Appendix 31-2:
Offshore Bat Survey (Autumn Migration 2024) Report

ORIEL WINDFARM
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Environmental Impact Assessment Report - Addendum
Appendix 31-2: Offshore Bat Survey (Autumn Migration 2024) Report

MDR1520C
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Contents

Tables

Figures

Appendices

1 INTRODUCTION

1.1 Background

RPS Group Limited (RPS) was commissioned by Oriel Windfarm Limited (OWL) to complete an offshore bat survey to inform a response to the National Parks and Wildlife Services (NPWS) submission concerning offshore bat migration received in August 2024 with respect to the Oriel Wind Farm project (hereafter referred to as 'the Project'). This technical report sets out the methodology and findings of the survey completed during the 2024 Autumn bat migration period (mid-September to November).

From the literature review completed to inform the assessment presented in chapter 31: Bats in the Marine Environment (EIAR volume 2C), there is currently no published empirical evidence of offshore bat activity (e.g. migration, commuting, foraging) within Irish marine waters. This is solely due to an absence of survey data being gathered rather than empirical evidence that such activity does not occur. However, since the application was submitted, data from other offshore wind farm applications has become available in the public realm. This data provides evidence of bats offshore.

Within the wider European context, there is increasing evidence of offshore bat activity (e.g. Lagerveld *et al*., 2014, 2021). Certain species, such as Nathusius' pipistrelle (*Pipistrellus nathusii*) (NPWS, 2016) and Leisler's bat (*Nyctalus leisleri*) (McAney K., 2006) are known to be migratory outside of Ireland; with migrations of 800 – 1950 km between summer and hibernation sites being recorded, including long-distance migration by certain species (e.g. between continental Europe and the UK) (Russ *et al*., 2001, Russ, 2014 , Ahlen *et al.*, 2007, Ahlen *et al.*, 2009). Given increasing evidence elsewhere, there is a need for empirical evidence within the Irish context to inform impact assessments and, if necessary, mitigation with respect to projects such as the Oriel Wind Farm Project.

With respect to the options for offshore survey, there is currently no published guidance or industry best practice standards for characterising offshore bat activity in the marine environment in Ireland or internationally which can be implemented. However, existing UNEP guidelines recommend surveying offshore wind turbine projects in the same manner as land-based turbines (Rodrigues *et al*., 2015). The guidance does provide some useful information on timing of surveys for the terrestrial environment. In addition to this, we can also draw from the various North Sea and Scandinavian studies which have been completed (Lagerveld *et al*., 2014 and 2021).

With the lack of available methodologies, a bespoke boat-based survey methodology has been developed for the Project; utilising a Chartwell 12M multirole work boat/ Landing craft (Rós Áine, Maritime Mobile Service Identity (MMSI): 250006515) operated by Irish Commercial Charter Boats (ICCB), and which was commissioned by OWL to conduct dedicated bat surveys within the limits of the Offshore Wind Farm Area (hereafter referred to as the 'Survey Area').

To pair with the boat-based surveys, coastal headland surveys were also undertaken to capture bat activity over the same timeframe as the boat-based survey. These data may be used to provide additional context and probability to offshore bat data collected during the Autumn migration period.

1.2 Objectives

In order to address the empirical evidence gap in the Irish context, the objectives of the survey are to:

- Identify any evidence of offshore bat activity within the Survey Area (Figure 2-1) located approximately 6 km (closest turbine) from the nearest shore on the Cooley Peninsula Co. Louth; and
- Identify whether there is any seasonality in the survey data which may indicate evidence of Autumn migration within the Survey Area.

2 METHODOLOGY

2.1 Boat-based survey

2.1.1 Transect routes

To define the transect routes for the boat-based survey, a 1nm^2 grid was overlain with the Offshore Wind Farm Area and 9 No. random grid squares within the grid were selected (see Figure 2-1). These grid squares were used to generate the 9 points or "stations" for the transect route (see Table 2-1 and Figure 2-1).

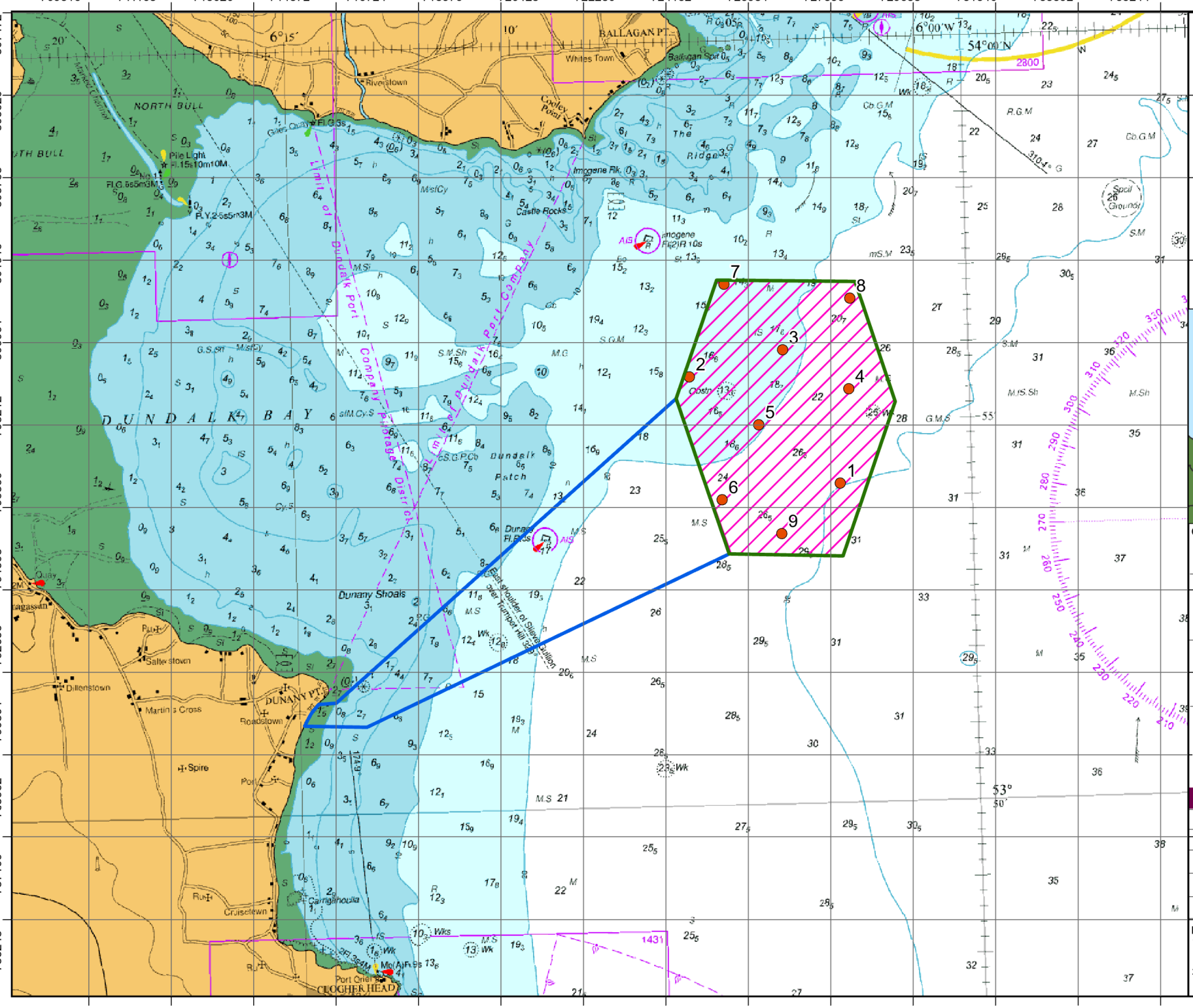
The transect was completed during suitable survey nights between mid-September and November. The particular nights in each month were determined by the vessel operator based on prevailing weather and sea conditions necessary to complete the survey. During any given survey night, the vessel commenced the survey at one of the 9 No. transect points at dusk.

It was aimed to reach each survey point over a survey night. The transect route on any given survey night was at the discretion of the vessel operator and was tracked using GPS. At each transect point and, when it was safe to do so, the vessel remained idle for at least 5 minutes and a maximum of 15 minutes before moving on to the next transect point. Once all the stations were surveys, the transect continued in reverse order to allow for two complete loops of the transect.

Subject to safety considerations to be determined by the vessel operator, the maximum transit speeds of the vessel whilst completing the transect were recommended to be no more than 4-6 knots (kts), with the combined speed of the vessel and the prevailing wind not exceeding 13.0kts (14.96mph or 24km/hr). This was in-line with known car-based bat monitoring maximum speeds of 15mph or 24km/hr (Roche *et al.,* 2012). Before the commencement of any given survey night, the vessel recorded the following: air temperature, weather conditions (e.g. rainfall, % cloud cover), average wind speed, prevailing direction, overall sea state, barometric pressure, phase of the moon, vessel speed (kts), vessel GPS location, and time.

Table 2-1: Stations used to generate the transect routes.

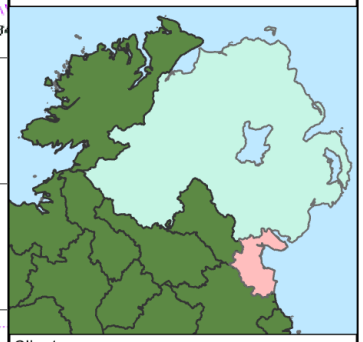
Station no.	Latitude (WGS84 - decimal)	Logitude (WGS84 - decimal)	Latitude (WGS84 - DMS)	Longitude (WGS84 - DMS)
1	53.9028	-6.04863	53°54′10″N	006°02′55″W
2	53.9269	-6.10325	53°55′37″N	006°06′12″W
3	53.9322	-6.06857	53°55′56″N	006°04′07″W
4	53.9233	-6.04452	53°55′24″N	006°02′40″W
5	53.916	-6.07813	53°54′58″N	006°04′41″W
6	53.8999	-6.09237	53°54′00″N	006°05′33″W
7	53.9468	-6.08957	53°56′48″N	006°05′22″W
8	53.9431	-6.04322	53°56′35″N	006°02′36″W
9	53.8922	-6.0707	53°53′32″N	006°04′15″W



Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points

Note: 1nm² grid shown
Data Source: OWL



Client
Oriel Wind Farm Limited

Project
Oriel Wind Farm Project

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Figure 2-1:
Boat-based survey
– transect points

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2.1.2 Equipment

The materials used for the deployment of the bat detectors during the boat-based survey were as follows:

- 2 no. Anabat Ranger Bat Detectors (with built in GPS);
- 4 no. Omni-directional Ultrasonic Microphone US-O V3;
- 2. no 10m Anabat Ranger extension cables;
- 4 no. 64GB SD cards and storage case suitable for use in Anabat Ranger Bat Detectors;
- 32 no. rechargeable batteries and battery charger for Anabat Ranger Bat Detectors sufficient for duration of survey;
- 2 no. IP67 armoured weatherproof cases with foam inserts;
- 4 no. ratchet straps suitable for attaching weatherproof cases to vessel;
- Tec-7 silicone gel sealant;
- Airtight waterproof tape;
- 24mm waterproof cable glands; and
- Cable ties.

Pre-deployment, the IP67 armoured weatherproof cases were drilled through, fitted with 24mm waterproof cable glands and further secured with Tec-7 silicone gel sealant. The cable was measured from the microphone to where the cable would pass into the box. At this point the diameter of the microphone cable was increased by adding a combination of insulation tape, and waterproof tape. This was to ensure that no water ingress was possible. Each of the Anabat Ranger Bat Detectors were then programmed as per the methodology outlined in Appendix A, in preparation for the deployment aboard the survey vessel.

2.1.3 Deployment

The equipment was prepared, checked, and deployed aboard the Rós Áine survey vessel (see Appendix D) on 24 September 2024 to monitor for migratory bat activity within the Survey Area. The deployment was completed at Howth Harbour, West Pier.

Anabat Ranger Bat Detectors were each held within an IP67 armoured weatherproof case (Figure 2-2) with an Omni-directional Ultrasonic US-O V3 microphone exiting the case through a sealed aperture (Figure 2-3). These detectors were equipped with internal GPS capabilities, as standard for this model. The equipment was set to the following Recording Mode: *Night Only*; and the following Recording Profile: *FS Ultrasonic* (full spectrum ultrasonic recording), which records 30 minutes pre-sunset until 30 minutes post-sunrise each day to capture the entire period of bat activity each night.

The installation of the Anabat Ranger Bat Detectors and microphones was completed by the vessel operator. The detectors and their associated cases were secured to the deck on the port side and starboard side of the survey vessel using cable ties and ratchet straps. The microphones and cables were secured to a vertical metal frame approximately 3.3 meters above sea level using cable ties, with the microphones pointing away from the port and starboard side the of the vessel at a slight downward angle (Figure 2-4). The placement of the microphones was determined based on the most suitable location for the size of the vessel, input from the ship captain/personnel, safety considerations, and accessibility for installation, maintenance, and demobilisation.

On board the vessel, the appointed operator was trained on the use and maintenance of the equipment along with how to download and transfer the data. Upon initial deployment, the appointed operator was briefed on the following:

- The equipment placement, its operation, and the maintenance requirements (see section 2.1.4 below) (including sensitivities relating to batteries, memory cards, microphones, etc.);
- Downloading data from SD cards and the weather logging requirements;
- Basic troubleshooting; and
- Points of contact within RPS.

Along with an in-person training of the equipment and its uses, a hardcopy of the maintenance protocol was also provided for reference (Appendix A).

Figure 2-2: Anabat Ranger Bat Detector inside weatherproof case.

Figure 2-3: Bat detector equipment as deployed.

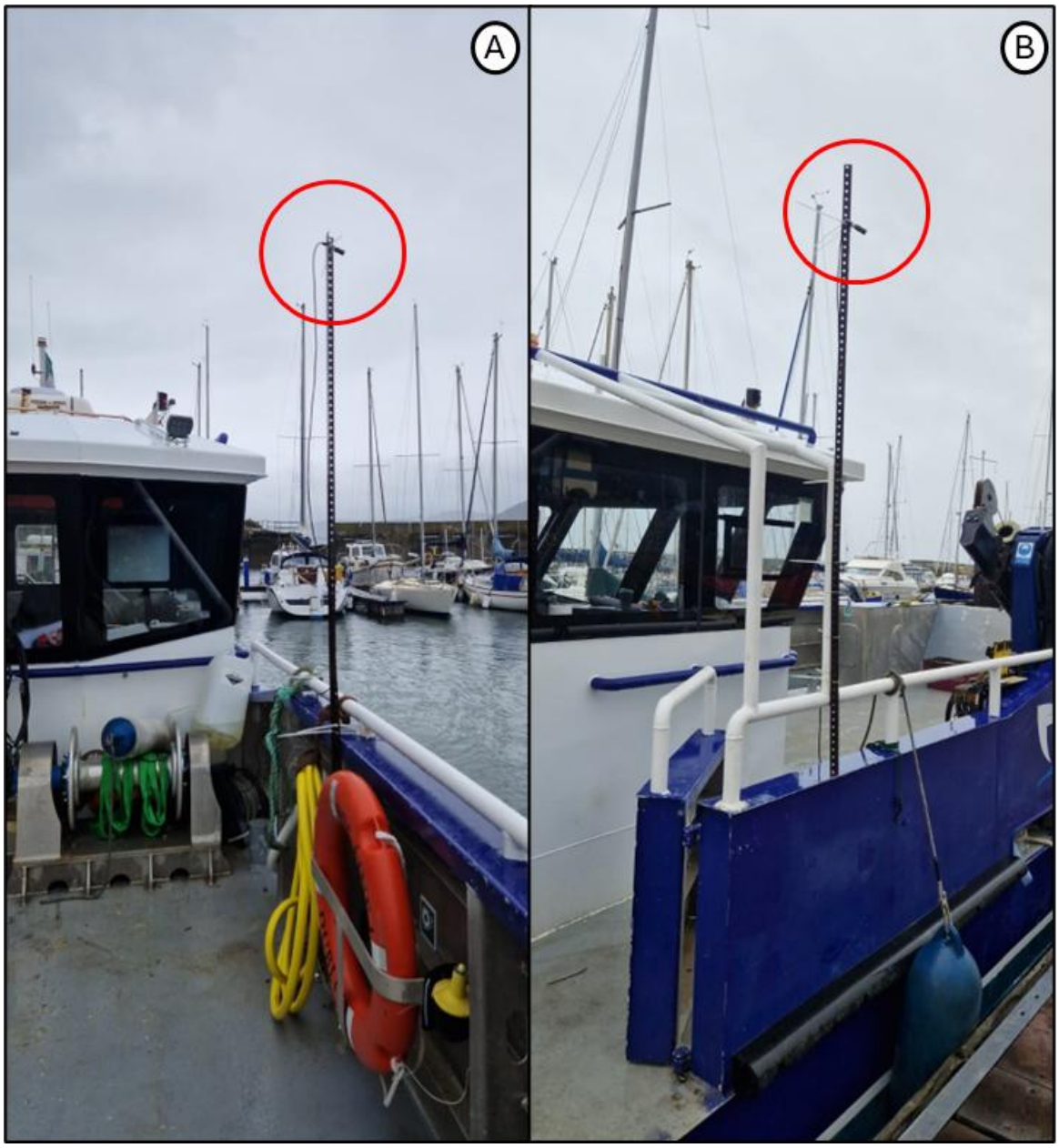


Figure 2-4: Placement of the microphones on the starboard side (A) and the port side (B) of the vessel

2.1.4 Maintenance

Maintenance was carried out before each survey by the appointed operator to check the batteries on the detectors and charge them, when necessary. Following each survey night, an RPS Ecologist met the vessel at Port (Howth, Skerries or Malahide) and downloaded the data files from the SD cards onto a laptop so they could be later uploaded to a SharePoint site. Initially, this task was undertaken by the appointed operator but due to the large datasets for download and transfer, this responsibility was instead delegated to an RPS Ecologist. The detectors were also checked to ensure the correct recording settings were selected before re-deployment. The appointed operator were trained by experienced RPS Ecologists on ongoing maintenance and management of the equipment. This included checks of:

- Battery status;
- SD cards status;
- Recording schedule; and
- Daily infill of the weather log.

The detailed protocols for replacing the internal batteries and SD cards are outlined in Appendix A. This is a step-by-step process, to ensure that the maintenance of the equipment was correct and consistent throughout the monitoring period.

2.2 Coastal headland survey

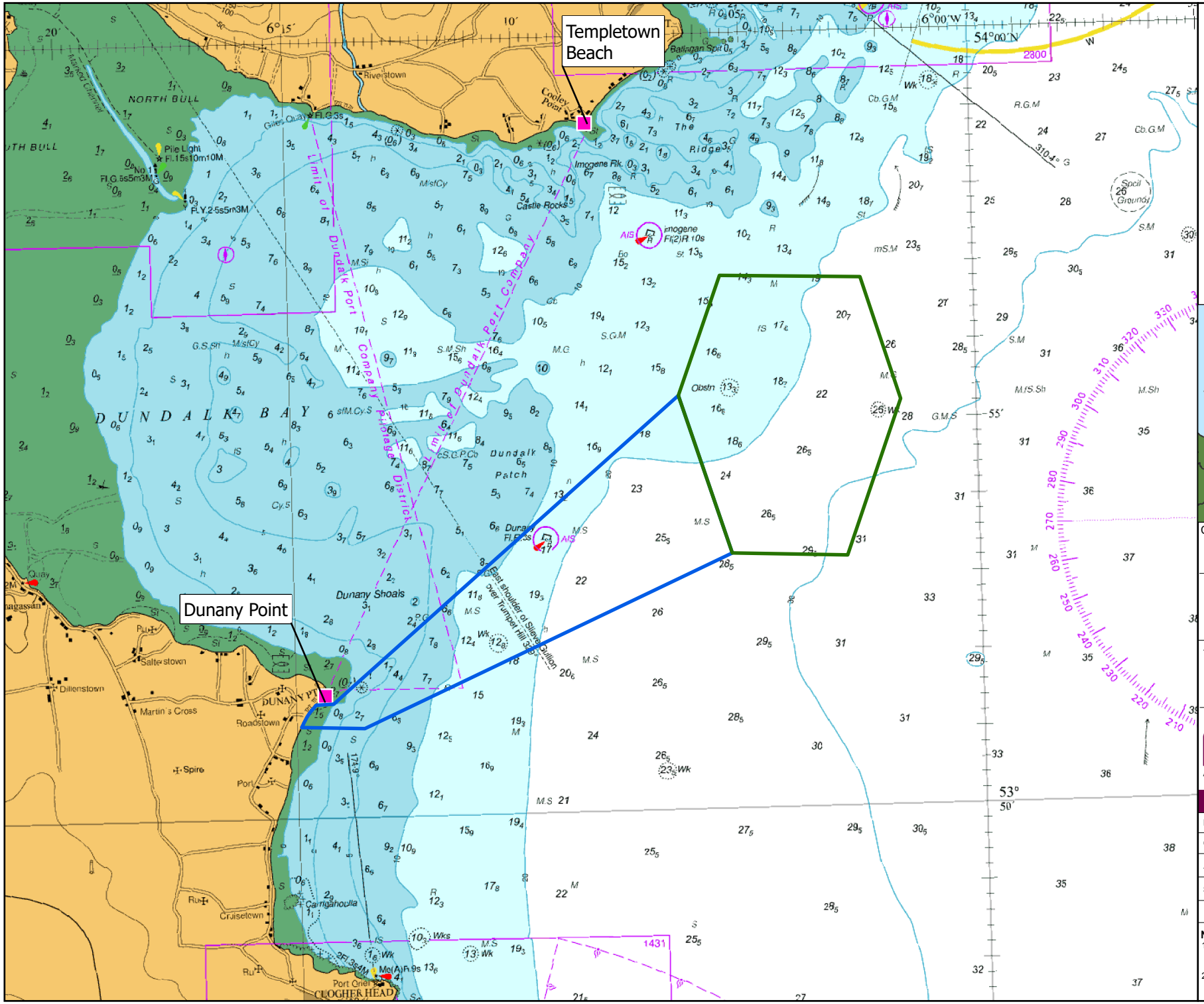
2.2.1 Static locations

To pair with the boat-based surveys, coastal headland surveys were also undertaken. Anabat Ranger Bat Detectors were strategically deployed along the Louth coast at the proximate headlands of the Project Area in order to provide additional context and probability to offshore bat data collected during the Autumn migration period. Bat detectors were deployed at Templetown Beach (TB) [Lat/Long coordinates: 53.981265, -6.140060; ITM 721993, 805157] and Dunany Point (DP) [Lat/Long coordinates: 53.859505, -6.239565; ITM 715803, 791442]. The locations of the headland survey points are presented in Figure 2-5.

2.2.2 Equipment

The materials used for the deployment of the bat detectors during the coastal headland survey were as follows:

- 2 no. Anabat Ranger Bat Detectors (with built in GPS);
- 4 no. Omni-directional Ultrasonic Microphone US-O V3;
- 2. no 5m Anabat Ranger extension cables;
- 4 no. 64GB SD cards and storage case suitable for use in Anabat Ranger Bat Detectors;
- 32 no. rechargeable batteries and battery charger for Anabat Swift Bat Detectors sufficient for duration of survey;
- 2 no. wooden fence post (and mallet for installation); and
- Cable ties.



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Project

Oriel Wind Farm Project

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Figure 2 5: Coastal headland survey – static detector locations

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2.2.3 Deployment

The equipment was prepared, checked, and deployed at Templetown Beach (Cooley Point) and Dunany Point on 18 September 2024.

At Templetown Beach, the installation of the microphone was completed by an RPS Ecologist during daylight hours. A 1.5 m wooden fence post was installed into the ground using a mallet. The detector was then secured at or near the base of the wooden fence post using ratchet straps and cable ties, and the microphone was secured to the top of the wooden fence pole approximately 1.3 m above ground level using cable ties. The microphone was positioned pointing away from the wooden fence post and toward the coast line at a slight downward angle (see Image A, Figure 2-6).

At Dunany Point, the installation of the microphone was completed by an RPS Ecologist during daylight hours. A 1.5 m wooden fence post was installed against an existing concrete wall and secured in place with a concrete slab. The microphone was secured to the top of the wooden fence pole approximately 2.4 m above ground level using cable ties. The microphone was positioned pointing away from the wooden fence post and toward the coastline at a slight downward angle (see Image B, Figure 2-6).

The equipment was set to the following Recording Mode: *Night Only*; and the following Recording Profile: *FS Ultrasonic* (full spectrum ultrasonic recording), which records 30 minutes pre-sunset until 30 minutes post-sunrise each day to capture the entire period of bat activity each night.

Figure 2-6: Deployment of bat detectors and microphones at Templemore Beach (A) and Dunany Point (B).

2.2.4 Maintenance

Ongoing maintenance of the bat detectors at Templetown Beach and Dunany Point was carried out every two weeks by an RPS Ecologist for the duration of the coastal headland survey period to swap out batteries and SD cards, and to download data collected. Data files were transferred to an RPS laptop and uploaded to the SharePoint site available to the client. The detectors were also checked to ensure the correct recording settings were selected before re-deployment.

The detailed protocols for replacing the internal batteries and SD cards are outlined in Appendix A. This is a step-by-step process, to ensure that the maintenance of the equipment was correct and consistent throughout the monitoring period. Unlike the boat-based survey (see Appendix A), the minimum and

maximum trigger frequency was left at 10 and 250kHz as large amounts of background noise, such as that recorded during the boat-based surveys, were not present during the headland survey.

2.3 Data Analysis

After each maintenance check and data collection during the boat-based and coastal headland survey, data from the SD cards were transferred and manually checked for quality and consistency.

After each boat-based survey, and after each coastal headland data collection period, data was processed for analysis. The recorded data were analysed using Kaleidoscope Pro (Wildlife Acoustics, Inc. Version 5.6.2) sound analysis software. This software compares the echolocation pulses of recorded bats to an integrated library of bat calls and automatically attributes recordings to specific species. For the input signal parameters, a frequency range of detection was set to 8-120 kHz while the length of detected pulses was set between 2 and 500 ms. A maximum intersyllable gap of 500 ms was selected. Bat recordings with a minimum of two pulses which satisfied these criteria were considered for identification and all other recordings were classified as noise.

Following the analysis of all audio recordings, 10% of all noise files and 10% of files marked as Pipistrelle species were manually checked for bat activity. All bat calls (bar pipistrelle bats), calls with no auto-identification, or with multiple bats within the same call, were checked manually to confirm identification. During manual analysis, calls were assigned to species according to their key parameters (Russ, 2016). Determinations of species identification and activity were made by suitably qualified and experienced RPS Ecologists.

2.4 Limitations

2.4.1 Survey methodology

Given that a bespoke survey methodology had been developed, there were risks associated with the collation of the data, e.g., equipment failure in the marine environment and potential interference from other emitting equipment. However, the methodology was developed with specific actions incorporated to minimise these risks, e.g., through checks on data collection, on board maintenance regime, check-ins for troubleshooting exercises, etc. In relation to survey methods, there were a number of limitations and/or considerations in relation to survey timing, data collection and the interpretation of data, including:

- As outlined in section 1.1, the boat-based and headland surveys were completed between mid-September and November 2024. In the event that seasonal migration does occur between Ireland and UK/Europe, the survey commenced slightly outside of the typical window (mid-August to October) where such migration may be evident. It should be noted, however, that bats are generally active in Ireland between April to October (Marnell *et al.,* 2022) and can be detected on warmer evenings in November. Therefore, the boat-based and headland surveys were undertaken during the season when bats are still active;
- As outlined in section 1.1, there are no standard survey methods or guidelines in Ireland or internationally for characterising offshore bat activity which can be implemented; however, existing UNEP guidelines (Rodrigues *et al*., 2015) recommend surveying offshore wind turbines in the same manner as land-based turbines;
- Surveying for bats offshore can be challenging due to the potentially harsh environment when vessels travel offshore during the night and the impact this potentially has on equipment. It was expected that there would be some level of equipment failure which could, in part, be mitigated through regular maintenance/data collection to ensure that the equipment was working effectively. Such measures were incorporated into the survey methodology to limit these risks;
- The microphones used have a typical detection range of between 15 m to 30 m. This could be a limitation if some species fly higher than can be detected by the microphones;
- Due to the lack of available studies and data sets of a similar nature to this survey type, it is unknown if the presence of the vessel (increased light and noise) itself causes avoidance behaviour in bats. This has the potential to be a limiting factor if bats avoid the monitoring area, resulting in their presence not being detected by the equipment;

- When undertaking coastal headland surveys, such surveys do not detect the flight path of individual bats, and therefore this survey type cannot characterise the relationship between a bat recorded along the coast and the offshore environment. However, data collected at coastal headlands proximate to the Survey Area can provide additional context to offshore bat data collected during the Autumn migration period;
- During data collection for both the boat-based and coastal headland survey, there was some loss of data due to periodic equipment malfunction, human error, and battery charge levels. However, data was collected on every available survey night during the boat-based survey and was collected over the majority of survey days at coastal headlands.

3 RESULTS

3.1 Boat-based survey

3.1.1 Data capture

As described in section 2.1.1, the boat-based survey was completed during suitable weather conditions[1] from mid-September to November. The deployment period for bat detectors aboard the Rós Áine survey vessel was between the 24 September and 14 November 2024. During this period, the vessels operated for a combined total of 12 nights (see Table 3-1).

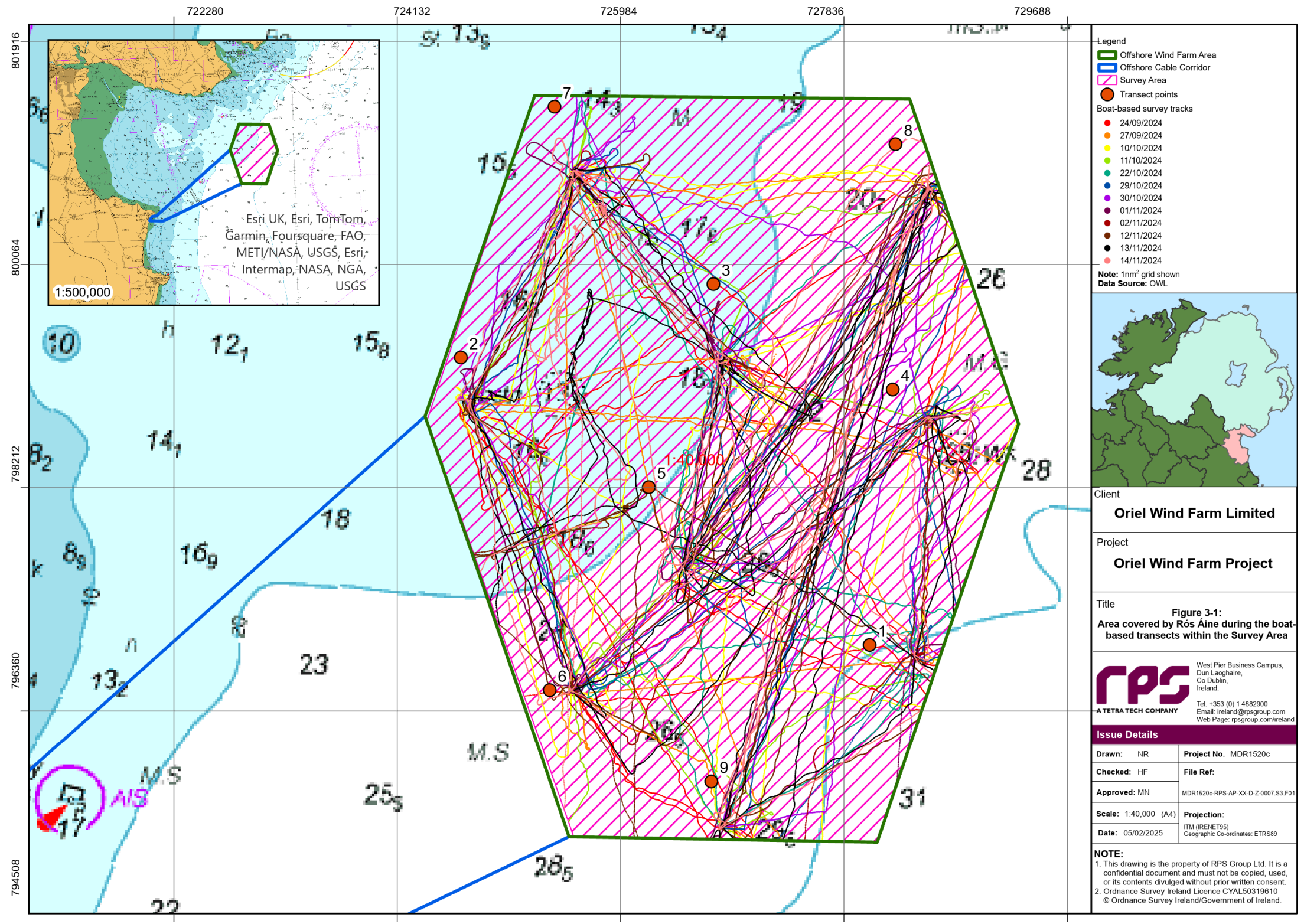
As described in section 2.4, some loss of data occurred due to periodic equipment malfunction, human error and battery charge levels (see Table 3-1). However, a full dataset was successfully collected from at least one bat detector during every available survey night. The Survey Area and GPS tracks covered by the Rós Áine survey vessel during the deployment period is provided in Figure 3-1

The individual transect routes for each survey night are provided in Appendix B.

Table 3-1: Summary of boat-based survey deployment dates and detector malfunctions.

Month	Total no. of survey nights per month	Survey date	Detector malfunctions Serial I.D no: 792872 (Port side)	Detector malfunctions Serial I.D no: 111378 (Starboard)
September	2	24/09/2024	None	Yes - human error
		27/09/2024	Yes – maintenance error	None
October	5	10/10/2024	None	None
		11/10/2024	Yes – some data lost due to battery levels	None
		22/10/2024	None	None
		29/10/2024	None	None
		30/10/2024	None	None
November	5	1/11/2024	None	None
		02/11/2024	None	None
		12/11/2024	None	None
		13/11/2024	None	None
		14/11/2024	None	Yes – human error

[1] Suitable conditions: sunset temperatures above 10 °C (Collins, 2023); wind speeds of < 5.4 m/s (20 km/hr) (Collins, 2023); rainfall < 4 mm/hr (i.e. low to moderate rainfall levels).



Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points

Boat-based survey tracks

- 24/09/2024
- 27/09/2024
- 10/10/2024
- 11/10/2024
- 22/10/2024
- 29/10/2024
- 30/10/2024
- 01/11/2024
- 02/11/2024
- 12/11/2024
- 13/11/2024
- 14/11/2024

Note: 1nm^2 grid shown
Data Source: OWL

Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

Figure 3-1:
Area covered by Rós Áine during the boat-based transects within the Survey Area

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3.1.2 Weather conditions

A weather log was recorded for the duration of the detector deployments while the vessels were on location (see Table 3-2).

Table 3-2: Vessel weather log.

Date; Time	Latitude; Longitude	Vessel Speed (kts)	Avg. wind speed[1]	Wind direction	Air temp. (°C)	Barometric pressure (Pa)	Sea state[2]	% Cloud cover	Rain (Y/N)	Moon phase[3]
24/09/2024; 19:00	53.9028; -6.04863	5.0	3-4	NW	6	999	Slight	0	N	Last QI
27/09/2024; 20:00	53.54050; -6.05288	5.0	4-5	NW	5	1021	Slight	0	N	Waning
10/10/2024; 19:10	53.54537; 6.0495	4.0	3-4	N - NW	6	1016	Slight	0	N	Waning
11/19/2024; 18:30	53.53378; -6.03672	4.5	4-5	SW	8	1010	Moderate	70	N	First QI
22/10/2024; 18:00	53.53918; -6.04963	4.5	3-4	S	8	1027	Slight	60	N	Last QI
29/10/2024; 17:00	53.54078; -6.02565	5.0	2-3	NW	10	1027	Calm	10	N	Waning
30/10/2024; 17:05	53.54500; -6.02465	5.0	3-4	S	11	1024	Slight	100	N	Waning
01/11/2024; 17:05	53.54056; -6.02523	5.0	1-2	S	10	1027	Calm	100	N	Waxing
02/11/2024; 17:05	53.54856; -6.02500	5.0	1-2	SE	4	1026	Calm	100	Y	Waxing
12/11/2024; 16:45	53.54500; -6.02480	5.0	1-3	NW	11	1039	Calm	10	N	Waxing
13/11/2024; 16:00	53.54754; -6.05277	4.5	2-5	NW	13	1036	Slight	80	N	Waxing
14/11/2024; 16:30	53.54631; -6.05280	5.0	1-2	NW	13	1032	Calm	90	Y	Waxing

1 (Avg, wind speed): Measured using marine Beaufort Scale: 0=Calm; 1=Light air; 2=Light breeze; 3=Gentle breeze; 4=Moderate breeze; 5=Fresh breeze; 6=Strong breeze; 7=Near gale; 8=Gale; 9=Strong gale; 10=Storm;

2 (Sea state): Calm=Wave height is 0-1m; Smooth=Wave height is between 0.1 and 0.5m; Slight=Wave height varies from 0.5 to 1.25 meters; Moderate=Wave height ranges from 1.25 to 2.5 meters; Rough=Wave height is between 2.5 and 4 meters; Very rough=Wave height spans 4 to 6 meters; High=Wave height extends from 6 to 9 meters;

3 (Moon phase): Waxing=illuminated face of moon is getting bigger; First QI=half-moon; Full=Moon completely illuminated; Waning=illuminated face of moon is getting smaller; Last QI=half-moon, opposite half is illuminated.

3.1.3 Bat survey results

No bats were recorded within the Survey Area during the deployment dates outlined in section 3.1. The detectors deployed during the boat-based surveys recorded high levels of noise, however no bat records were identified.

3.2 Headland survey

3.2.1 Data capture

As described in section 2.2.3, headland surveys were undertaken from 18 September 2024 to 30 November 2024. Bat detectors were deployed for 73 consecutive nights and captured data for a total of 68 nights at Templetown Beach and 70 nights at Dunany Point. A summary of the deployment dates and data captured for the headland survey is presented in Table 3-3.

Table 3-3: Summary of headland survey deployment dates and detector malfunctions.

Detector Location	Latitude; Longitude	Date Deployed	Date Retrieved	Total Number of nights data recorded	Detector malfunctions
Templetown Beach	53.981265; -6.140060	18/09/2024	25/09/2024	7	None
		25/09/2024	08/10/2024	10	None
		08/10/2024	23/10/2024	13	None
		23/10/2024	05/11/2024	11	None
		05/11/2024	21/11/2024	17	None
		21/11/2024	30/11/2024	10	None
Dunany Point	53.859505; -6.239565	18/09/2024	25/09/2024	7	None
		25/09/2024	08/10/2024	13	Yes – data corruption
		08/10/2024	23/10/2024	13	None
		23/10/2024	05/11/2024	12	None
		05/11/2024	21/11/2024	17	None
		21/11/2024	30/11/2024	8	None

3.2.2 Weather conditions

Throughout the deployment period, weather conditions varied for bat surveys (i.e., no or low to high amounts of precipitation, light/moderate breeze to strong gusts (mean wind speed ranged from 6.5 km/hr to 36 km/hr) and temperatures from -4.1°C to 19°C). Weather data was collected from the closest MET Éireann recording station (Dublin Airport). The dates and weather conditions for the static bat detector deployments are detailed in Appendix C. It is important to note that the weather conditions recorded comes from Dublin Airport opposed to Dundalk Bay itself.

3.2.3 Survey results

The headland survey data was examined for activity. A total of seven species of bat including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Leisler's bat (Nyctalus leisleri), brown long-eared (*Plecotus auratus*), Daubenton's (*Myotis daubentoniid*) and Natterer's bat (*Myotis nattereri*) were identified foraging and/or commuting in the vicinity of the static detector deployment locations. Daubenton's bat was identified at Templetown beach only, and Natterer's bat was identified at Dunany Point only. In addition, unidentified *Pipistrellus* species and unidentified *Myotis* species were also recorded.

Dunany point headland had the highest total passes across the survey period, which were dominated by soprano pipistrelle (47%), Leisler's bat (25.6%), and common pipistrelle (23.1%) (see Table 3-4). Templetown beach headland was dominated by common pipistrelle (67.5%) and soprano pipistrelle (26.9%) bat passes, with a smaller proportion of Leisler's bat (3.2%) (see Table 3-5).

Peak bat activity at Dunany Point was recorded on 01 and 02 November (1,462 and 1,626 records of soprano pipistrelle) during south and south-westerly winds. Peak bat activity at Templetown Beach was recorded on 01 and 14 November at Templetown Beach (234 and 398 records of common pipistrelle) during

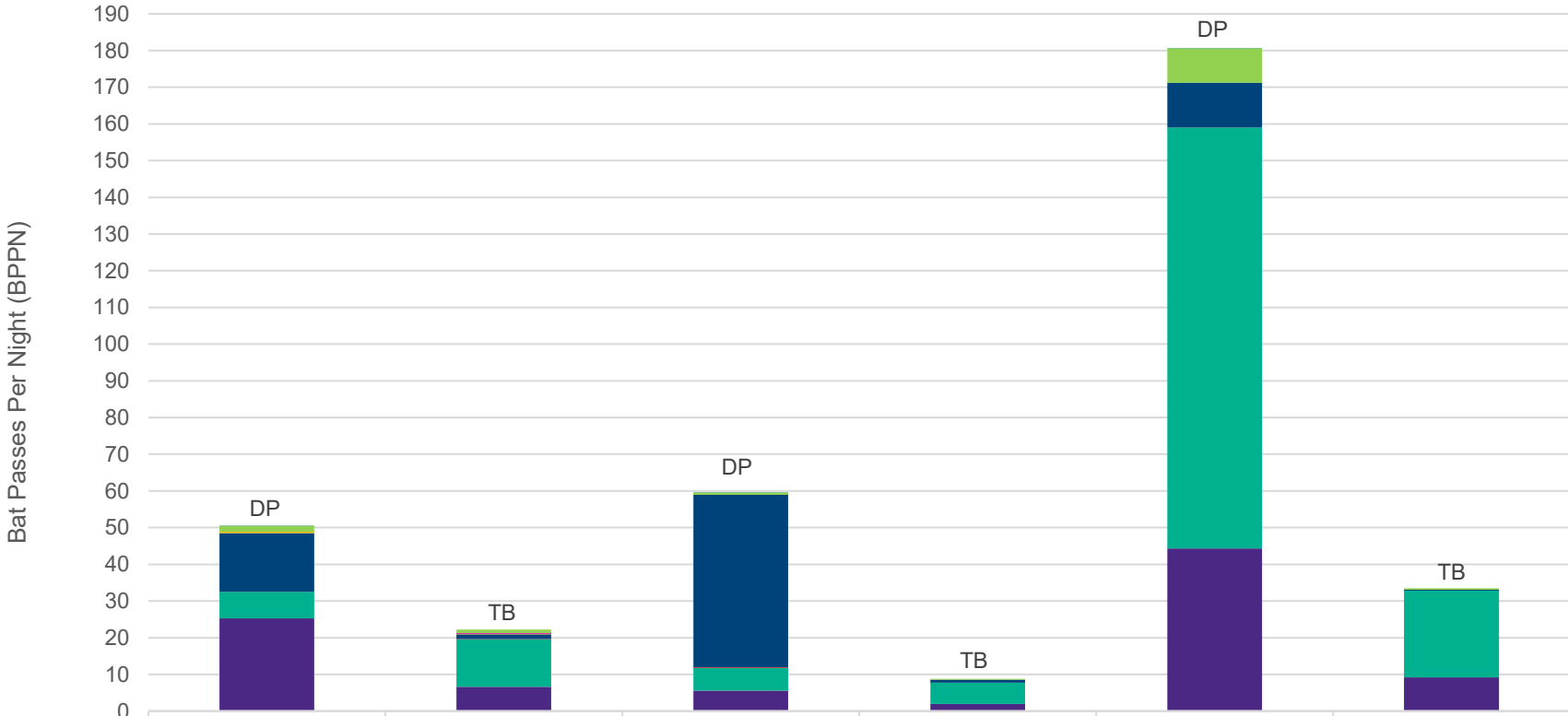
south and north-westerly winds. Overall, peak Bat Passes Per Night (BPPN) was observed in November for both Dunany Point (180.7 BPPN) and Templetown Beach (33.5 BPPN) (see Figure 3-2). The most frequently recorded species were soprano pipistrelle's, followed by common pipistrelle.

Table 3-4: Dunany Point – number of bat passes per species.

Species	September	October	November	Total (%)
Common pipistrelle	328	174	1329	**1831 (23.1)**
Soprano pipistrelle	95	191	3441	**3727 (47.0)**
Nathusius' pipistrelle	0	4	0	**4 (<0.1)**
Leisler's bat	207	1457	366	**2030 (25.6)**
Brown long-eared	6	0	0	**6 (<0.1)**
Natterer's bat	0	1	0	**1 (<0.1)**
Pipistrellus species	21	20	283	**324 (4.1)**
Myotis species	1	2	1	**4 (<0.1)**
Total	**658**	**1849**	**5420**	

Table 3-5: Templetown Beach – number of bat passes per species.

Species	September	October	November	Total (%)
Common pipistrelle	86	60	275	**421 (26.9)**
Soprano pipistrelle	168	180	709	**1057 (67.5)**
Nathusius' pipistrelle	1	0	0	**1 (<0.1)**
Leisler's bat	17	25	8	**50 (3.2)**
Brown long-eared	2	0	0	**2 (0.1)**
Daubenton's bat	2	0	0	**2 (0.1)**
Pipistrellus species	13	7	12	**32 (2.0)**
Total	**289**	**272**	**996**	**1565**



	September	September	October	October	November	November
Myotis species	0.1	0.0	0.1	0.0	0.0	0.0
Pipistrellus species	1.6	1.0	0.6	0.2	9.4	0.4
Daubenton's bat	0.0	0.2	0.0	0.0	0.0	0.0
Natterer's bat	0.0	0.0	0.0	0.0	0.0	0.0
Brown long-eared	0.5	0.2	0.0	0.0	0.0	0.0
Leisler's bat	15.9	1.3	47.0	0.8	12.2	0.3
Nathusius' pipistrelle	0.0	0.1	0.1	0.0	0.0	0.0
Soprano pipistrelle	7.3	12.9	6.2	5.8	114.7	23.6
Common pipistrelle	25.2	6.6	5.6	1.9	44.3	9.2

DP = Dunany Point; TB = Templetown Beach

Figure 3-2: Bat passes per night (BPPN) by month and location.

4 CONCLUSION AND RECOMMENDATIONS

4.1 Boat-based survey

The results of the boat-based survey were conclusive that no bats were recorded during the 12 no. day deployment period within the Survey Area. However, due to the limitations for this type of survey (challenging offshore conditions and therefore limited number of survey days available), particularly during the Autumn months and as outlined in section 2.4, it is difficult to draw robust conclusions even in the absence of recorded migration activity. The following is recommended:

- Undertake an offshore bat survey during the Spring migration period (mid-March to May). It is proposed that data be collected during at least one Autumn and one Spring migration period in order to provide robust information on the usage of the Offshore Wind Farm Area by migrating bats. Spring migration surveys may also present milder weather conditions and an increased number of available survey days with suitable survey conditions;
- Increase the height of microphone deployment, where possible, to improve maximum detection ranges; and
- Explore technological solutions to reduce the recording of background noise within the offshore environment.

4.2 Headland survey

As no bats were recorded offshore, it is difficult to contextualise the bat activity recorded at both Templetown Beach and Dunany Point. As described in section 3.2.3, the largest peak in activity at the headland locations occurred on 01, 02 and 14 November which coincides with the Autumn migration window. On these same dates, bat detectors were also deployed on boat-based surveys, however no bats were recorded.

The majority of activity recorded was from Dunany Point during south and south-westerly winds in November. Records could either be a result of commuting/foraging behaviour or migration behaviour. However, neither can be confirmed from the data collected.

The following is recommended:

- On the basis that offshore Spring migration surveys are recommended, headland surveys are also recommended for completion alongside the boat-based survey to provide additional context and probability to offshore bat data collected during the Spring migration period.

5 REFERENCES

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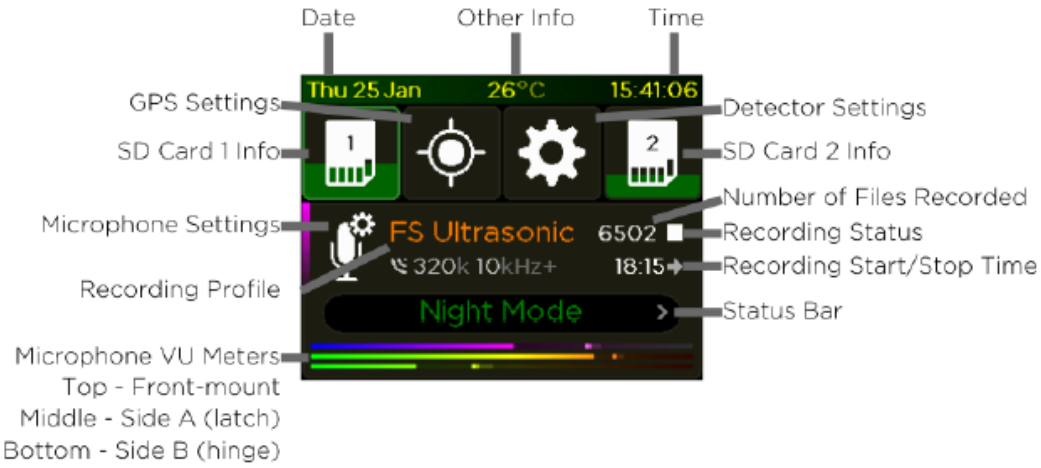
Appendix A
Maintenance Protocol

RANGER BAT DETECTOR MAINTENANCE PROTOCOL: BATTERIES, SD CARDS, AND MICROPHONES

Detector closed (front)

Detector closed (back)

Detector open (internal features)



Home screen/dashboard

Weatherproof box (closed)

Accessing the detector

1. Open the waterproof case by unhooking the two latches.
2. Open the recorder by releasing the lockable latch.
3. To 'wake up' the detector, press the **Sleep/Power Button** ⏻. If the detector does not 'wake up', see replacing batteries (**Step 6**).

Replacing the SD card

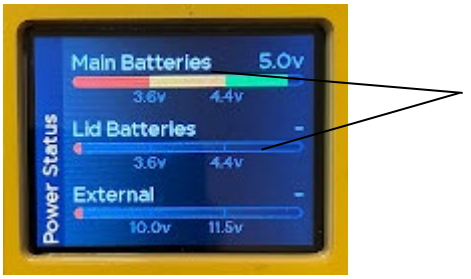
4. On the main screen (see above) use the touch screen icons to select:

   SD Card 1  **> Eject SD Card** 
5. To remove, depress the SD card into the card slot (until you hear a click). This will release the SD card. Download data and transfer to RPS via secure fileshare. Insert new card into the same SD slot and press until the card clicks into place. The SD card icon should highlight green now (i.e. card now in use).

Checking and replacing the batteries

6. On the home screen (see above) use the touch screen to select the **Settings Menu** ⚙.

   Select **System Info> Battery icon**  . The first line displays the **Battery Voltage**. Where the battery voltage is less than 4.25V change the batteries for newly recharged 8 no. batteries. This applies for both the Main Batteries and the Lid Batteries (see below).

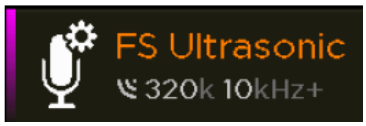


7. To change the batteries, hold down the **Sleep/Power Button** ⏻ until the detector turns off (c. 5 seconds). **N.B.** Do not remove the batteries without turning off the detector first to avoid potential SD card corruption. Gently remove the batteries (see below). Remove existing batteries and insert newly recharged batteries with their polarity (+/-) orientation as shown on the battery bay markings into the main battery holding and the lid battery holding. To 'wake up' the detector, press the **Sleep/Power Button** ⏻. Check battery voltage, as per **Step 6**.

8. **GPS Satellites**
   - Place/hold the detector where there is a clear sky view.
   - Wait for the **Check LED** to stop flashing. The detector will automatically try to acquire satellites to obtain a GPS fix. While acquiring satellites, the detector will state 'No GPS fix' or 'Waiting for GPS' at the bottom of the screen and the GPS Symbol will be flashing . Once a GPS fix is made, the **Check LED** will stop flashing, and the GPS Symbol will stop flashing . The GPS fix will automatically set the clock, record the GPS location and determine the sunset/sunrise times. The recording start time will be displayed at the bottom of the screen.
   - To double check a GPS fix has been made, use the touch screen to select the **Settings Menu** . Select **System Info** > **Tools icon** . The GPS satellite icon should be green (not red) (this will be the 13th icon on the touch screen).
   - Once the **Check LED** has stopped flashing, you can lock the lid closed and place the detector in its final deployment location and secure.
   - To test the operation of the detector while the camouflage case is closed, after deployment, place the magnet (at end of lanyard) next to the **Check LED** (on outside of case); a **brief flash** indicates unit is working.

Checking the recording parameters (should only be required when batteries have been changed)

9. Recording Mode:
   - Press the Mode button until the **Night Only LED** is lit.
   - On the home screen, ensure that recording profile is set to "FS Ultrasonic" (see below).



- If it is not set to ”FS Ultrasonic” using the touch screen on the home screen to select the above icon. This will provide a list of different recording profiles. The selected recording profile will have a green dot indicating which profile is in use (see below).

Recoding parameters: *FS Ultrasonic*

10. Once the FS ultrasonic recording profile has been selected. Click on the icon again and select Edit in order to check the following parameters:

Sample rate
Select Sample Rate and use the arrows to select a sample rate of ‘**320kSps**’.
Activation

- Select Activation and use the arrows to select ‘**Triggered**’.

Mic Sensitivity

- Select Mic Sensitivity and use the sliding scale to select ‘**12**’.

Min. Trigger Sensitivity

- Boat-based survey: Select Min. Trigger Sensitivity and use the up and down arrows to select ‘**12kHz**’.
- Headland survey: Select Min. Trigger Sensitivity and use the up and down arrows to select ‘**10kHz**’.

Max. Trigger Sensitivity

- Boat-based survey: Select Max. Trigger Sensitivity and use the up and down arrows to select ‘**120kHz**’.
- Headland survey: Select Max. Trigger Sensitivity and use the up and down arrows to select ‘**250kHz**’.

Min Event

- Select Min Event and use the up and down arrows to select ‘**2ms**’.

Min Record Time

- Select Min Record Time and use the up and down arrows to select ‘**2s**’.

Max File Length

- Select Max File Length and use the arrows to select ‘**10s**’.

File Prefix

- Select File Prefix and use the arrows to select ‘**Serial Num.**’.

HP Filter

- Tap the HP Filter to toggle for (On)

Transect

- Tap Transect to toggle for (On)

Metadata Key

- Select Metadata Key and ensure it states, “Not set”.

Metadata Value

- Select Metadata Value and ensure it states, “Not set”.

When done editing the above recording parameters, use the button and the detector will “save” the parameters.

Securing the Detector

11. Close the detector (lockable latches) and replace the unit into the foam cut-out within the weatherproof box (see below). Close the weatherproof box and refasten the two box latches.

Detector unit correctly placed into foam insert

Replacing the Microphone (only on instruction from RPS)

12. While the detector unit is powered off (see **Step 6**) the microphone can be detached (unscrewed) from the cable (see detachment location circled in red below). To unscrew the microphone secure both the cable attachment nut and microphone thread, then unscrew the microphone counter-clockwise. Once fully unscrewed, pull the microphone away from the cable nut.

Microphone attached to cable (above), cable attachment nut (below left), and replacement microphone with thread (below right)

13. To attach the replacement microphone carefully align the 4 pins and node of the microphone into the receiving elements of the cable. Once aligned, push the microphone into the cable until the treads meet the nut. Hand tighten the microphone onto the cable nut by screwing clockwise.

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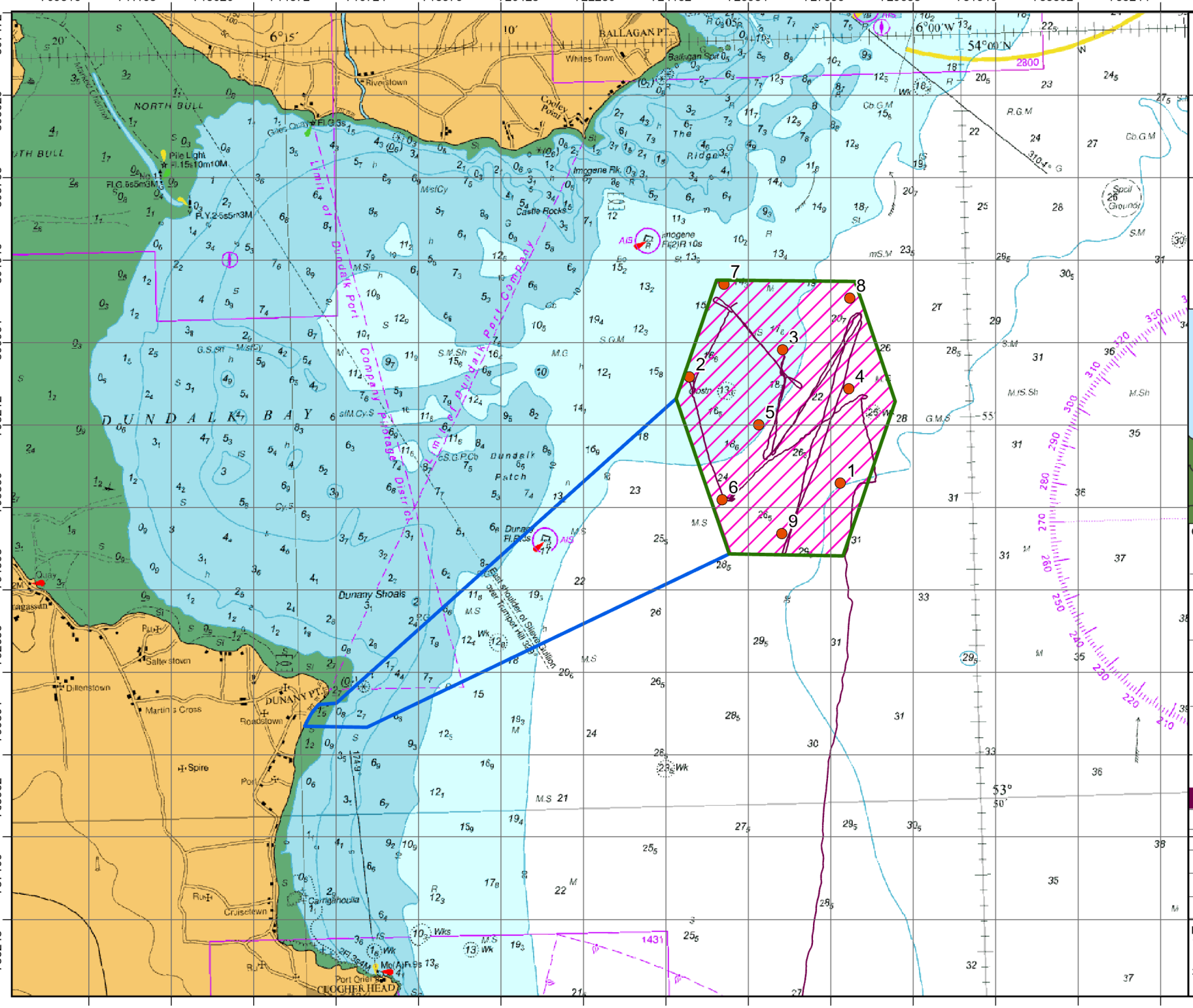
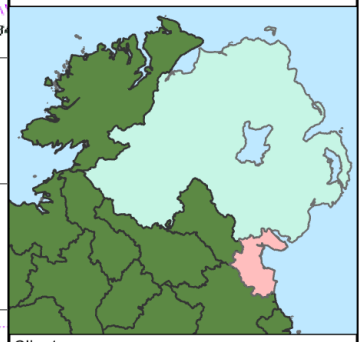
Appendix B
Transect Routes



Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points
- 01/11/2024

Data Source: OWL



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Boat-based survey tracks for 01/11/24

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Date: 27/01/2025	

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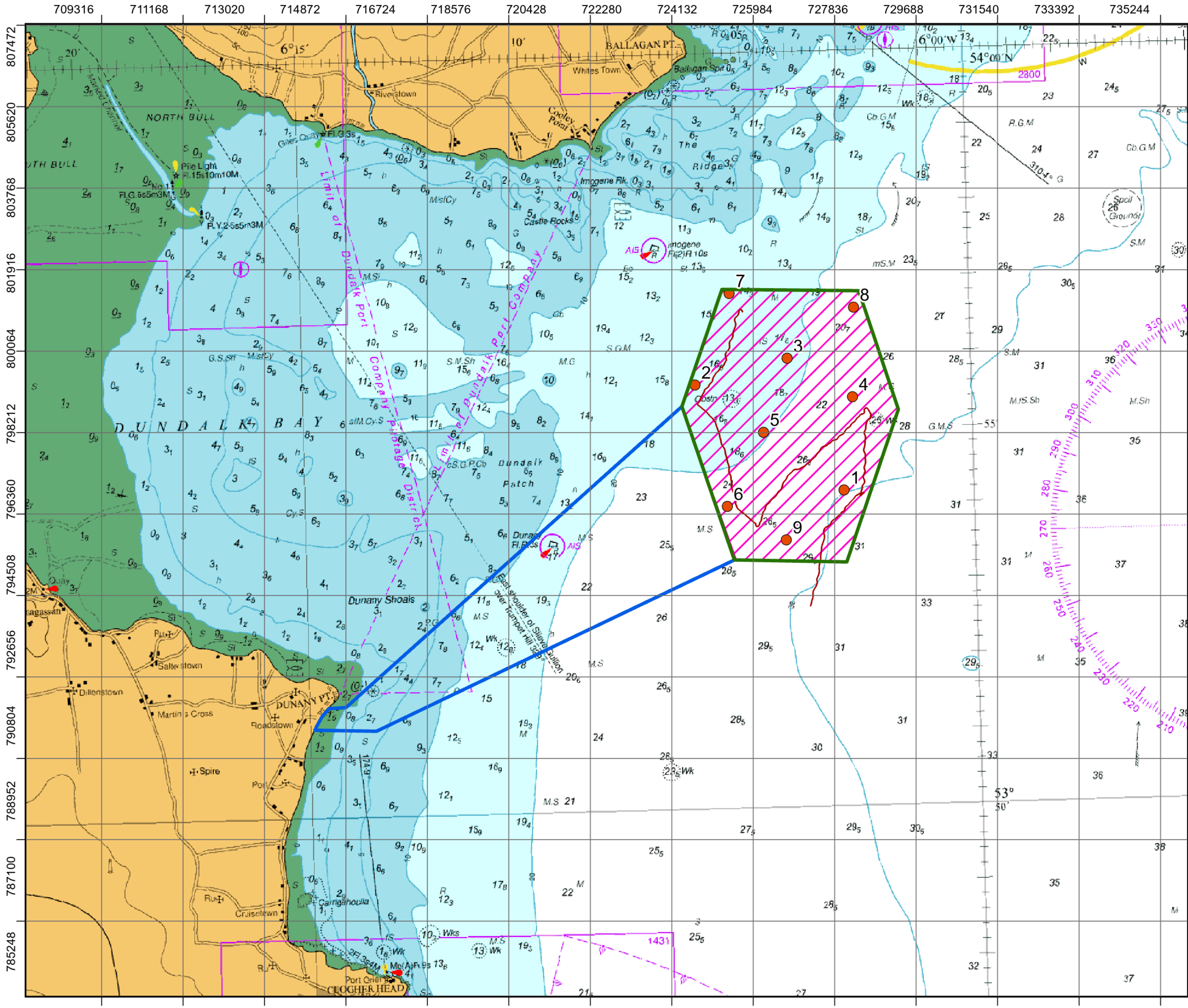

Legend

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- Offshore Cable Corridor
- Survey Area
- Transect points
- 02/11/2024

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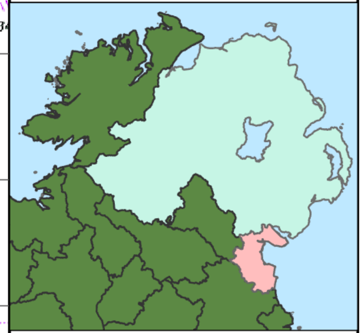

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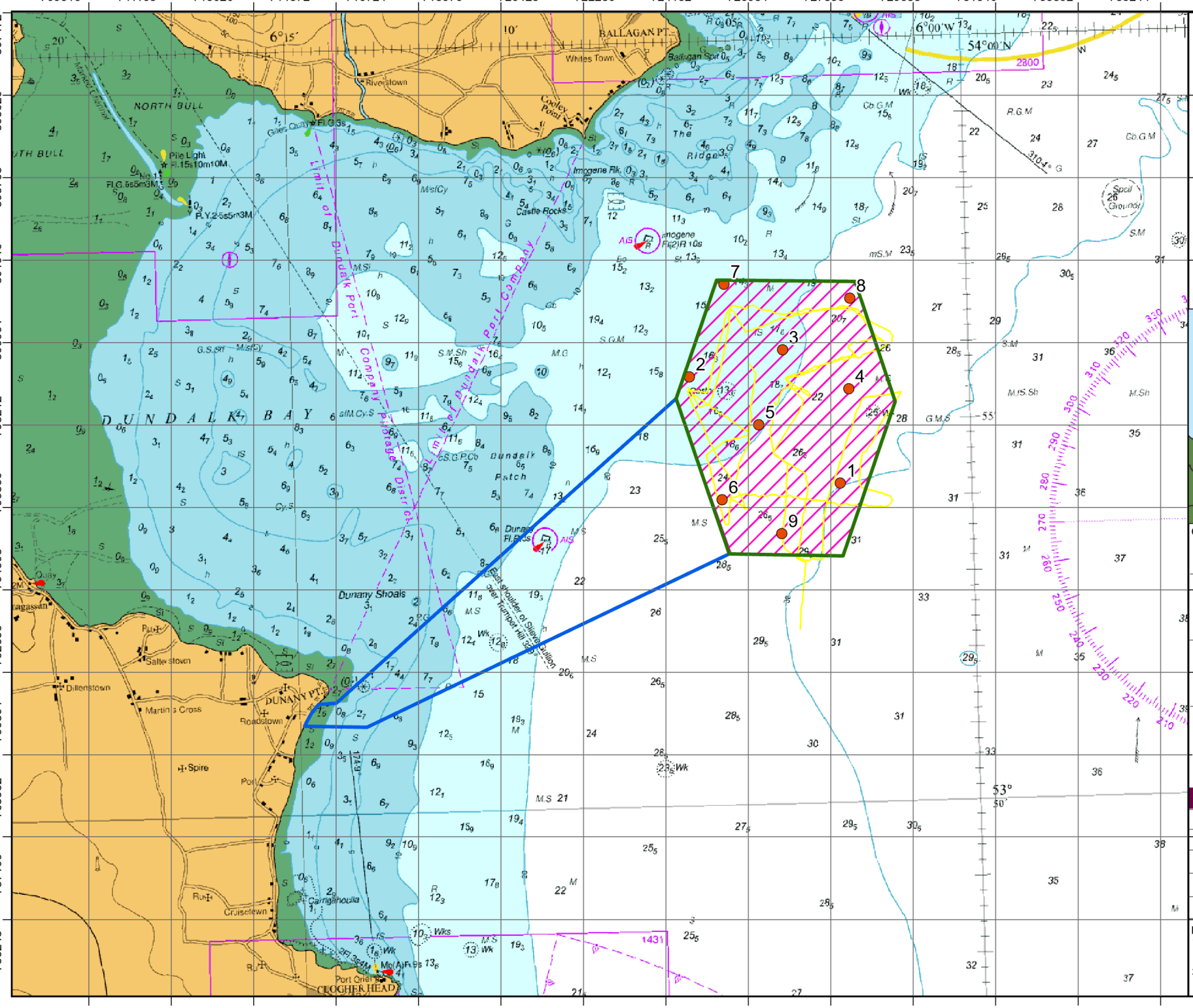

Legend

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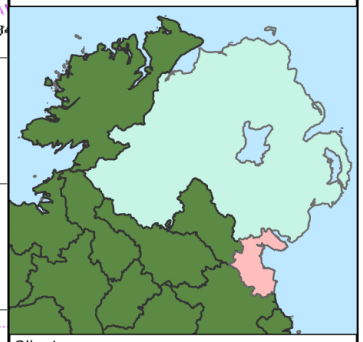
- Survey Area
- Transect points
- 10/10/2024

Data Source: OWL



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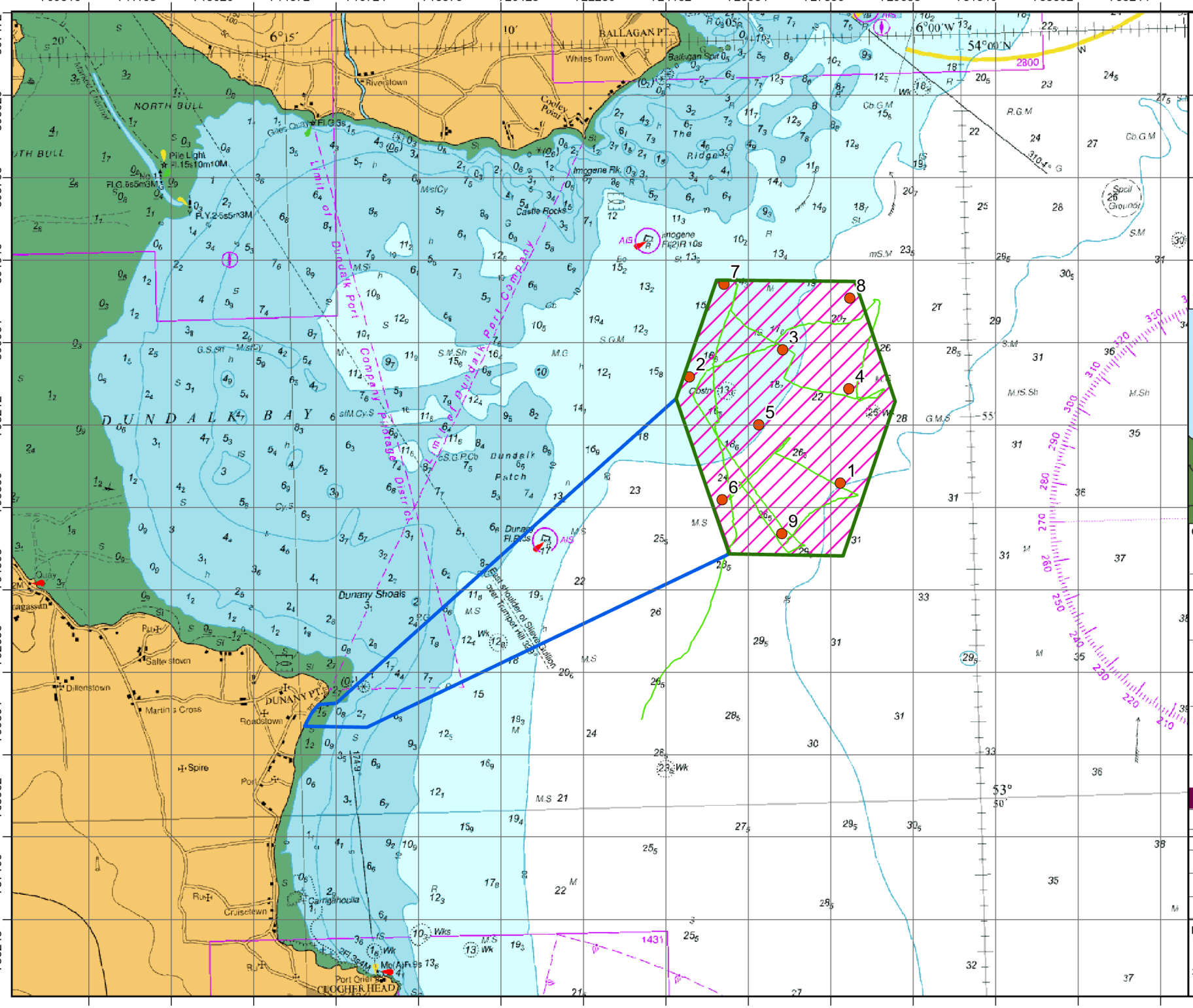

Legend

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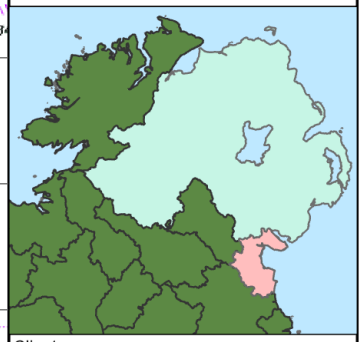
- Offshore Cable Corridor
- Survey Area
- Transect points
- 11/10/2024

Data Source: OWL



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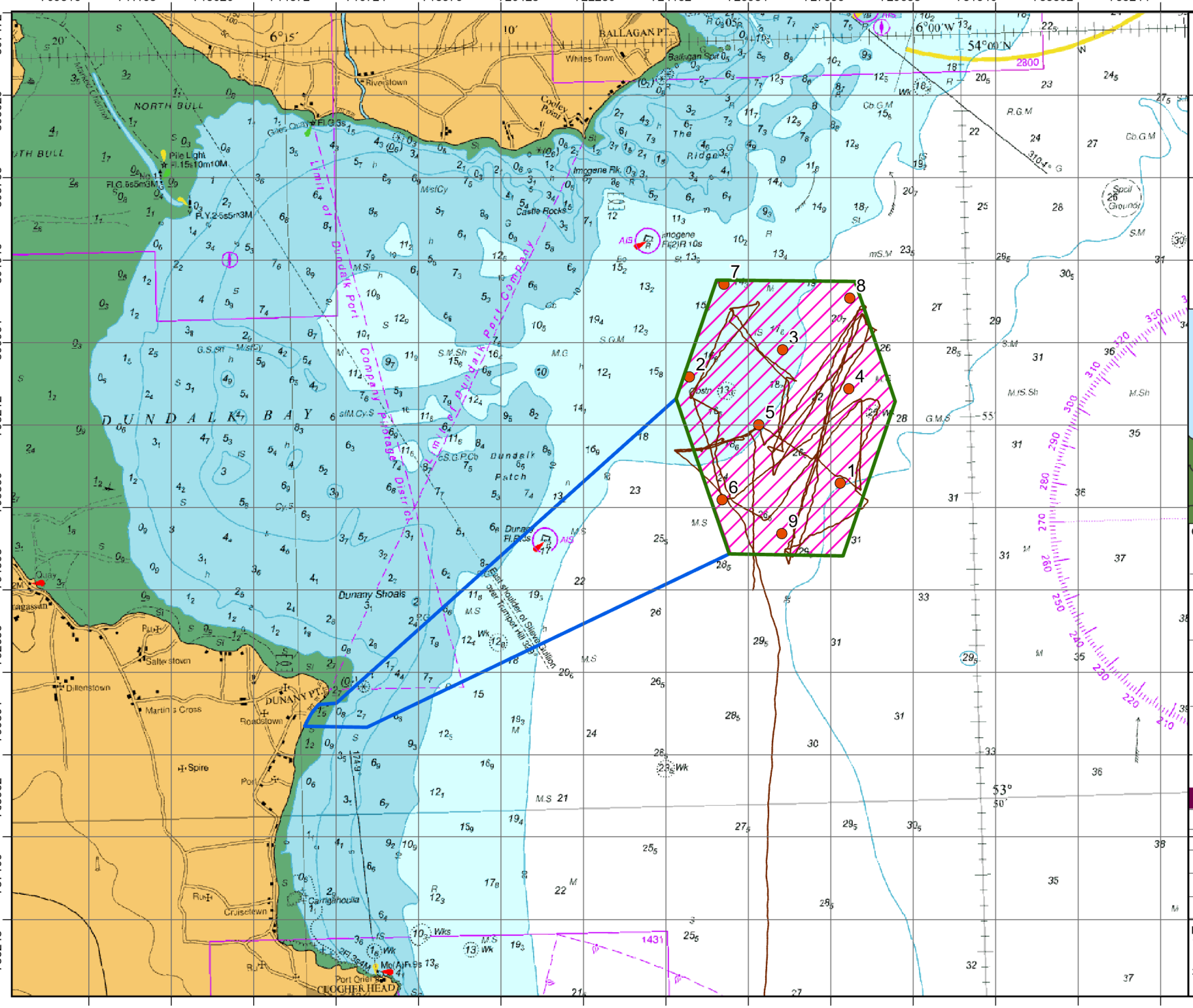

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- Survey Area
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- 12/11/2024

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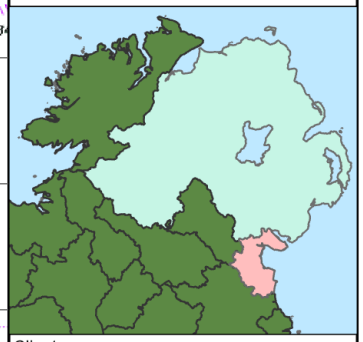

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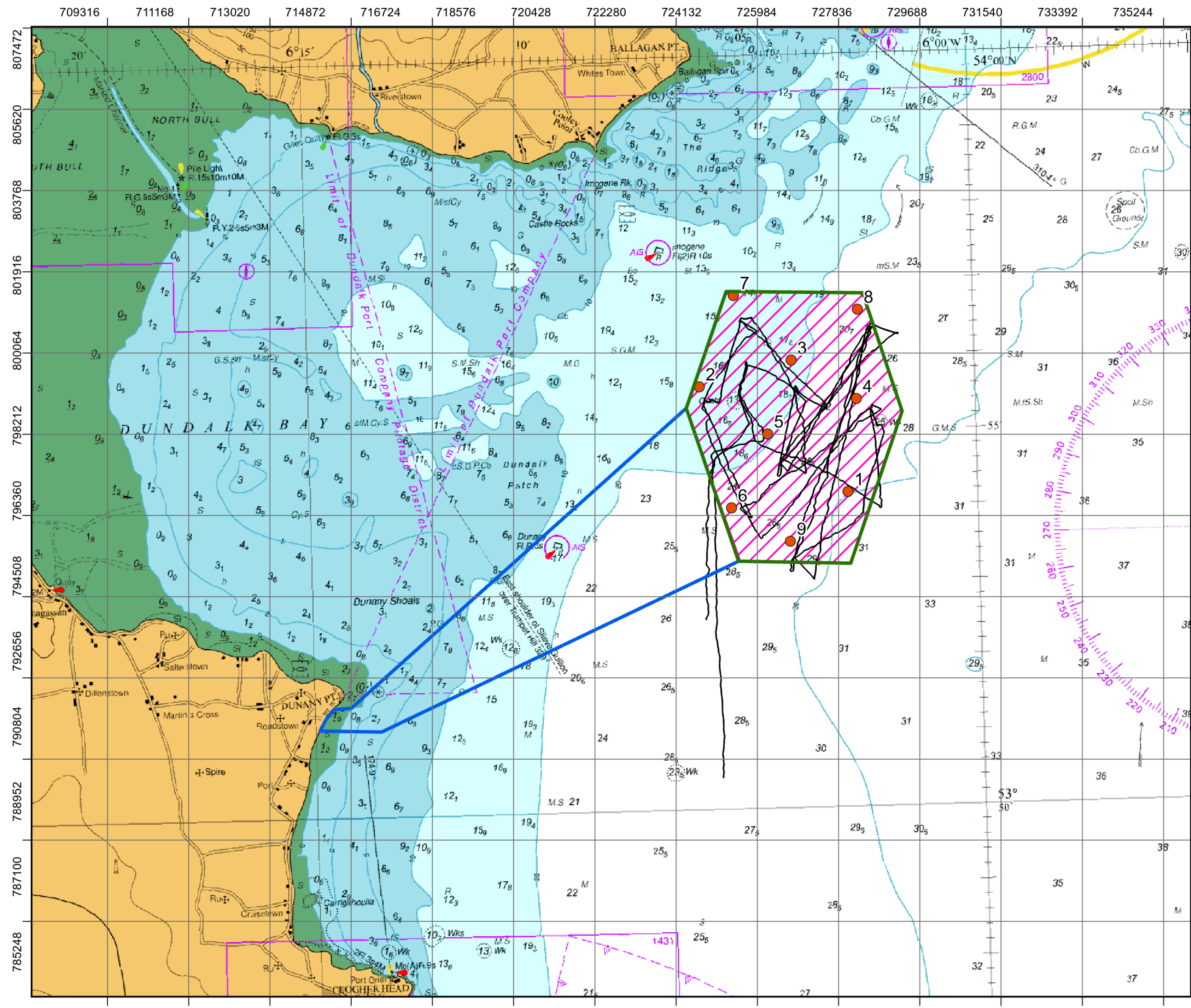

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- Survey Area
- Transect points
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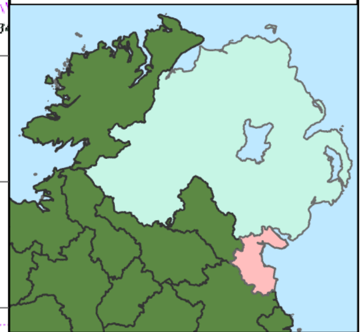

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Issue Details

Drawn: NR	**Project No.** MDR1520c
Checked: HF	**File Ref:**
Approved: MN	MDR1520c-RPS-AP-XX-D-Z-0018.S3.F01
Scale: 1:120,000 (A4)	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 27/01/2025	

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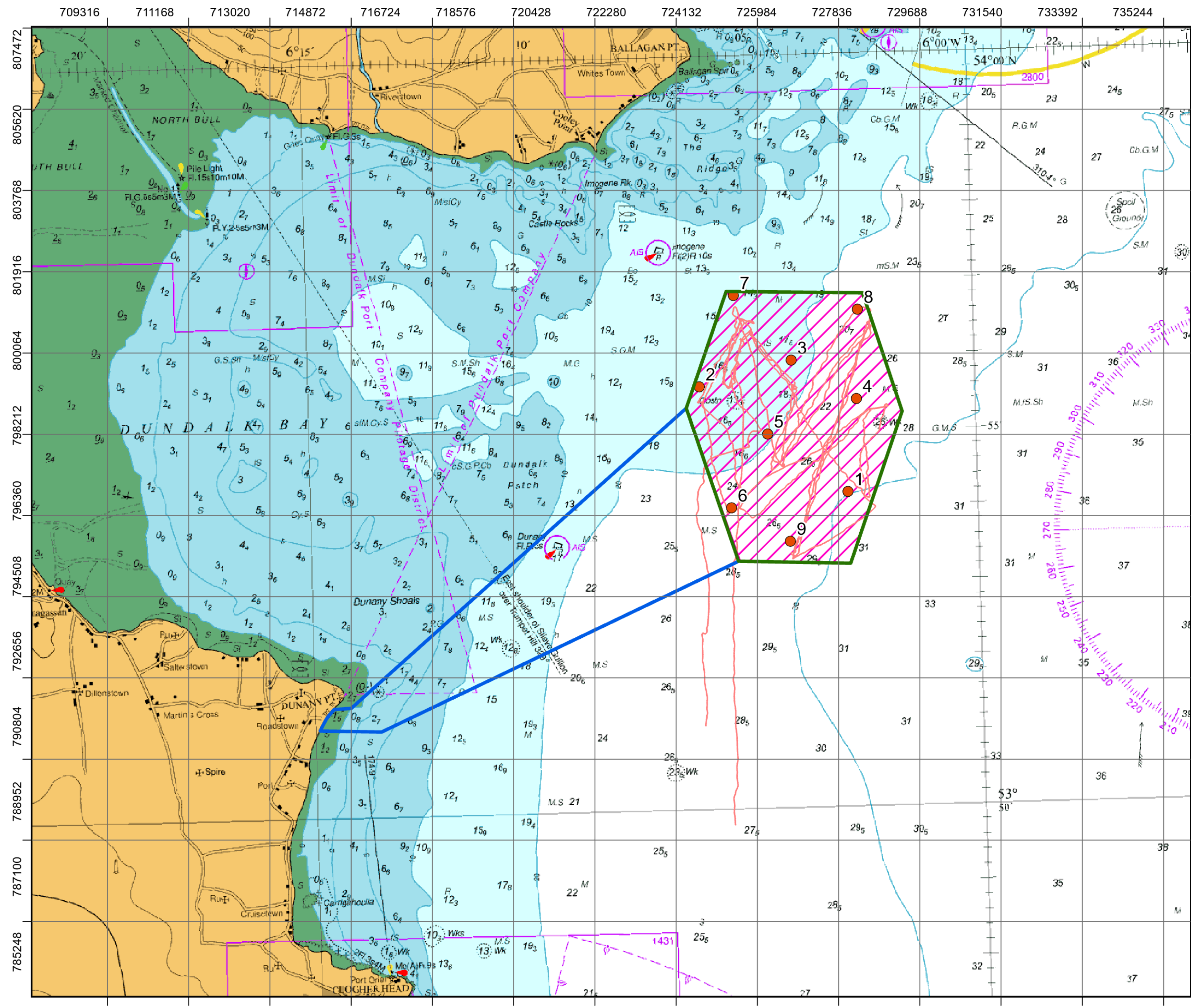

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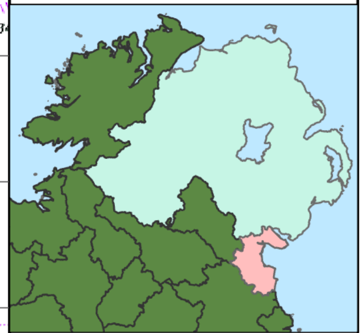

Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

Boat-based survey tracks for 14/11/24

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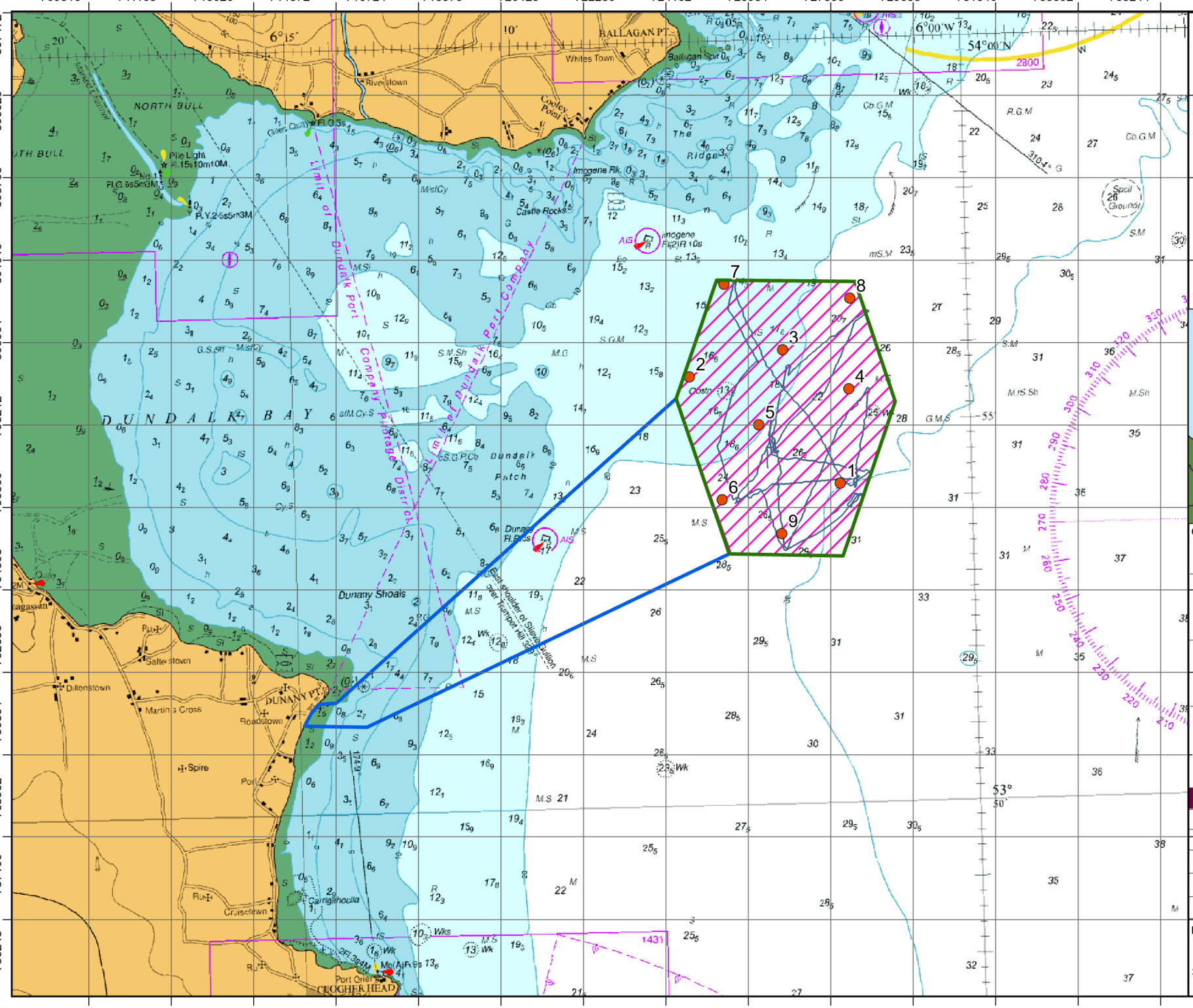
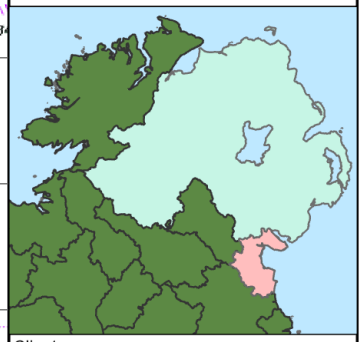
Drawn: NR	Project No. MDR1520c
Checked: HF	File Ref:
Approved: MN	MDR1520c-RPS-AP-XX-D-Z-0019.S3.F01
Scale: 1:120,000 (A4)	Projection:
Date: 06/02/2025	ITM (IRENET95) Geographic Co-ordinates: ETRS89



Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points
- 22/10/2024

Data Source: OWL



Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

Boat-based survey tracks for 22/10/24

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Issue Details

Drawn: NR	**Project No.** MDR1520c
Checked: HF	**File Ref:** MDR1520c-RPS-AP-XX-D-Z-0011.S3.F01
Approved: MN	
Scale: 1:120,000 (A4)	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 27/01/2025	

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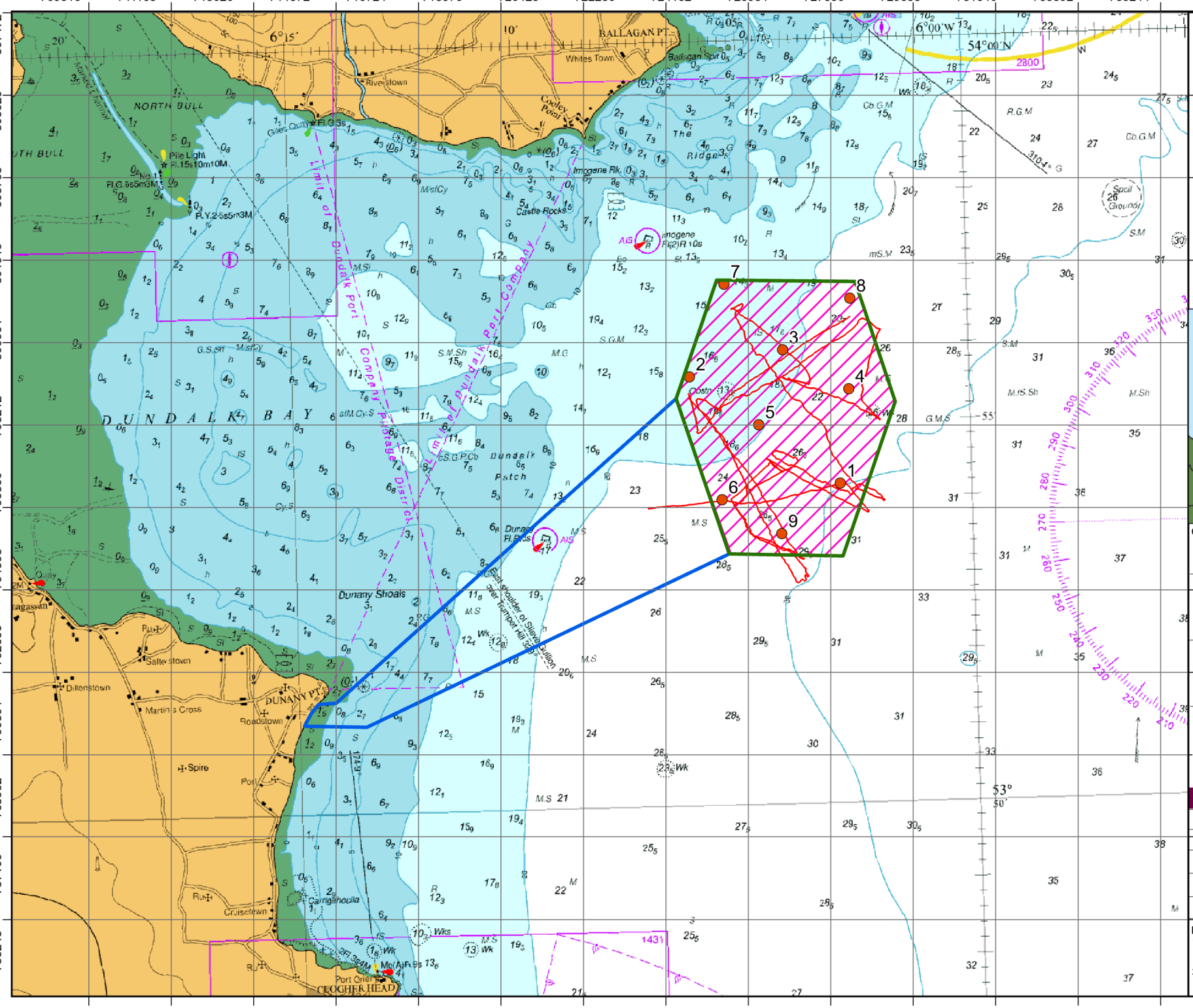


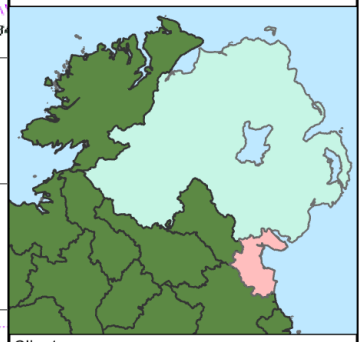
Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points

Boat-based survey tracks

- 24/09/2024

Data Source: OWL



Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

Boat-based survey tracks for 24/09/24

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Issue Details

Drawn: NR	**Project No.** MDR1520c
Checked: HF	**File Ref:** MDR1520c-RPS-AP-XX-D-Z-0008.S3.F01
Approved: MN	
Scale: 1:120,000 (A4)	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 27/01/2025	

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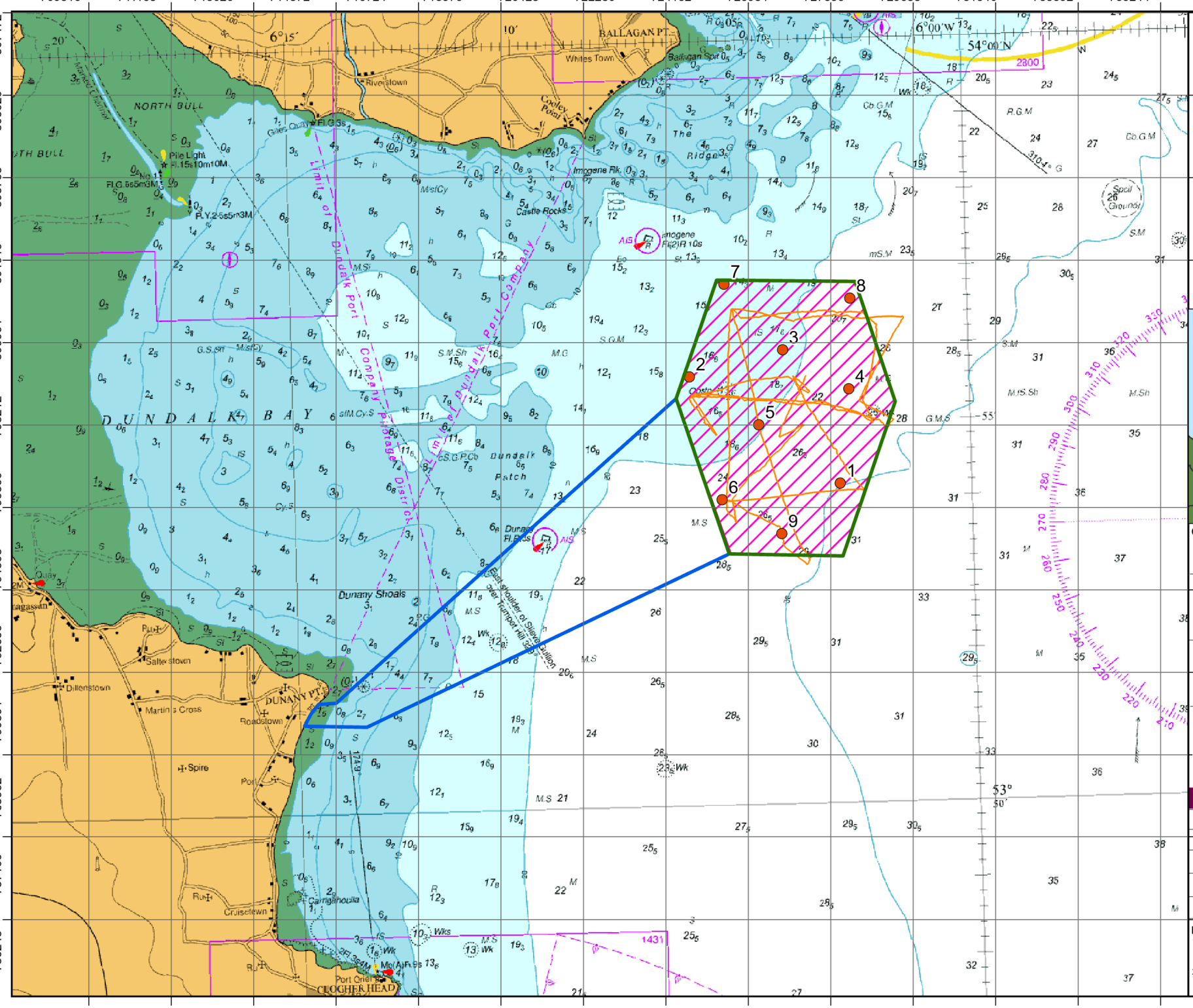
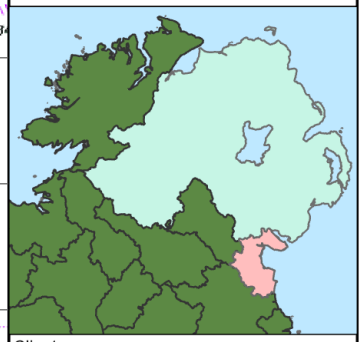


Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points
- 27/09/2024

Data Source: OWL



Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

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Scale: 1:120,000 (A4)	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 27/01/2025	

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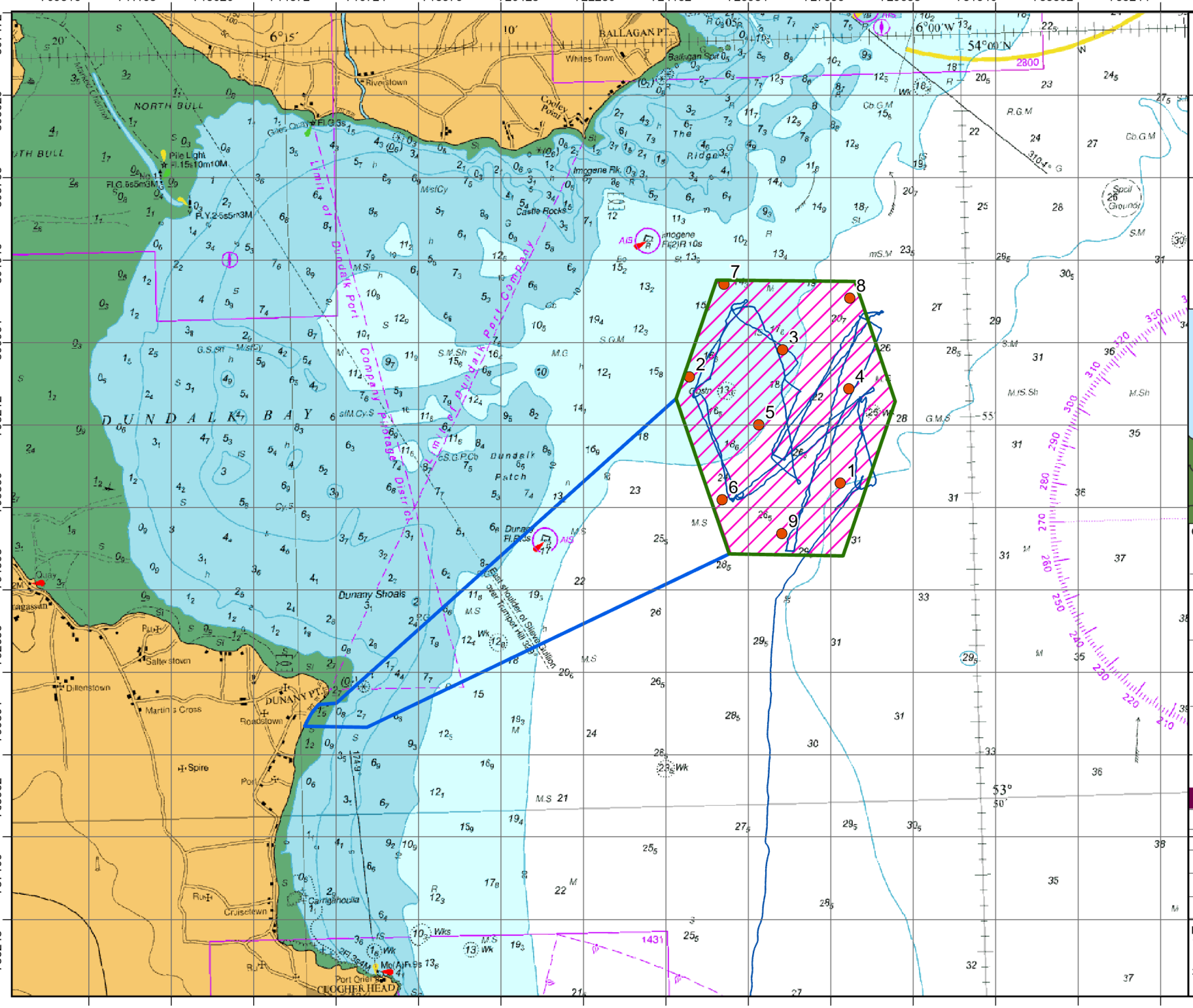
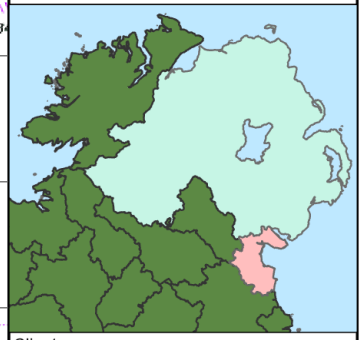


Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points
- 29/10/2024

Data Source: OWL



Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

Boat-based survey tracks for 29/10/24

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Issue Details

Drawn: NR	**Project No.** MDR1520c
Checked: HF	**File Ref:** MDR1520c-RPS-AP-XX-D-Z-0013.S3.F01
Approved: MN	
Scale: 1:120,000 (A4)	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 27/01/2025	

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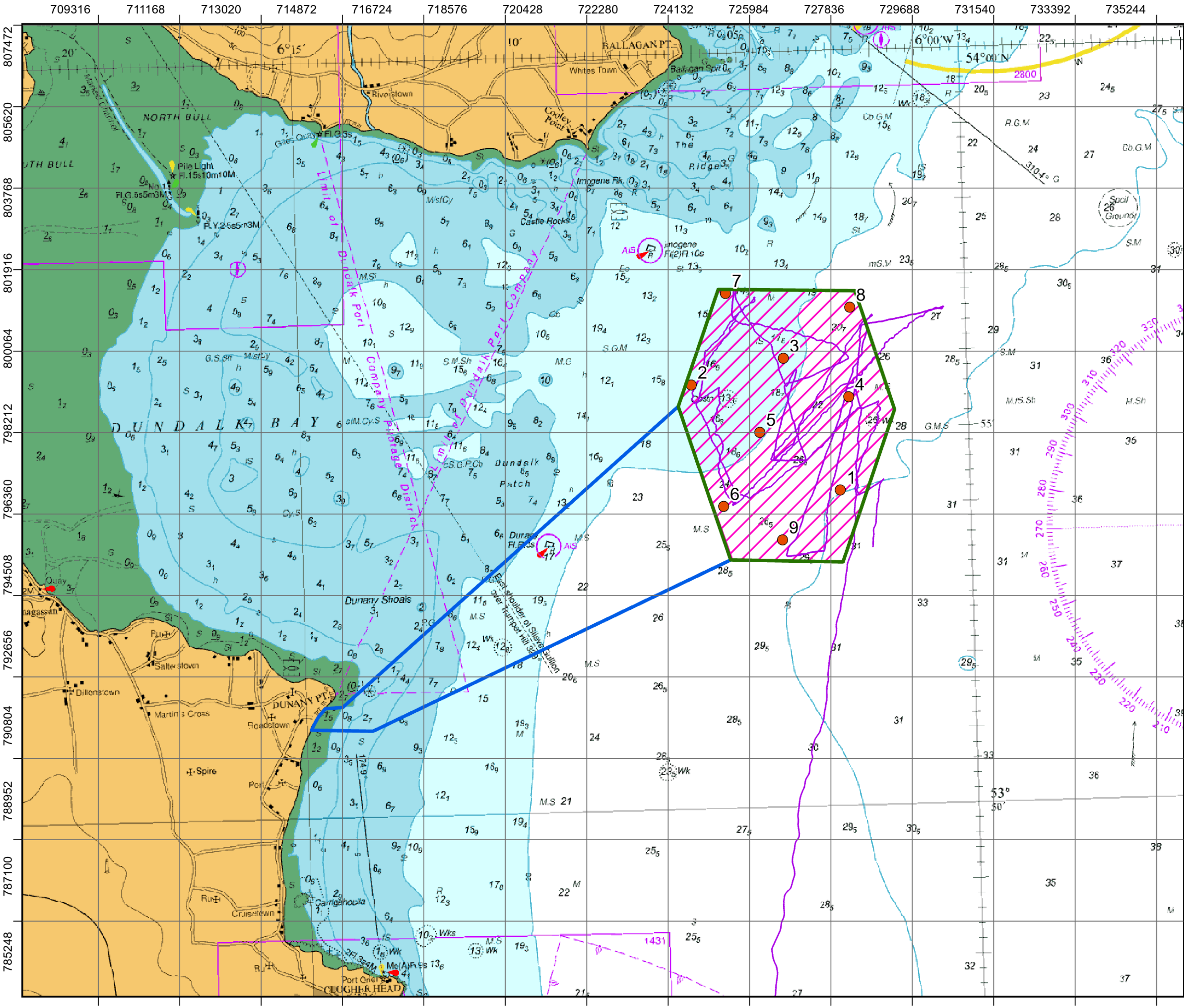
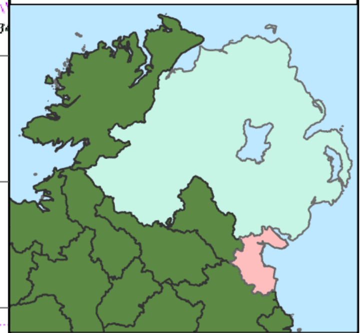


Legend

- Offshore Wind Farm Area
- Offshore Cable Corridor
- Survey Area
- Transect points
- 30/10/2024

Data Source: OWL



Client

Oriel Wind Farm Limited

Project

Oriel Wind Farm Project

Title

Boat-based survey tracks for 30/10/24

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Issue Details

Drawn: NR	**Project No.** MDR1520c
Checked: HF	**File Ref:**
Approved: MN	MDR1520c-RPS-AP-XX-D-Z-0014.S3.F01
Scale: 1:120,000 (A4)	**Projection:** ITM (IRENET95) Geographic Co-ordinates: ETRS89
Date: 27/01/2025	

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Appendix C
Historic Weather Records – Headland Survey

Table 1: Dates and weather conditions for headland bat detector deployment. Weather data was collected from the closest MET Eireann recording station with data available (Dublin Airport).

Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Mean Wind Speed (kts)	Max Gust (>=34 kts)
18/09/2024	0.2	19.0	6.3	5.4	-
19/09/2024	tr (trace of rain)	16.0	6.2	6.3	-
20/09/2024	0.2	15.7	10.1	9.2	-
21/09/2024	4.3	15.8	13.7	11.1	-
22/09/2024	tr	14.8	13.0	11.1	-
23/09/2024	tr	13.9	10.8	8.2	-
24/09/2024*	tr	16.0	5.7	9.1	-
25/09/2024	10.8	11.9	1.5	7.5	-
26/09/2024	9.5	13.4	8.3	12.3	37
27/09/2024*	1.6	12.4	5.8	12.2	-
28/09/2024	0	13.5	5.2	5.9	-
29/09/2024	6.7	13.4	6.2	12.9	36
30/09/2024	8.9	13.3	8.7	9.5	-
01/10/2024	2.6	15.0	8.4	10.7	-
02/10/2024	tr	15.6	10	12.0	-
03/10/2024	0	14.4	6.3	8.7	-
04/10/2024	tr	15.5	12.4	12.1	-
05/10/2024	1.6	14.7	11.9	13.4	-
06/10/2024	3.7	15.9	8.2	8.0	-
07/10/2024	5.0	18.7	9.6	6.9	-
08/10/2024	10.5	15.4	11.1	9.0	-
09/10/2024	1.1	12.9	8.1	12.9	-
10/10/2024*	0.9	10.4	2.4	8.6	-
11/10/2024*	tr	11.6	2.6	5.5	-
12/10/2024	0.5	11.7	2.7	10.9	34
13/10/2024	tr	10.0	2.1	6.8	-
14/10/2024	tr	13.6	5.8	5.1	-
15/10/2024	2.2	15.3	10.8	9.7	-
16/10/2024	6.0	17.3	11.5	4.8	-
17/10/2024	0.2	16.2	8.7	7.9	-
18/10/2024	3.4	17.3	8.3	8.7	-
19/10/2024	tr	15.3	9.3	7.4	-
20/10/2024	1.5	15.9	11.0	19.6	54
21/10/2024	tr	15.0	9.4	10.5	-
22/10/2024*	tr	16.1	7.7	5.0	-
23/10/2024	tr	14.9	5.6	7.4	-
24/10/2024	0.1	16.5	12.5	10.8	-
25/10/2024	3.5	14.9	5.3	7.2	-
26/10/2024	0.9	13.6	4.3	6.7	-
27/10/2024	3.1	14.6	3.9	8.9	-

Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Mean Wind Speed (kts)	Max Gust (>=34 kts)
28/10/2024	1.1	14.7	11.2	8.4	-
29/10/2024*	0	11.5	9.5	7.1	-
30/10/2024*	tr	15.0	9.6	4.1	-
31/10/2024	0	11.2	9.8	6.9	-
01/11/2024*	tr	12.0	10.2	5.1	-
02/11/2024*	0.4	12.0	9.9	3.5	-
03/11/2024	0.1	12.9	9.9	4.1	-
04/11/2024	0.2	12.6	10.1	5.6	-
05/11/2024	0.1	13.8	9.1	5.0	-
06/11/2024	tr	17.1	12.6	7.0	-
07/11/2024	tr	15.2	12.0	9.6	-
08/11/2024	0.2	12.9	10.5	9.0	-
09/11/2024	0.2	11.8	10.0	6.5	-
10/11/2024	1.6	14.5	6.0	6.2	-
11/11/2024	tr	10.7	1.7	4.7	-
12/11/2024*	tr	10.7	0.5	4.8	-
13/11/2024*	tr	8.7	0.7	7.9	-
14/11/2024*	0.3	13.1	8.5	3.9	-
15/11/2024	1.5	13.1	10.6	5.0	-
16/11/2024	1.0	10.9	6.0	9.1	-
17/11/2024	2.6	9.9	5.9	8.0	-
18/11/2024	15.4	6.5	0.7	8.2	-
19/11/2024	11.8	5.1	-1.3	9.6	-
20/11/2024	tr	5.1	-1.6	8.4	-
21/11/2024	tr	2.6	-0.6	9.6	-
22/11/2024	tr	4.6	-0.5	10.1	-
23/11/2024	16.9	15.7	3.6	16.6	-
24/11/2024	0.8	15.1	7.5	16.1	40
25/11/2024	0	8.3	2.6	9.9	-
26/11/2024	tr	7.8	-1.9	5.5	-
27/11/2024	tr	6.2	-3.3	5.3	-
28/11/2024	0.5	11.3	-4.1	13.0	-
29/11/2024	0.2	14.2	10.9	12.7	-
30/11/2024	0.4	15.8	11.8	10.2	-

Note: * = boat based survey date. 10.8 kts = 20 km/hr.

Appendix D
Vessel used for Offshore Bat Surveys – Rós Áine