/11/2022	06:30	W, 25kts	Rough	Dark	Full cloud/Stormy
	12:00	W, 25 kts	Rough	3	Rain/Stormy
	18:00	NW, 11kts	Rough	3	Showers
	23:00	NW, 19kts	Rough	3	Stormy
21/11/2022	06:30	W, 28kts	Rough	Dark	Rain/Stormy
	12:00	W, 25kts	Rough	10	Clear/Stormy
	18:00	W, 26kts	Rough	5	Windy
	23:00	NW, 14kts	Rough	5	Stormy
22/11/2022	06:30	NW, 7kts	Calm	Dark	Cloudy/Dry
	12:00	NW, 3kts	Calm	8	Sunny/Dry
	18:00	NE, 9kts	Mod	5	Wind
	23:00	NW, 18kts	Mod	Dark	Wind/Rain
23/11/2022	06:30	SW, 25kts	Rough	Dark	Wind/Rain
	12:00	SW, 30kts	Rough	6	Showers/Stormy
	18:00	SW, 31kts	Rough	5	Stormy

Date	Time	Wind (Direction & Speed in knots (kt))	Sea State (Douglas Scale)	Visibility (nm)	Additional Comments
	23:00	SW, 24kts	Rough	5	Windy
24/11/2022	06:30	S, 40kts	Rough	Dark	Rain/Stormy
	12:00	S, 30kts	Rough	5	Cloudy/Stormy
	18:00	W, 26kts	Rough	10	Clear/Windy
	23:00	W, 22kts	Rough	5	Clear/ High Winds
25/11/2022	06:30	W/SW, 28kts	Rough	Dark	Showers/Stormy
	12:00	SW, 25kts	Rough	5	Clear/Windy
	18:00	S, 22kts	Rough	3	Fog/Dark
	23:00	S, 22kts	Rough	3	Windy
26/11/2022	06:30	S, 35kts	Rough	Dark	Storm
	12:00	S, 30kts	Rough	3	Stormy/Showers
	18:00	SSW, 31kts	Rough	3	Storm
	23:00	SSW, 31kts	Rough	3	Windy
27/11/2022	06:30	S/SW, 25kts	Rough	Dark	Windy/Rain
	12:00	S/SW, 25kts	Rough	7	Windy/Clear
	18:00	SW, 31kts	Rough	5	Windy/Rainy
	23:00	SW, 17kts	Mod	5	Windy
28/11/2022	06:30	NW, 18kts	Rough	10	Weather Clearing
	12:00	NW, 15kts	Mod	10	Sunny
	18:00	NW, 12kts	Mod	7	Clear
	23:00	WNW, 5kts	Mod	10	Clear
29/11/2022	06:30	SSE, 5kts	Calm	10	Clear
	12:00	SSE, 7kts	Mod	10	Cloudy
	18:00	SE, 14kts	Mod	10	Clear
	23:00	SE, 15kts	Mod	5	Showers/Windy
30/11/2022	06:30	SE, 18kts	Mod	Dark	Clear/Dry
	12:00	SE, 15kts	Mod	8	Clear/Sunny

3 Survey Results

3.1 Overview of Survey Results

This section presents analysis of the vessel tracks recorded on AIS, and radar within the study area throughout the 14-day survey period. The AIS receiver generally tracked vessels over greater range than the corresponding radar track and provided more accurate information on position and vessel characteristics. Therefore, the AIS track has generally been prioritised where the vessel was recorded by both systems. Vessels not on AIS were tracked on radar (approximately 4% of the total). All non-AIS data was combined with the AIS data to create a single dataset of all vessels.

3.2 Vessel Type

An overview of the vessel traffic recorded during the survey period, colour-coded by vessel type, is presented in Figure 3.1.

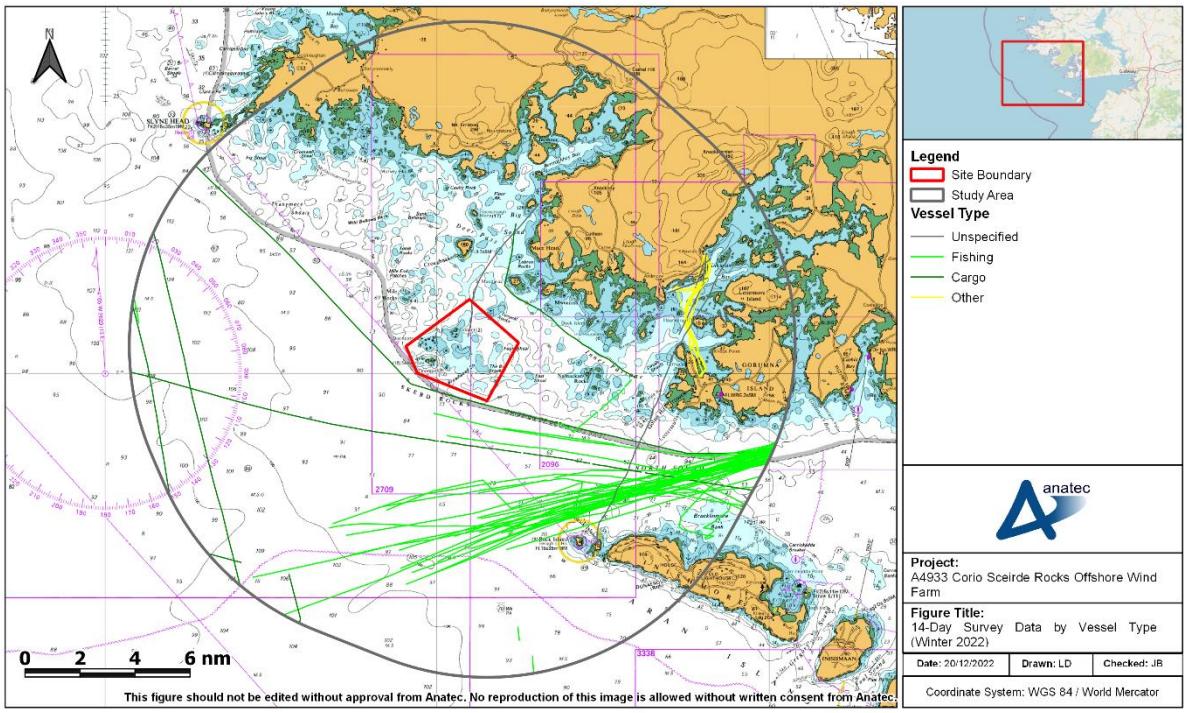

Figure 3.1 Survey Data by Vessel Type (Winter 2022)

The highest volume of traffic within the study area was made up of fishing vessels passing through the channel between the Aran Islands and the mainland to the south of the site. Based on their behaviour and speeds, these vessels were typical on transit rather than actively fishing. Cargo vessels were also recorded within the study area, with some transiting at the western extent of the study area in the deeper waters further offshore, while others passed through the channel between the Aran Islands and the mainland and passed the site closer to shore.

A summary of the vessel type distribution is provided in Figure 3.2. A total of 9% were unspecified.

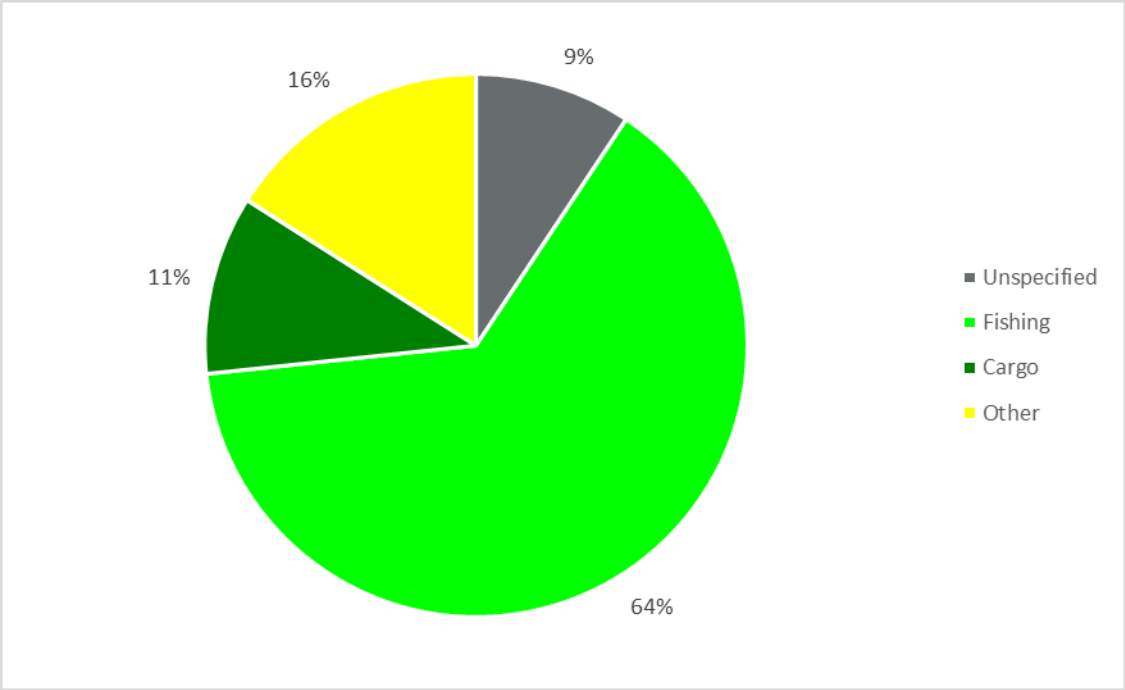

Figure 3.2 Distribution of Vessel Types within 10nm Study Area

The most common vessel type within the study area was fishing (64%), cargo (11%) and vessels classed as 'other' (16%). The only vessel in the 'other' category was a fish farm vessel recorded frequently within Kilkieran Bay during the survey period.

3.3 Vessel Counts

The daily numbers of unique vessels present within the study area during the survey period are provided in Figure 3.3, noting that the first and last days of the survey are partial days.

An average of between five and six unique vessels per day were present within the study area during the survey period. The busiest day was 28th November 2022, on which 17 unique vessels were present. It is noted that the 28th saw a significant improvement in the weather, which may have caused the increase in the number of vessels recorded. The quietest (full) days were 22nd and 24th of November 2022, on which two unique vessels were recorded.

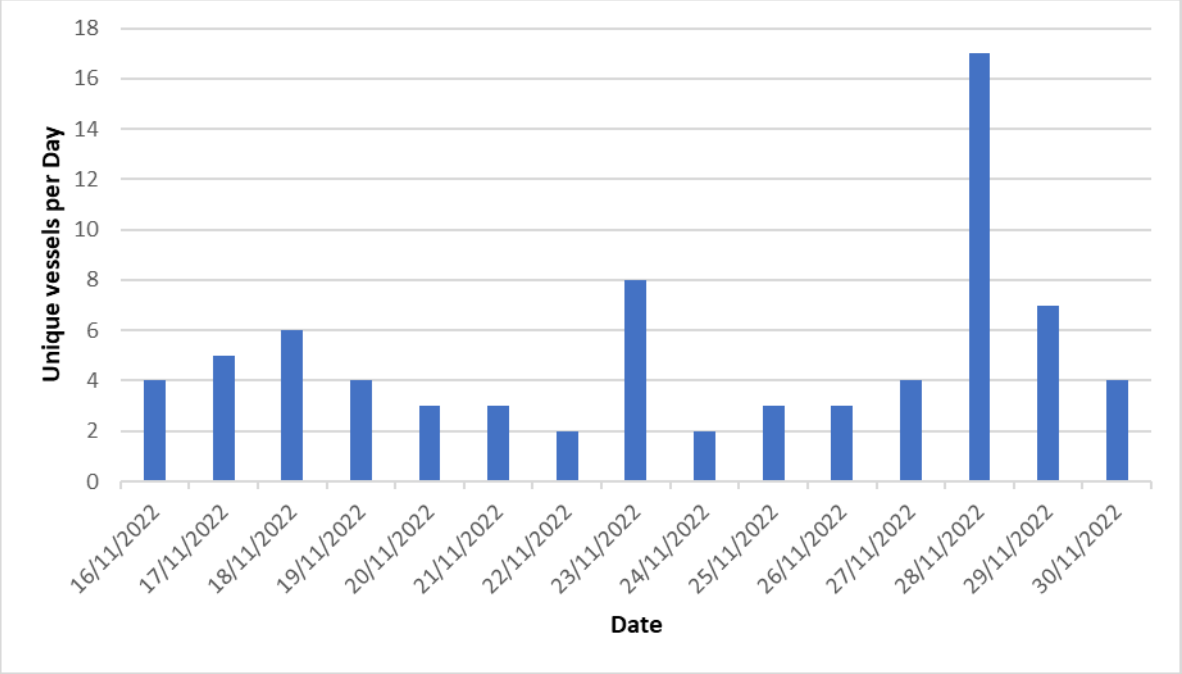

Figure 3.3 Number of Unique Vessels per Day (Winter 2022)

3.4 Vessel Length

The tracks of vessels present within the study area during the survey period, colour-coded by vessel length, are presented in Figure 3.4. Vessel length was able to be established for 90% of targets. All vessels with a precise vessel length were recorded via AIS.

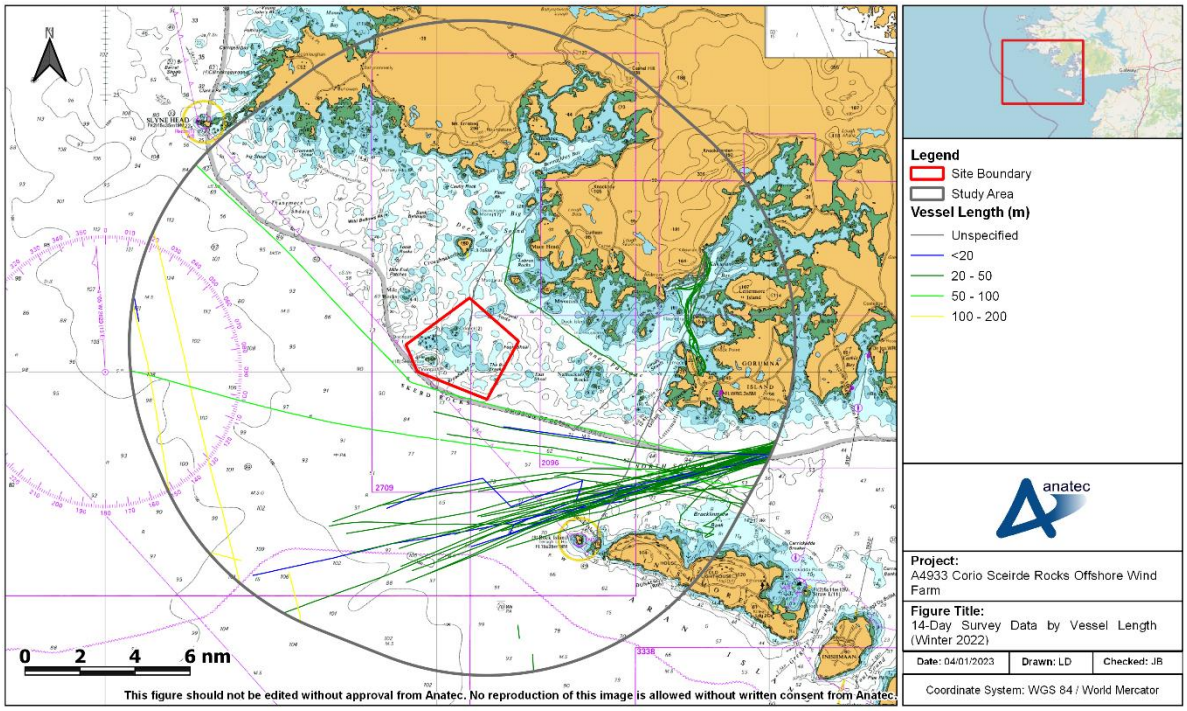

Figure 3.4 Survey Data by Vessel Length (Winter 2022)

The longest vessels were predominantly cargo vessels transiting further offshore in the deeper waters and utilising the routes passing to the west of the site. Vessels of smaller (or unspecified) length were typically fishing vessels, and a single small cargo vessel.

The average vessel length was 32m. The largest was a general cargo ship at 150m transiting southbound to Aughinish on the 17th November 2022 passing approximately 9nm west of the site.

3.5 Vessel Draught

An overview of the vessels within the study area during the survey period, colour-coded by vessel draught, is provided in Figure 3.5. Vessel draught was able to be established for 38% of tracks within the study area, noting that draught information was not available for any of the radar targets. Draught information was unavailable generally for smaller vessels such as fishing vessels and the fish farm support vessel.

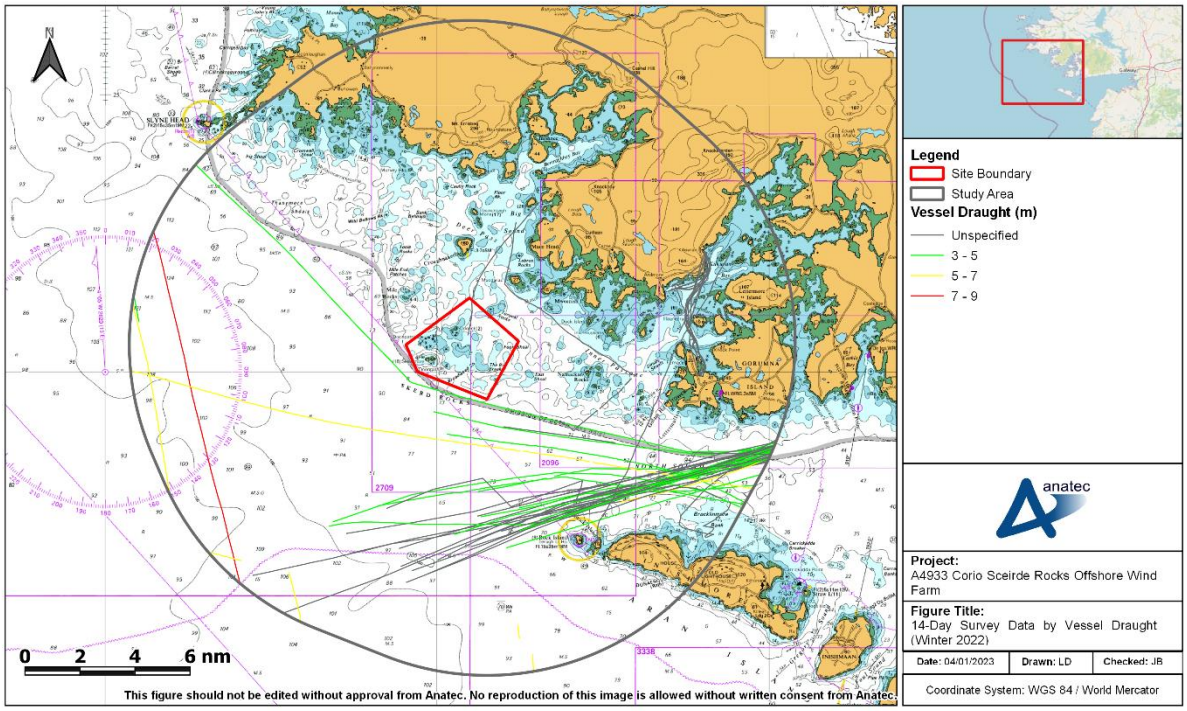

Figure 3.5 Survey Data by Vessel Draught (Winter 2022)

The average vessel draught was 4.8m. Vessels with deeper draughts were mainly cargo vessels. The deepest draught was a general cargo vessel at 8.3m transiting to Tallinn, Estonia on the 17th November 2022 passing through the western extent of the study area, 8nm from the site.

3.6 Average Vessel Speed

Vessel tracks colour-coded by average track speed are presented in Figure 3.6. Following this, the speed distribution is summarised in Figure 3.7. The average vessel speed within the study area was 5.7 knots (kt).

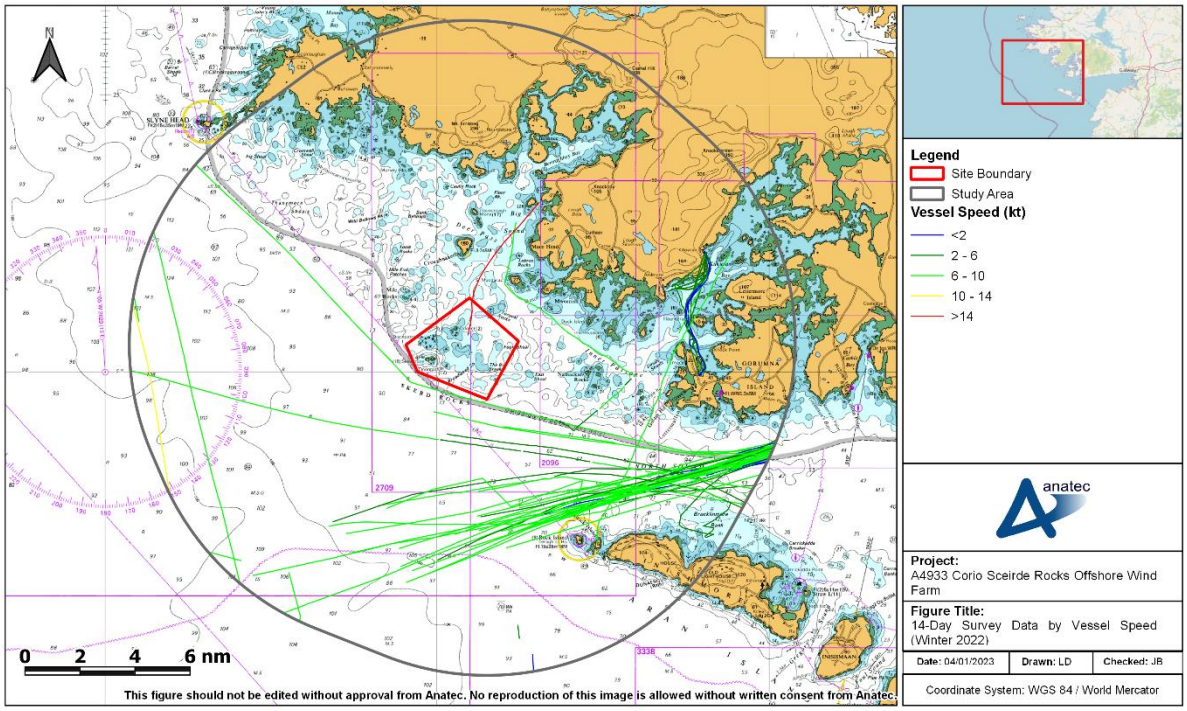

Figure 3.6 Survey Data by Average Vessel Speed (Winter 2022)

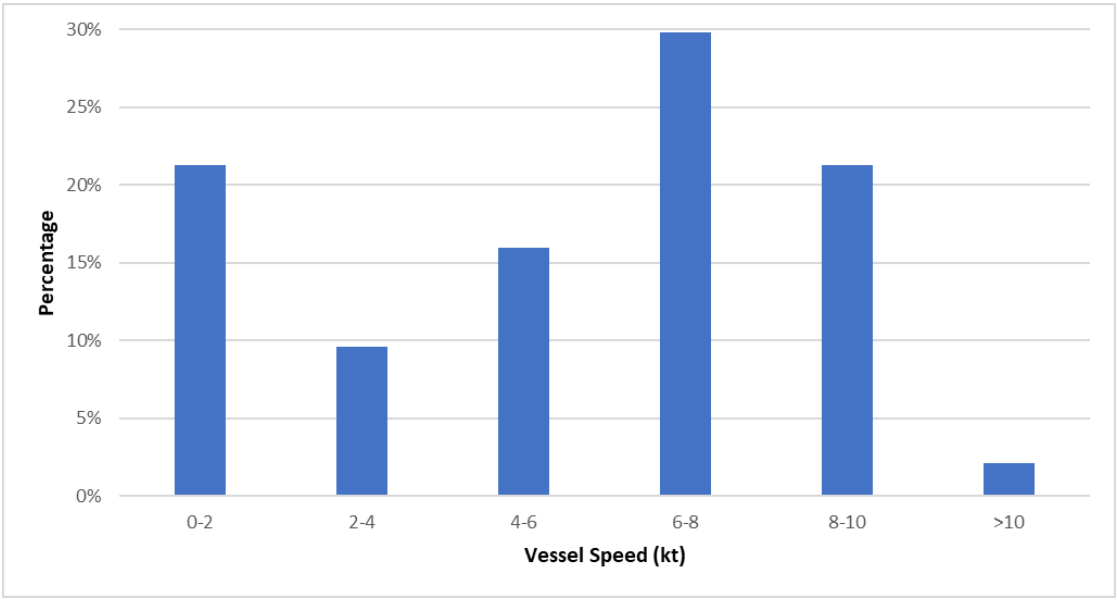

Figure 3.7 Distribution of Average Vessel Speeds

Higher speed vessels were typically cargo and fishing vessels on passage. Slower speeds tended to be recorded by a working fish farm vessel in Kilkieran Bay as well as some slower moving fishing vessels. The highest speed recorded within the study area was 11.9kt, recorded by a cargo vessel transiting in the west of the study area.

3.7 Vessel Destination

Valid vessel destinations were available for 48% of vessels recorded within the study area, noting that destinations were unavailable for radar targets. The most common destinations broadcast on AIS were Ardmore Fish Farm (33%), fishing grounds (17%) and Vigo, Spain (11%). Other destinations included various ports and harbours in Ireland, the UK, as well as Tallinn, Estonia.

3.8 Vessels Intersecting the Site

The tracks of vessels recorded intersecting or in proximity to the site during the survey period is presented in Figure 3.8 colour-coded by vessel type.

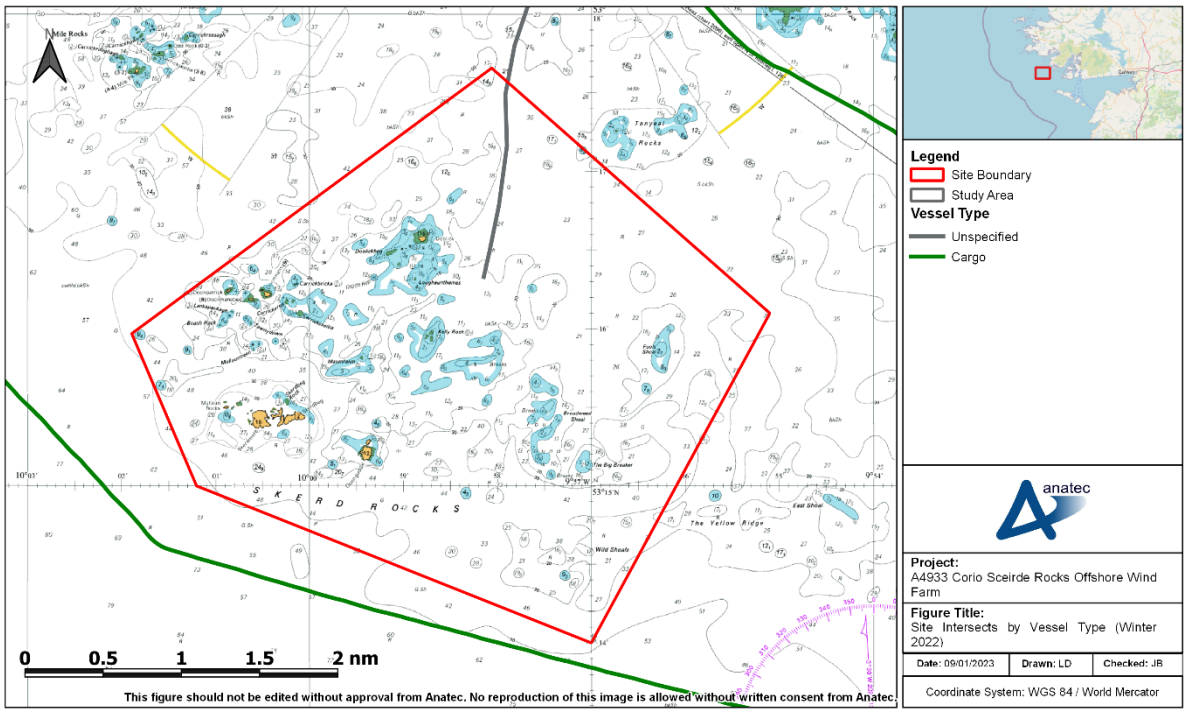

Figure 3.8 Winter Survey Data Intersecting the Site by Vessel Type

Only one vessel was recorded intersecting the site during the survey period, with this being a radar target of unspecified type recorded overnight. It is anticipated that larger vessels on passage would pass further offshore of the site given the rocky outcrops in the area and shallow waters within the site. An 88m cargo vessel was recorded passing within 0.2nm of the site boundary to the south, while on passage to Ayr.

3.9 Anchored Vessels

No vessels were identified to be at anchor in the study area during the survey period.

4 Detailed Review by Vessel Type

The following sub-sections present a more detailed analysis of the main vessel types recorded within the study area during the survey period.

4.1 Cargo Vessels

An overview of the cargo vessels recorded within the study area throughout the survey period, colour-coded by vessel length, is presented in Figure 4.1. All cargo vessels were recorded via AIS.

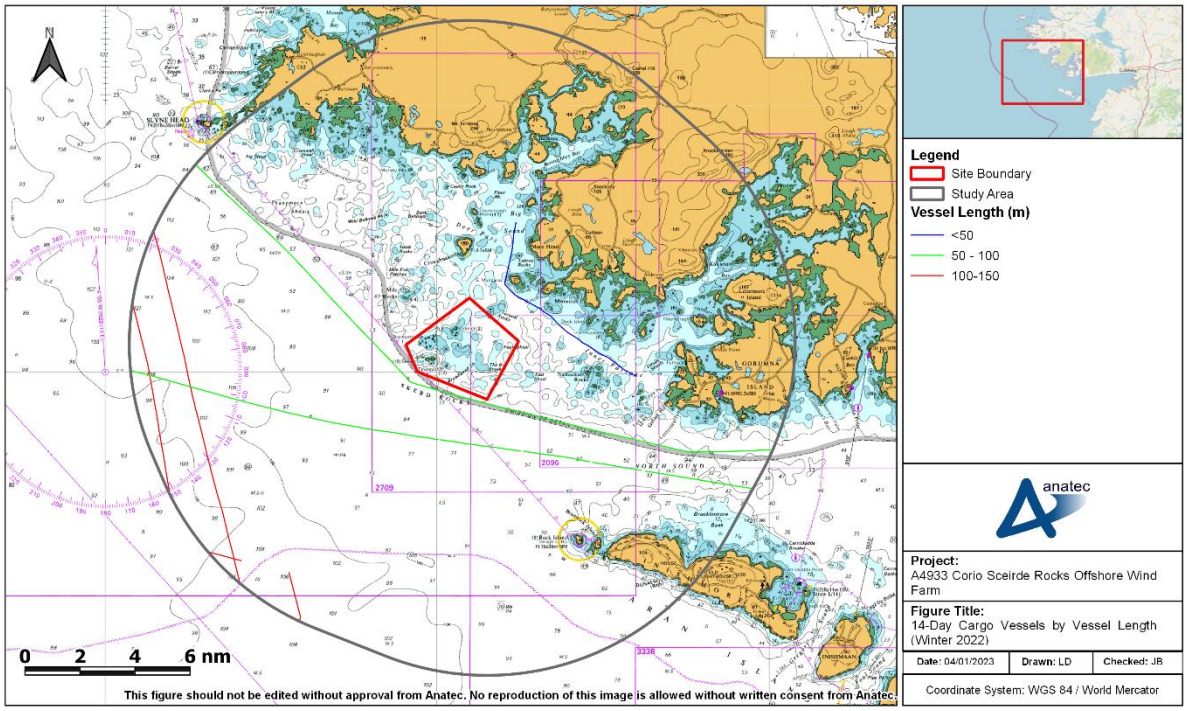

Figure 4.1 14-Day Cargo Vessels by Vessel Length

An average of one cargo vessel approximately every two days was recorded within the study area. None were recorded within the site boundary.

All cargo vessels were general cargo with destinations including ports and harbours in Ireland, UK, and Estonia.

4.2 Fishing Vessels

An overview of the fishing vessels recorded within the study area during the survey period is presented in Figure 4.2. All but one of the fishing vessels recorded within the study area were recorded on AIS, with a single vessel recorded only on radar.

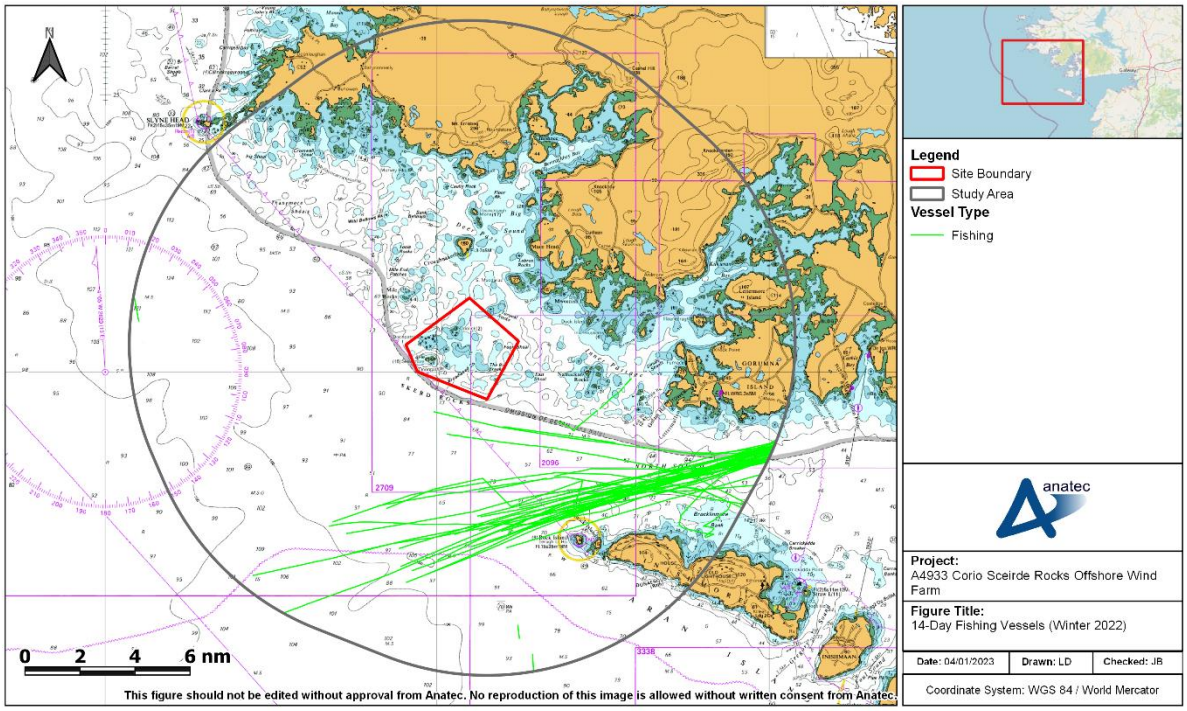

Figure 4.2 14-Day Fishing Vessels

An average of three to four unique fishing vessels per day were present within the study area during the survey period. These were primarily recorded to the south of the site, passing between the Aran Islands and the Irish mainland.

4.3 Other / Unspecified Vessels

An overview of those vessels classed as “Other” or “Unspecified” recorded within the study area during the survey period is presented in Figure 4.3.

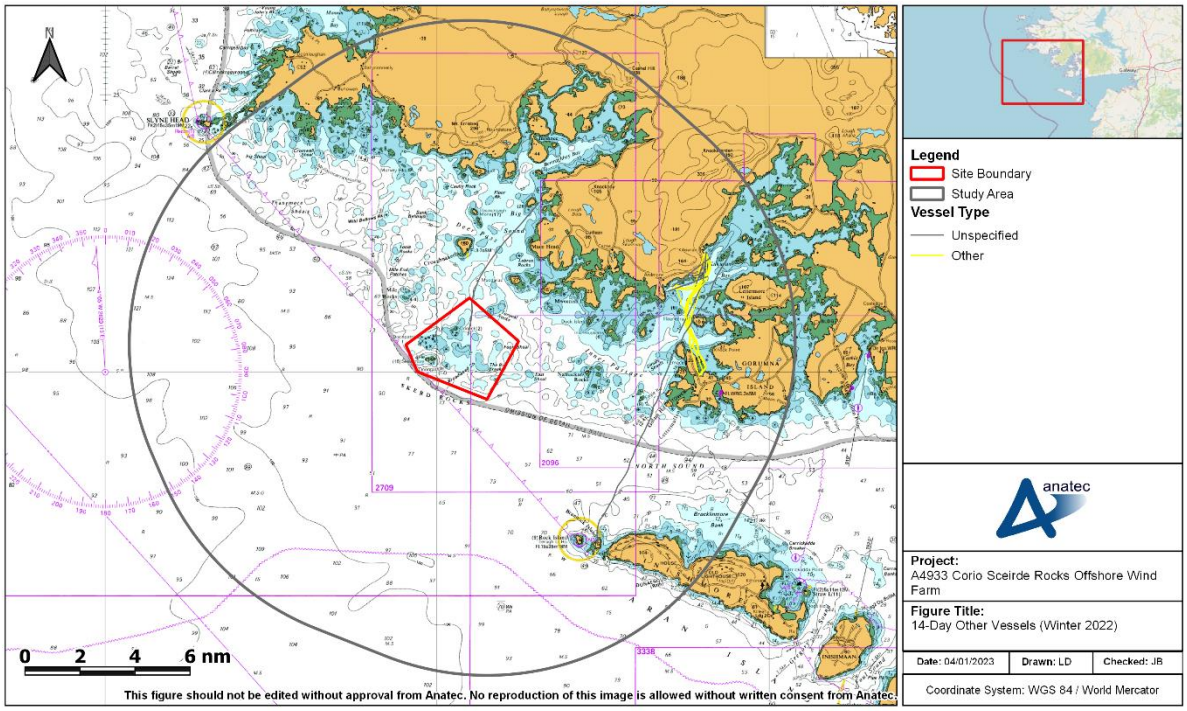

Figure 4.3 14-Day Other and Unspecified Vessels

An average of approximately one vessel per day was recorded in the Other category throughout the survey period. The only vessel recorded within this category was a fish farm vessel recorded within Kilkieran Bay on multiple occasions throughout the survey period.

Unspecified vessels consisted of two vessels recorded only on radar, without any visual observation, as well as a single vessel recorded on AIS on multiple occasions within Kilkieran Bay. The AIS vessel was recorded behaving similarly to the fish farm vessel, visiting Ardmore. One of the radar targets was recorded passing north into Bertraghboy Bay from within the site in the early hours of the morning. The other radar vessel was recorded passing from Kilkieran to the Aran Islands. As both vessels were recorded overnight, no visual identification was possible.

5 Summary

This report presents analysis of AIS, Radar, and visual data collected within a 10nm study area around the proposed Sceirde Rocks Offshore Wind Farm site during a 14-day survey period in winter 2022. The survey was carried out from the 16th to 30th November 2022.

On average there was between five and six unique vessels per day recorded within the study area. The most common vessel types were fishing vessels (64%), cargo vessels (11%) and other vessels (16%). The busiest day was 28th November 2022, on which 17 unique vessels were present.

The average length and draught of vessels was 32m and 4.8m, respectively. The longest vessel was 150m and the deepest draught vessel was 8.3 m. The average speed of vessels within the study area was 5.7kt. There were no vessels deemed at anchor within the study area.

The most frequently broadcast destinations for vessels within the study area were Ardmore Fish Farm (33%), fishing grounds (17%) and Vigo, Spain (11%).

A single vessel was recorded within the site boundary during the survey period, with this being a radar target which could not be identified visually.

6 References

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