

Appendix 31-3: Offshore Bat Survey (Spring Migration 2025) Report





ORIEL WIND FARM PROJECT

Environmental Impact Assessment Report - Addendum

Appendix 31-3: Offshore Bat Survey (Spring Migration 2025) Report

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ORIEL WINDFARM PROJECT – OFFSHORE BAT SURVEY (SPRING MIGRATION 2025) REPORT

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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 2025 Spring bat migration period (mid-March to May).

From the literature review completed to inform the assessment presented in EIAR chapter 31: Bats in the Marine Environment, there was no published empirical evidence of offshore bat activity (e.g. migration, commuting, foraging) within Irish marine waters at that time. 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 through the environmental assessments completed to inform those applications. This data provides evidence of bat activity offshore within marine waters.

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 10.5m offshore 105; P5 passenger boat Lisín 1 (Maritime Mobile Service Identity (MMSI): 250000636) 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 Spring migration period.

1.1.1 Autumn 2024 Migration survey

The Spring migration survey 2025 has been undertaken following the conclusions and recommendation provided in the Autumn migration survey report 2024, (see EIAR appendix 31-2 Addendum: Offshore Bat Survey (Autumn Migration 2024) Report). The Autumn migration survey report recommended that at least one Spring and one Autumn migration survey be completed in order to provide robust information on the usage of the Offshore Wind Farm Area by migrating bats.

The Autumn survey report also recommended that where possible, the height of microphones be increased to improve maximum detection ranges; and explore technological solutions to reduce the recording of background noise within the offshore environment.

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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 Spring migration within the Survey Area.

2 METHODOLOGY

2.1 Boat-based survey

2.1.1 Transect routes

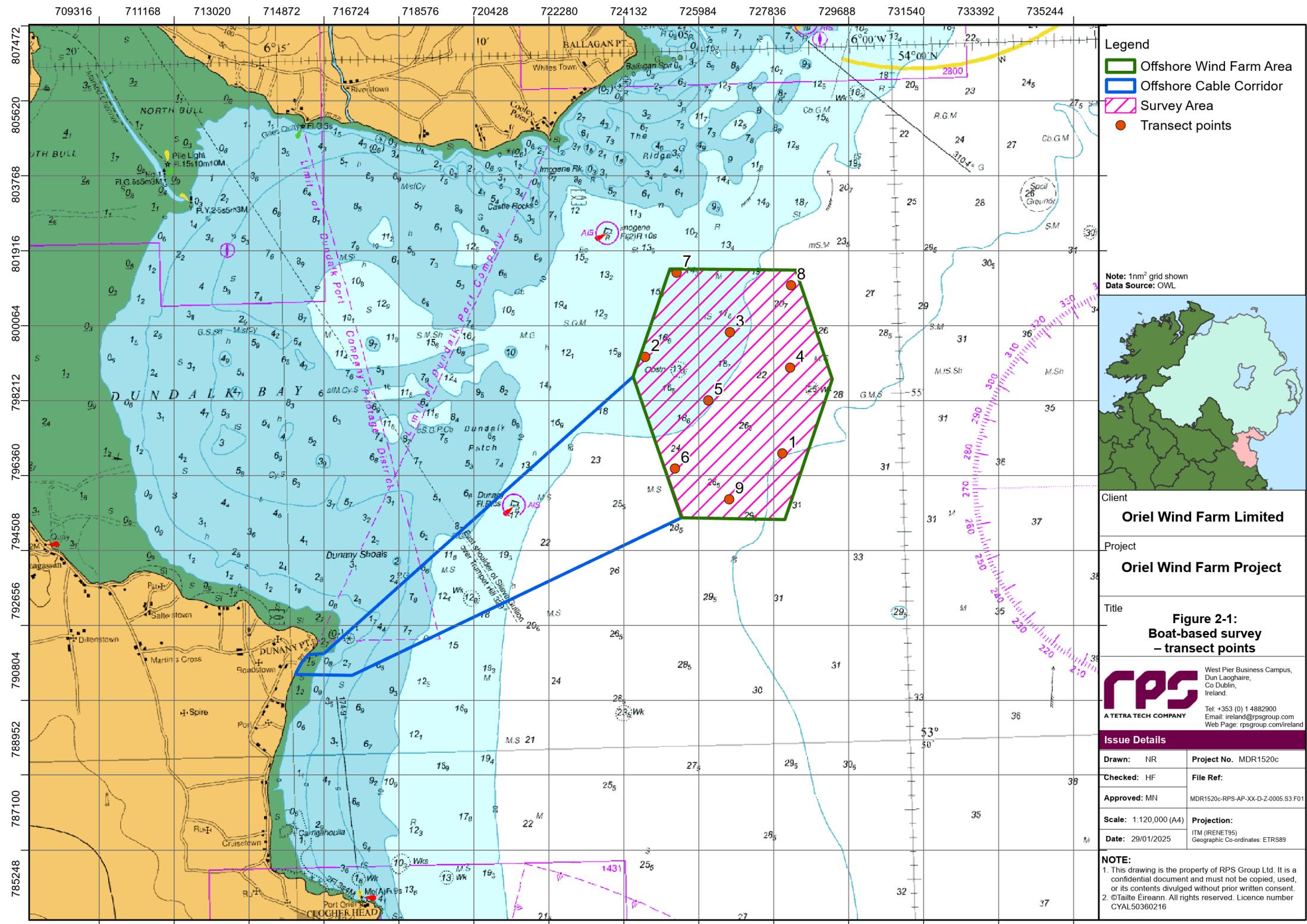
To define the transect routes for the boat-based survey, a 1nm² grid was overlain with the Offshore Wind Farm Area and 9 No. random grid squares within the grid were selected (see Figure 2-1). The transect was completed during suitable survey nights between mid-March and May. The particular nights in 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 surveyed, 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)	Longitude (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



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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. Directional Ultrasonic Microphone US-D;
- 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 Lisín 1 survey vessel (see Appendix D) on 7 April 2025 to monitor for migratory bat activity within the Survey Area. The deployment was completed at Malahide Marina.

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). It should be noted that the Omni-directional microphones were replaced by Directional Ultrasonic Microphone US-D on 13 May 2025, as a technological solution recommended by Titley Scientific to reduce the recording of background noise within the offshore environment. The 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 cabin exterior using cable ties and ratchet straps. The microphones and cables were secured to a vertical metal frame approximately 4 meters above sea level using cable ties, with the microphones pointing away from the portside and starboard side of the vessel at a slight upward 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.);

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- 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.

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Figure 2-3: Bat detector equipment as deployed.

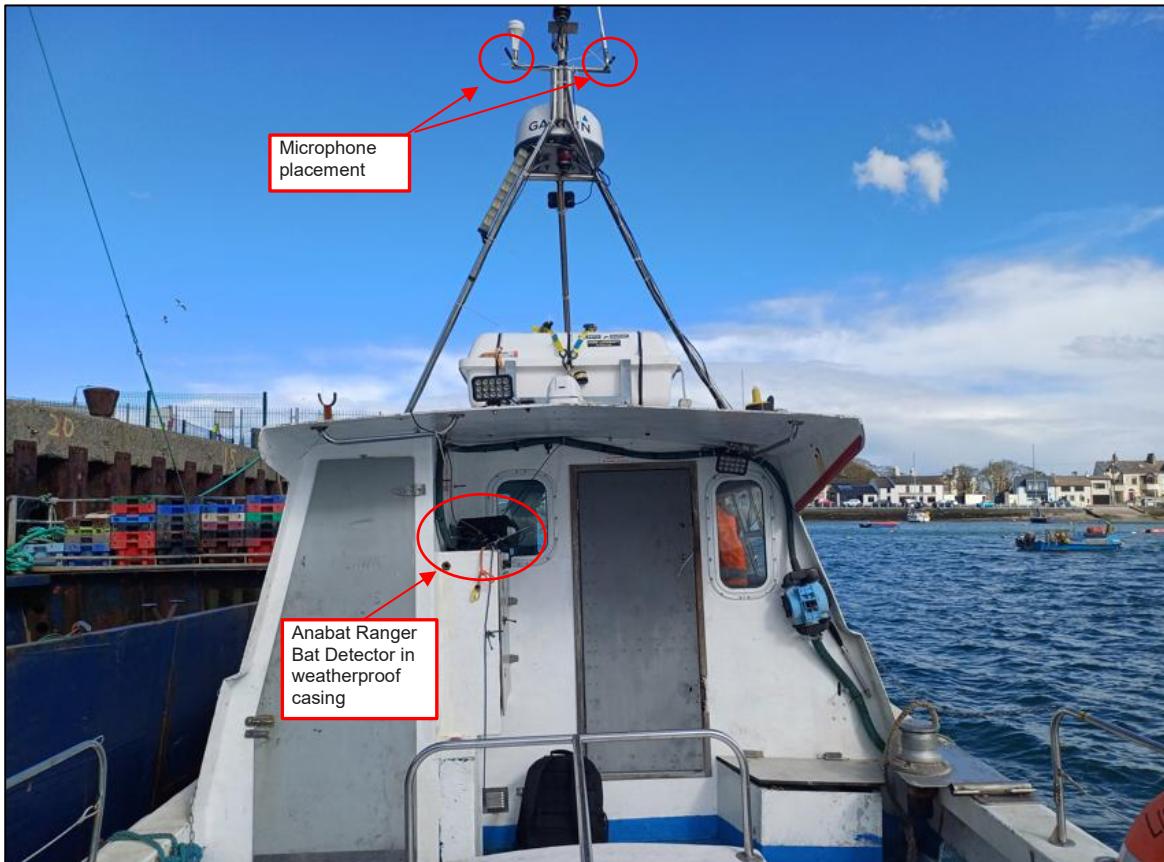


Figure 2-4: Placement of the microphones on the starboard side and the port side of the vessel

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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. 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

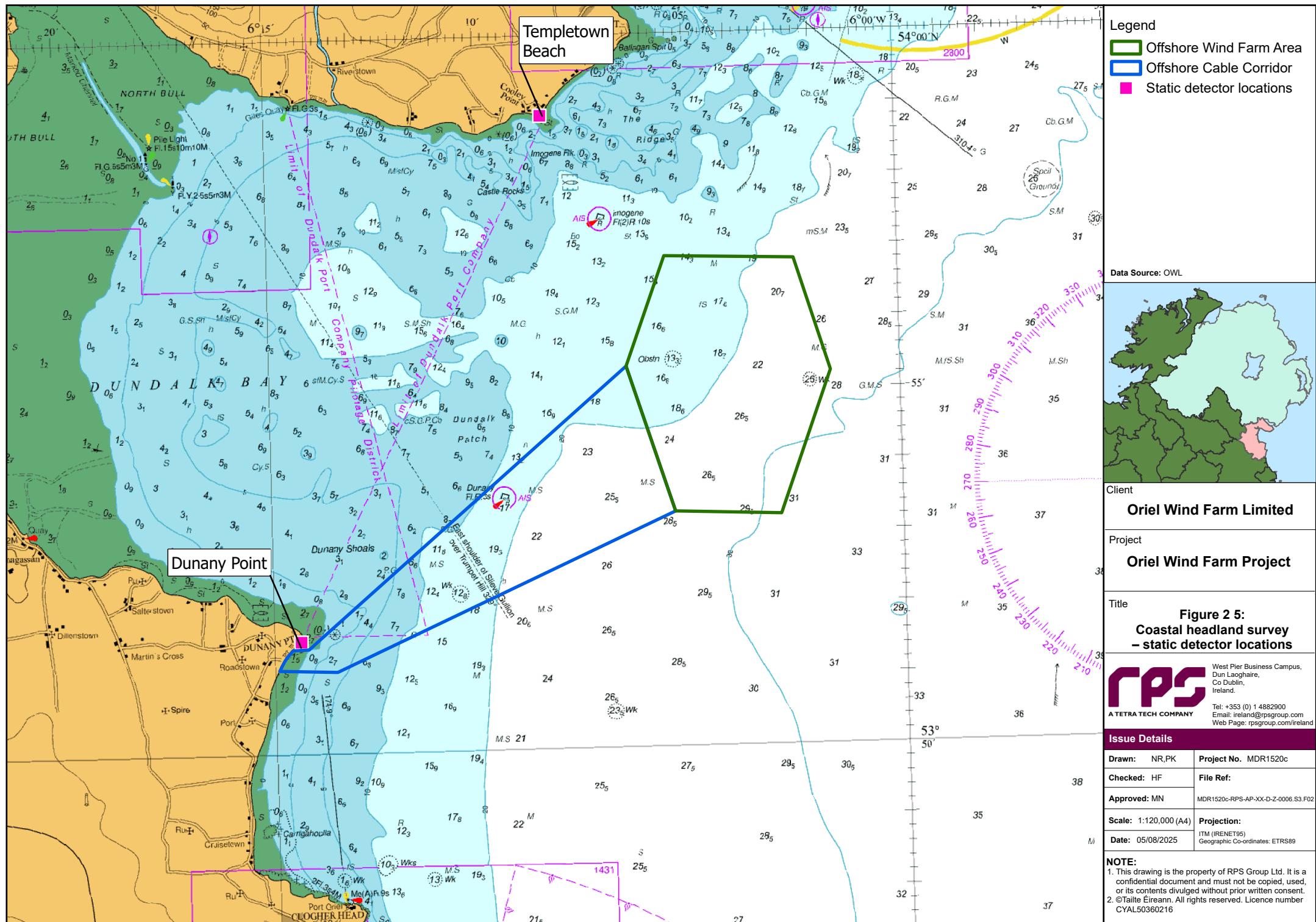
2.2.1 Static locations

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 Spring 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 both detectors were selected based on a combination of land accessibility, safety of equipment, and placement of detectors along potential coastal ‘flyways’. 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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2.2.3 Deployment

The equipment was prepared, checked, and deployed at Templetown Beach (Cooley Point) and Dunany Point on 13 March 2025.

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 coastline 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

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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, 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 effecting the number of available survey nights with suitable conditions for migrating bats, suitable conditions for vessels to safely travel offshore during the night and the impact this potentially has on equipment;
- Between mid-March and May, easterly winds were persistent, resulting in an easterly swell and unfavourable sea conditions for offshore survey. This was a limiting factor throughout the survey period, in particular on 02 May 2025 when the vessel deployed offshore ceased surveying and returned early to Port at 2.30am;
- It was expected due to harsh offshore environment 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;

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- 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 Spring migration period;
- During data collection for both the boat-based and coastal headland survey, there was some loss of data and data interruption due to periodic equipment malfunction, human error, battery charge levels, and poor weather conditions (i.e. boat returning early or inability to complete boat surveys due to wind conditions effecting sea state). However, every effort was made to collect data on every available survey night during the boat-based survey and was collected over the majority of survey days at coastal headlands.

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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 conditions¹ from mid-March to May 2025. The deployment period for bat detectors aboard the Lisín 1 survey vessel was between the 7 April and 27 May 2025. During this period, the vessels operated for a combined total of nine nights (see Table 3-1).

As described in section 2.4, some loss of data occurred due to 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, excluding 02 May. On this night, the boat returned to port at 2:30am due to poor weather conditions and therefore only captured data during the available survey window. The Survey Area and GPS tracks covered by the Lisín 1 survey vessel during the deployment period is provided in Appendix B².

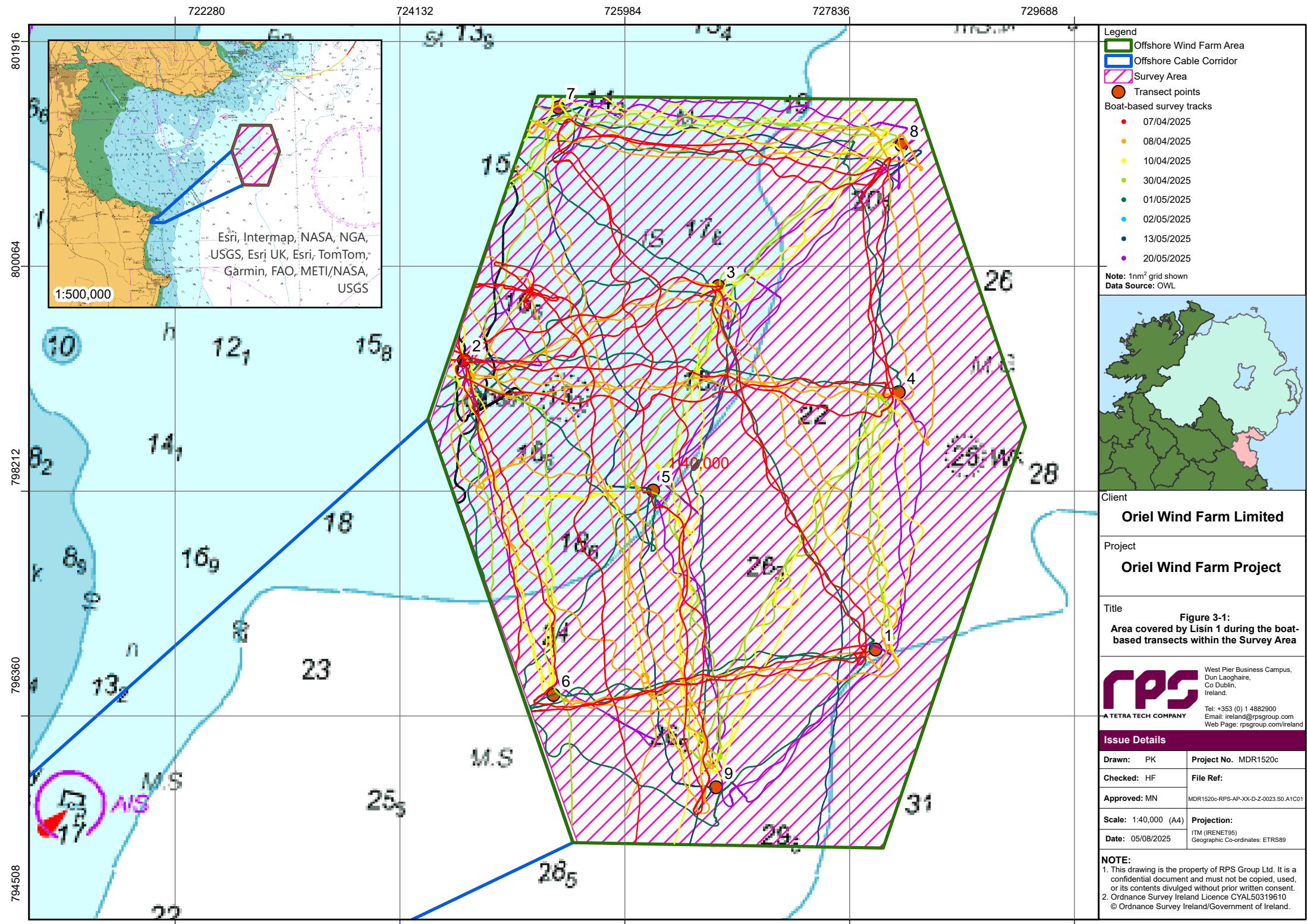
Table 3-1: Summary of boat-based survey deployment dates and detector malfunctions.

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)
April	4	07/04/2025	None	None
		08/04/2025	None	None
		10/04/2025	None	None
		30/04/2025	None	None
May	7	01/05/2025	None	None
		02/05/2025*	None	None
		13/05/2025	Yes – detector did not turn on due to low battery levels	None
		20/05/2025	None	None
		27/05/2025	None – however GPS data unavailable	None – however GPS data unavailable

* Boat returned at 2:30am due to poor weather conditions.

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).

² On 27/05/2025, the GPS data failed, and boat tracks are unavailable. However, the vessel operator confirmed that Lisín 1 visited all stations along the transect route.



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3.1.2 Weather conditions

Between mid-March and May, RPS Ecologists in conjunction with the Vessel Operator reviewed the weather conditions to determine suitable conditions for migrating bats¹, and safe conditions for the survey vessel. 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) ¹	Avg. wind speed	Wind direction	Air temp. (°C)	Barometric pressure (Pa)	Sea state ²	% Cloud cover	Rain (Y/N)	Moon phase ³
07/04/2025; 19:30	53.92117; -6.09041	5.0	5	East	8	1026	Calm	0	N	Waxing
08/04/2025; 19:30	53.89099; -6.07278	5.0	4	NE	8	1027	Calm	0	N	Waxing
10/04/2025; 19:20	53.89958; 6.09709	- 4.8	5	S	9	1029	Calm	0	N	Waxing
30/04/2025; 19:50	53.53863; -6.05482	5	4	NE	14	1020	0.8 m	10	N	Crescent
01/05/2025; 20:10	53.53570; -6.0438	5	18	NE	11	1017	Slight	20	N	Crescent
02/05/2025*	-	-	3	SW	11	1020	-	-	N	Waxing
13/05/2025*	-	-	3	SW	15	1020	-	-	N	Waning
20/05/2025; 20:05	53.85504; -6.06076	3	12	NE	12	1028	0.5 m	10	N	Crescent
27/05/2025; 20:50	-53.55644; -6.06033	5	10	S	10	1008	0.2 m	80	Y	Waxing

*Vessel weather logs from dates marked with an asterisk were lost due to system error and so the data shown in the table above were estimated based on records from Ballyhaise, Dunsany, and Dublin Airport Met Eireann synoptic stations (<https://www.met.ie/climate/available-data/historical-data>).

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.

Some incidental records of bats were record whilst the boat was idle at Skerries harbour. On 11 April 2025, seven passes of Leisler bat (*Nyctalus leisleri*) were recorded, on 12 April 2025 a single pass of Leisler bat was recorded. On 02 May and 13 May 2025, a single pass of Leisler bat was recorded. These records indicate that Leisler bat are likely foraging and commuting along the coast and/or within coastal habitats.

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3.2 Headland survey

3.2.1 Data capture

As described in section 2.2.3, headland surveys were undertaken from 13 March 2025 to 01 June 2025. Bat detectors were deployed for 80 consecutive nights and captured data for a total of 71 nights at Templetown Beach and 72 nights at Dunany Point. Where data was not recorded for the full 80 nights, this was attributed to either no bat activity being recorded, or low battery levels resulting in detector shut down. 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	13/03/2025	27/03/2025	14	None
		27/03/2025	10/04/2025	8	Yes – some data lost due to battery levels
		10/04/2025	02/05/2025	22	None
		02/05/2025	11/05/2025	9	None
		11/05/2025	23/05/2025	6	Yes – some data lost due to battery levels
		23/05/2025	01/06/2025	9	None
Dunany Point	53.859505; -6.239565	13/03/2025	27/03/2025	14	None
		27/03/2025	10/04/2025	11	None
		10/04/2025	02/05/2025	22	None
		02/05/2025	11/05/2025	9	None
		11/05/2025	23/05/2025	2	Yes – some data lost due to battery levels
		23/05/2025	01/06/2025	9	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 3.9 km/hr to 14 km/hr) and temperatures from -4°C to 21.8°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 five species of bat including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Natusius' pipistrelle (*Pipistrellus nathusii*), Leisler's bat, and brown long-eared (*Plecotus auratus*) were identified foraging and/or commuting in the vicinity of the static detector deployment locations. Natusius' pipistrelle was identified at Templetown beach only, and unidentified *Pipistrellus* species and unidentified *Myotis* species were also recorded at both headland locations.

Templetown beach headland had the highest total passes across the survey period, which were dominated by common pipistrelle (59.6%), Leisler's bat (23.6%), and soprano pipistrelle (11.7%) (see Table 3-5). Dunany point headland was dominated by Leisler's bat (45.1%), common pipistrelle (37.6%) and soprano pipistrelle (11.9%) bat passes (see Table 3-4).

Peak bat activity at Dunany Point was recorded on 01 May (877 records of Leisler's bat) during north-easterly winds. Peak bat activity at Templetown Beach was recorded on 02 May (686 records of common

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pipistrelle) during north-easterly winds. Overall, peak Bat Passes Per Night (BPPN) was observed in May for both Dunany Point (154.3 BPPN) and Templetown Beach (257.9 BPPN) (see Figure 3-2).

As detailed above, the most frequently recorded species were common pipistrelle, followed by Leisler's bat and soprano pipistrelle. Individual results for these three species are presented in Figure 3-3 which demonstrates peak BPPN for all three species at both headland locations, in the month of May. Further analysis was undertaken of the records for these three species during the month of May, presenting the number of bat passes by week, time and location to identify foraging and/or migrating trends/patterns present within the data (see Appendix E).

The results for May (Table 3-6) typically indicate that the peak concentration of bat passes are likely associated with local populations using coastal areas for foraging and commuting i.e. foraging bats are typically active for 1-2 hours after dusk, rest for a short period, and then feed again before daybreak. There is no clear evidence indicating the movement of bats out to sea for foraging, migration and/or commuting between headlands.

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

Species	March	April	May	Total (%)
Common pipistrelle	402	98	1770	2270 (37.6)
Soprano pipistrelle	296	52	374	722 (11.9)
Leisler's bat	178	130	2409	2717 (45.1)
Brown long-eared	0	0	4	4 (<0.1)
<i>Pipistrellus</i> species	78	6	225	309 (5.1)
<i>Myotis</i> species	0	1	2	3 (<0.1)
Total	954	287	4784	6025

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

Species	March	April	May	Total (%)
Common pipistrelle	42	157	4754	4953 (59.6)
Soprano pipistrelle	4	22	948	974 (11.7)
Nathusius' pipistrelle	0	0	2	2 (<0.1)
Leisler's bat	0	64	1903	1967 (23.6)
Brown long-eared	0	0	2	2 (<0.1)
<i>Pipistrellus</i> species	1	9	386	396 (4.7)
<i>Myotis</i> species	1	2	1	4 (<0.1)
Total	48	254	7996	8298

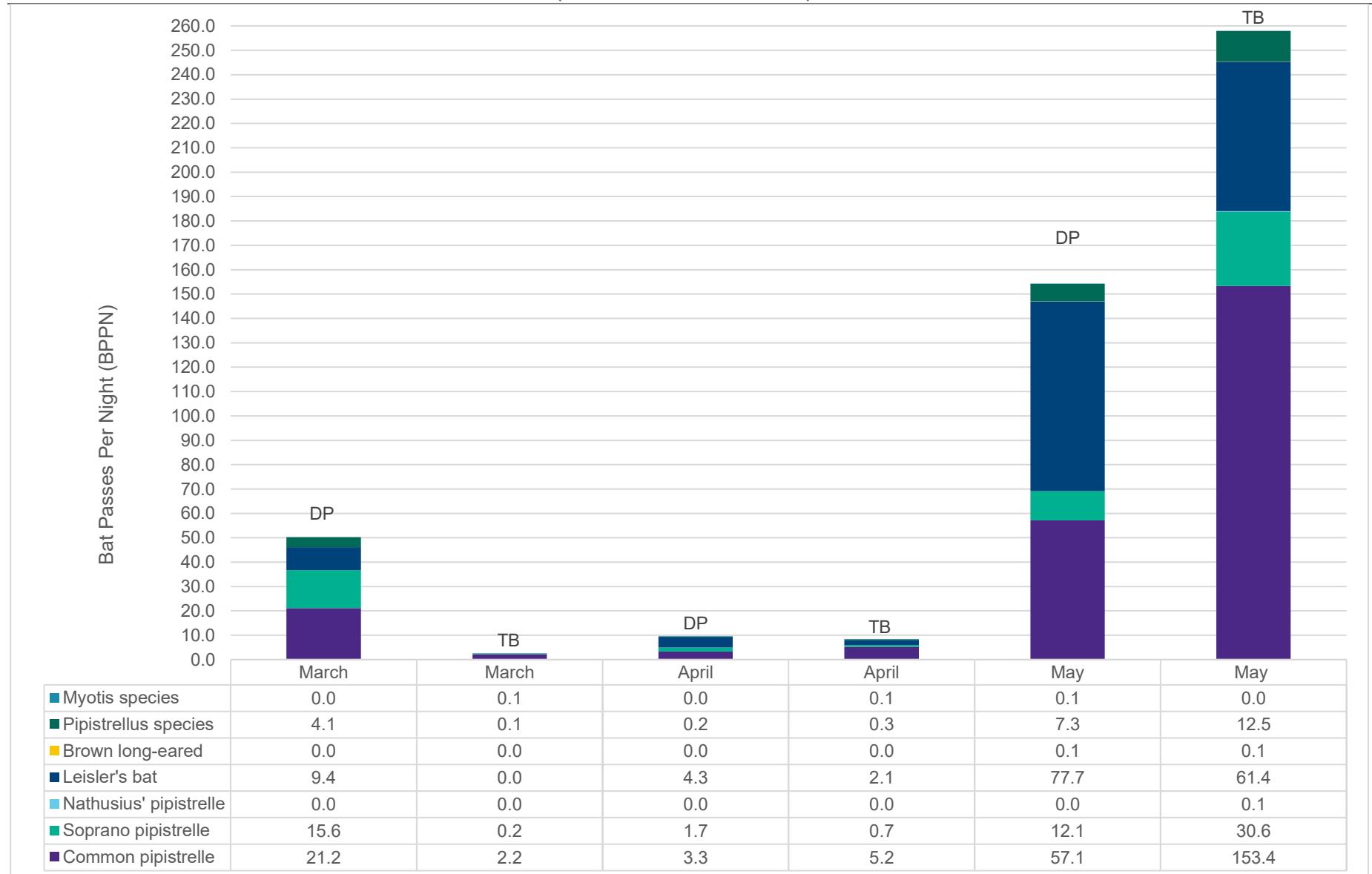
Table 3-6: Total bat passes in May by week, time and location for common pipistrelle, soprano pipistrelle and Leisler's bat (TB = Templetown Beach; DP = Dunany Point). [Note: 0-50 = light grey; 50-200 = dark grey; 200+ = dark grey; no records = white]

Time	20:00-21:00	21:00-22:00	22:00-23:00	23:00-00:00	00:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00
Common pipistrelle TB										
Week 1										
Week 2										
Week 3										
Week 4										
Week 5										
Common pipistrelle DP										
Week 1										
Week 2										
Week 3										
Week 4										

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Time	20:00-21:00	21:00-22:00	22:00-23:00	23:00-00:00	00:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	5:00-06:00
Week 5										
Soprano pipistrelle TB										
Week 1										
Week 2										
Week 3										
Week 4										
Week 5										
Soprano pipistrelle DP										
Week 1										
Week 2										
Week 3										
Week 4										
Week 5										
Leisler's Bat TB										
Week 1										
Week 2										
Week 3										
Week 4										
Week 5										
Leisler's Bat DP										
Week 1										
Week 2										
Week 3										
Week 4										
Week 5										

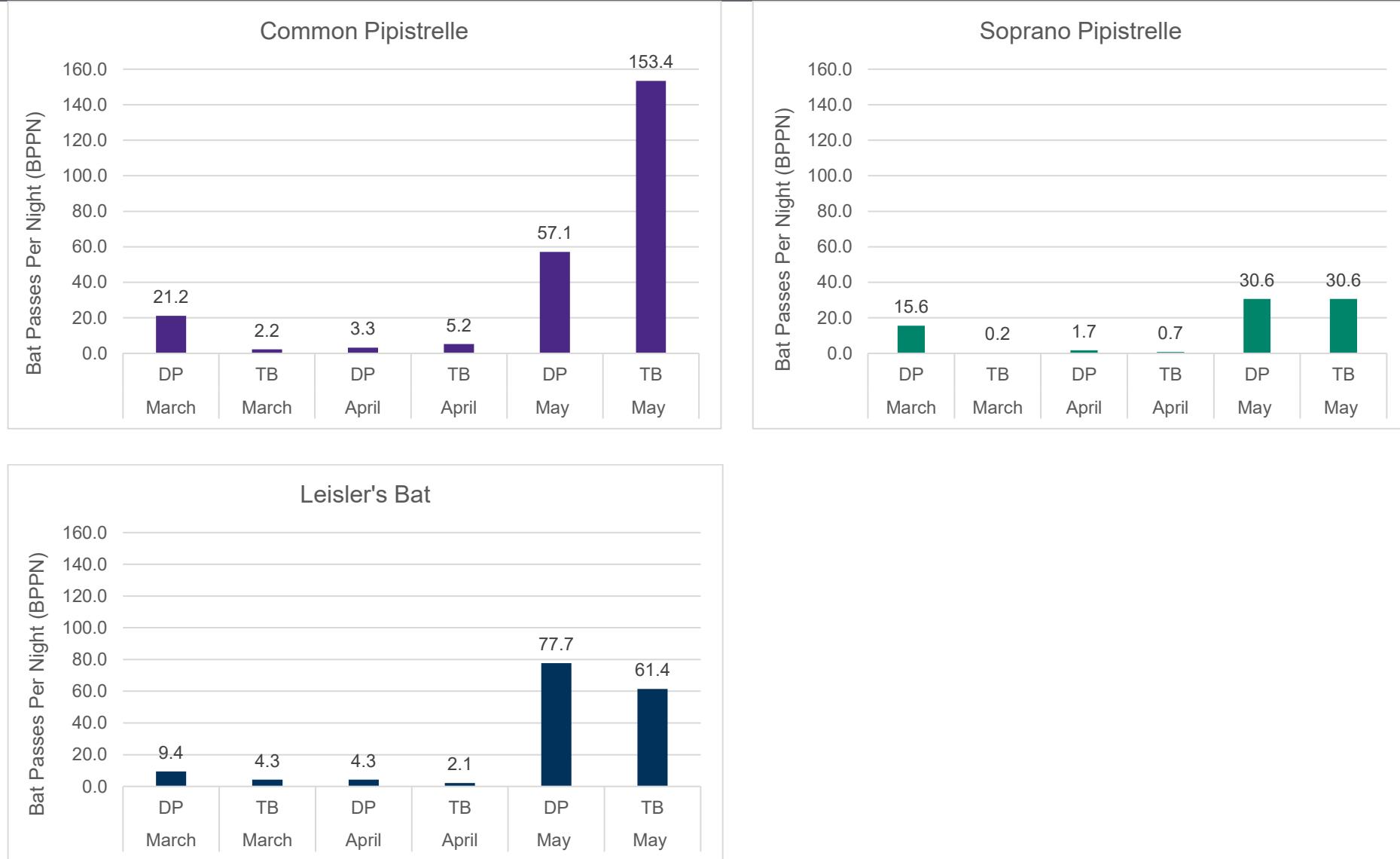
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DP = Dunany Point; TB = Templetown Beach

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

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DP = Dunany Point; TB = Templetown Beach

Figure 3-3: Bat passes per night (BPPN) by month and location for Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat.

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4 CONCLUSION

The results of the boat-based survey were conclusive that no bats were recorded during the nine day deployment period within the Survey Area (note: detection height of 4m + range of 15-30 m).

The largest peak in activity at the headland locations occurred on 01 and 02 May which coincides with the Spring migration window. The majority of activity recorded was from Dunany Point during north-easterly winds in May. On these same dates, bat detectors were also deployed on boat-based surveys, however no bats were recorded.

The most frequently recorded species were common pipistrelle, followed by Leisler's bat and soprano pipistrelle. The results indicate that the peak concentration of bat passes are likely associated with local populations using coastal areas for foraging and commuting.

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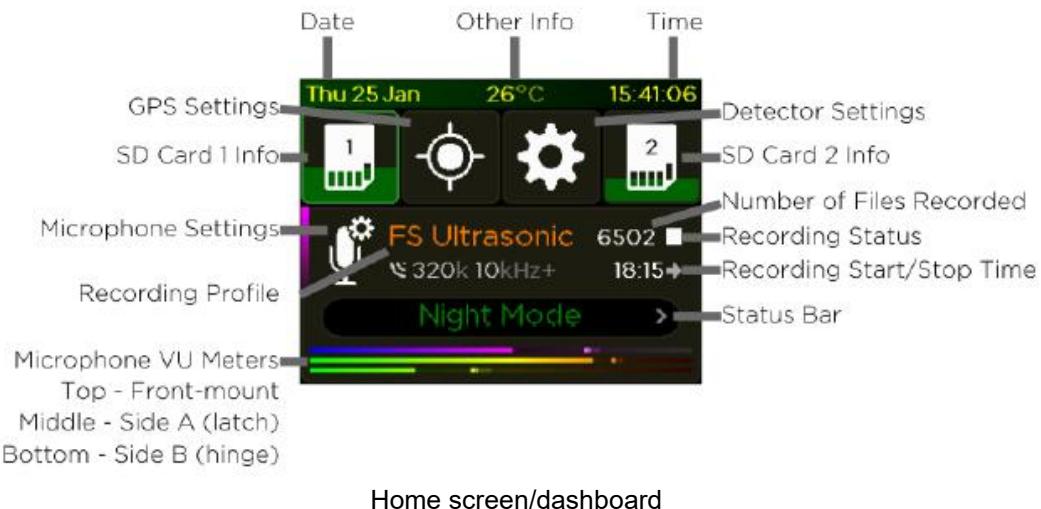
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Appendix A
Maintenance Protocol

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



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

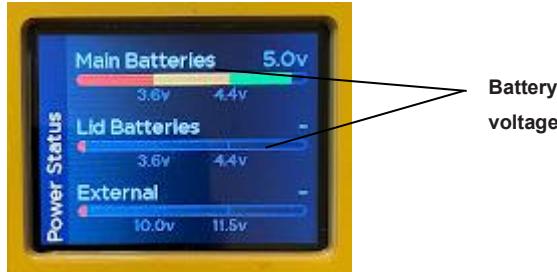
4. On the main screen (see above) use the touch screen icons to select:



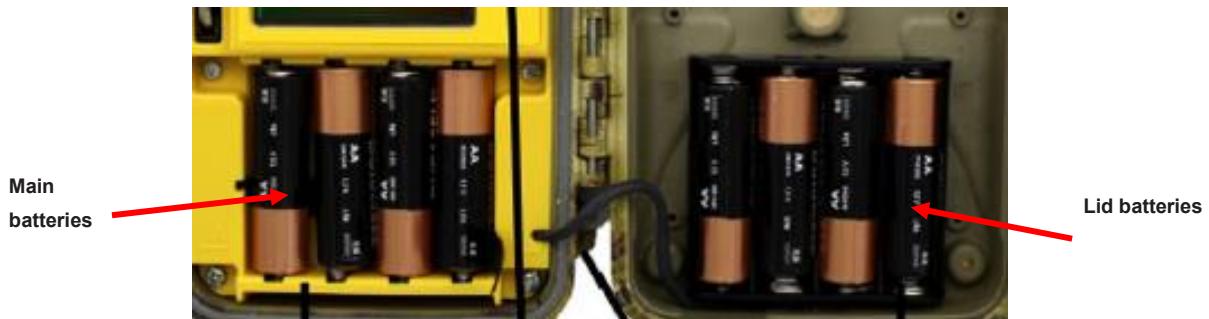
5. To remove, depress the SD card into the card slot (until you hear a click). This will release the SD card. Download data and transfer to RPS via secure fileshare. Insert new card into the same SD slot and press until the card clicks into place. The SD card icon should highlight green now (i.e. card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



Recording 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 '**192kSps**'.

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

- Select Min. Trigger Sensitivity and use the up and down arrows to select '**12kHz**'.

Max. Trigger Sensitivity

- Select Max. Trigger Sensitivity and use the up and down arrows to select '**120kHz**'.

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

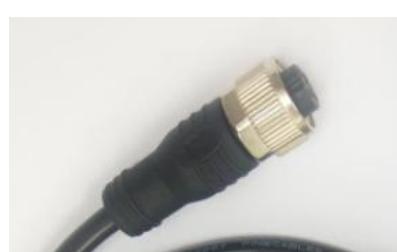
- 11.** Close the detector (lockable latches) and replace the unit into the foam cut-out within the weatherproof box (see below). Close the weatherproof box and refasten the two box latches.



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.

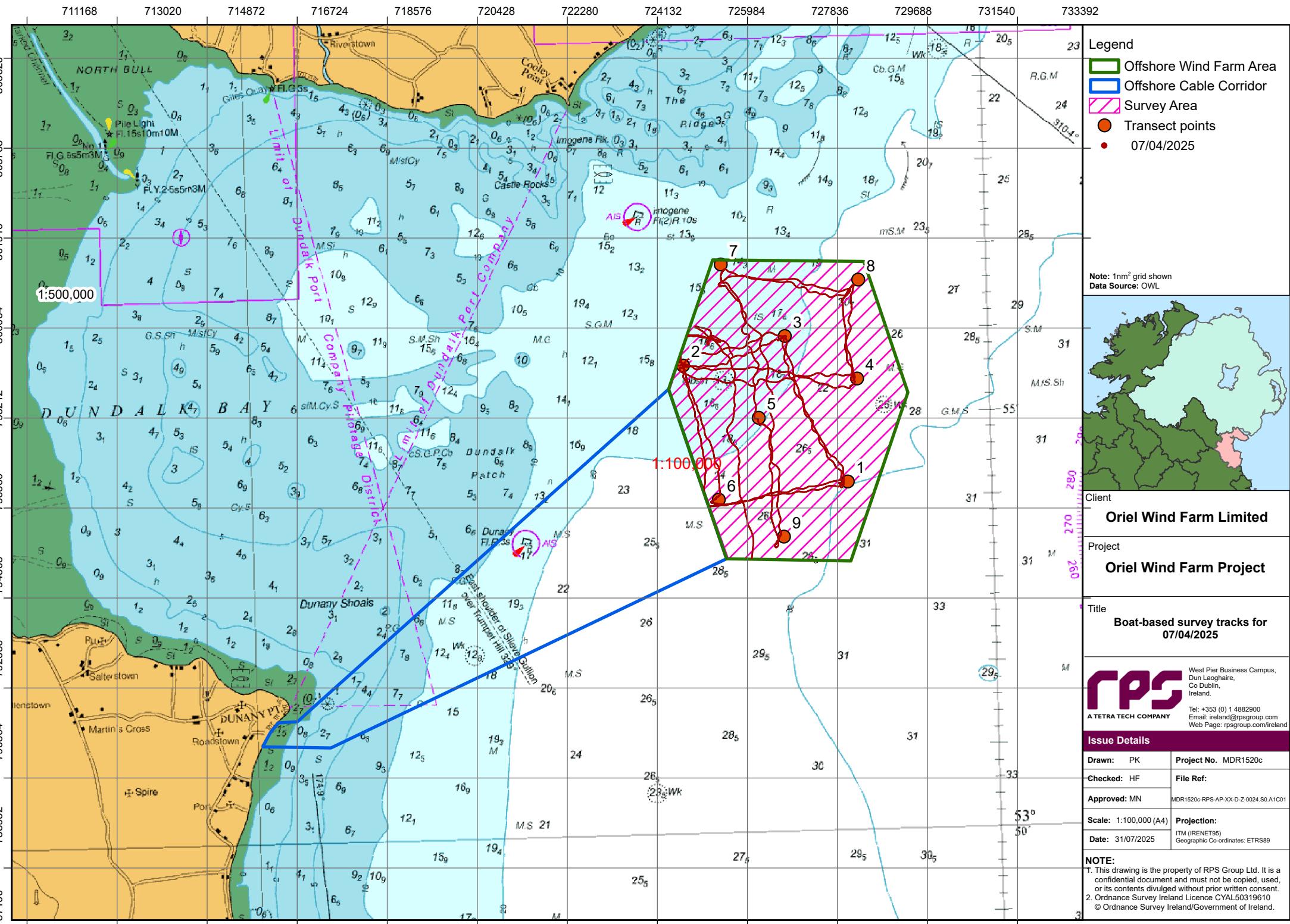
Contact details:

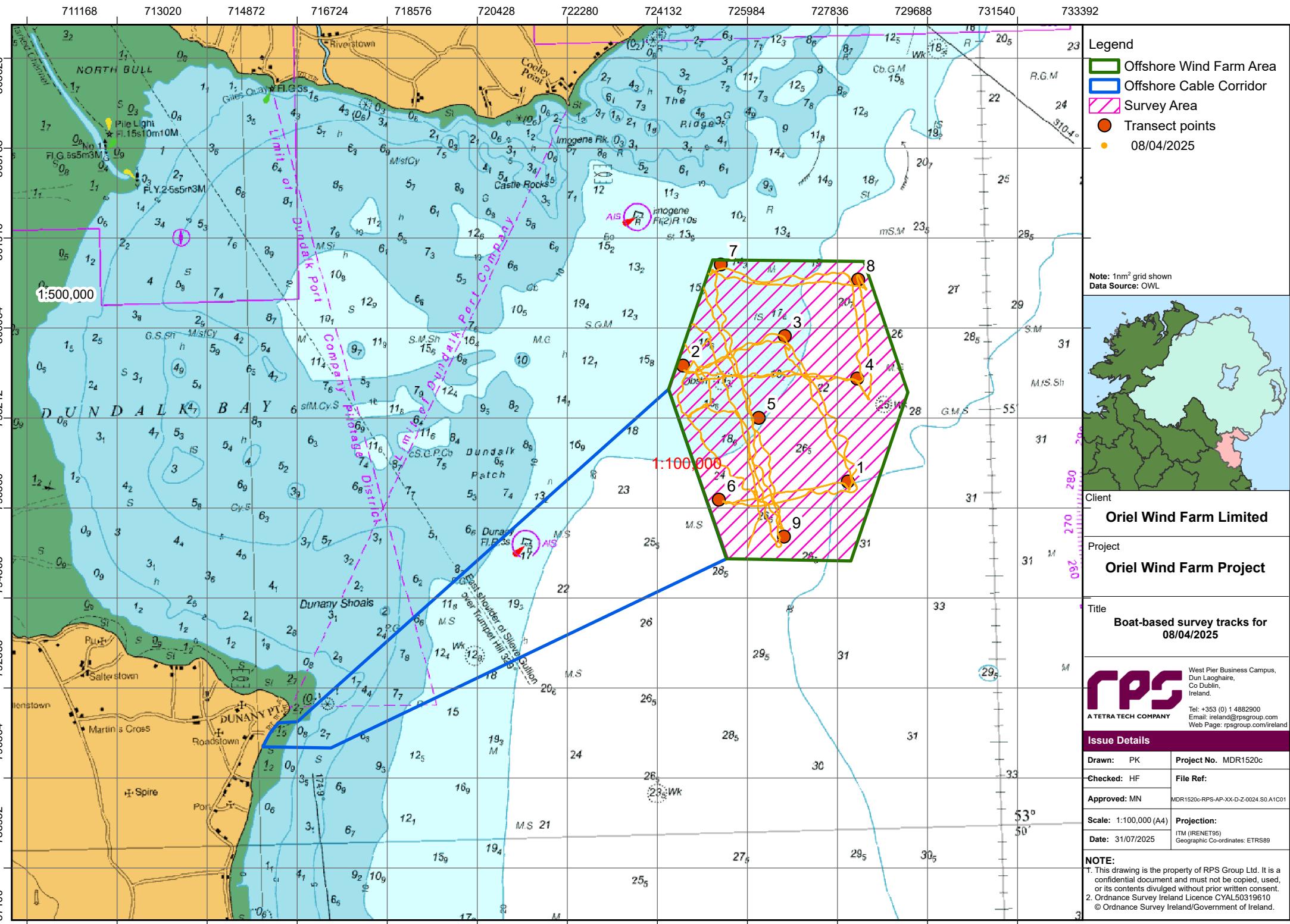
Miles Newman (RPS Associate Ecologist); +353 87 194 4705; miles.newman@rps.tetratech.com

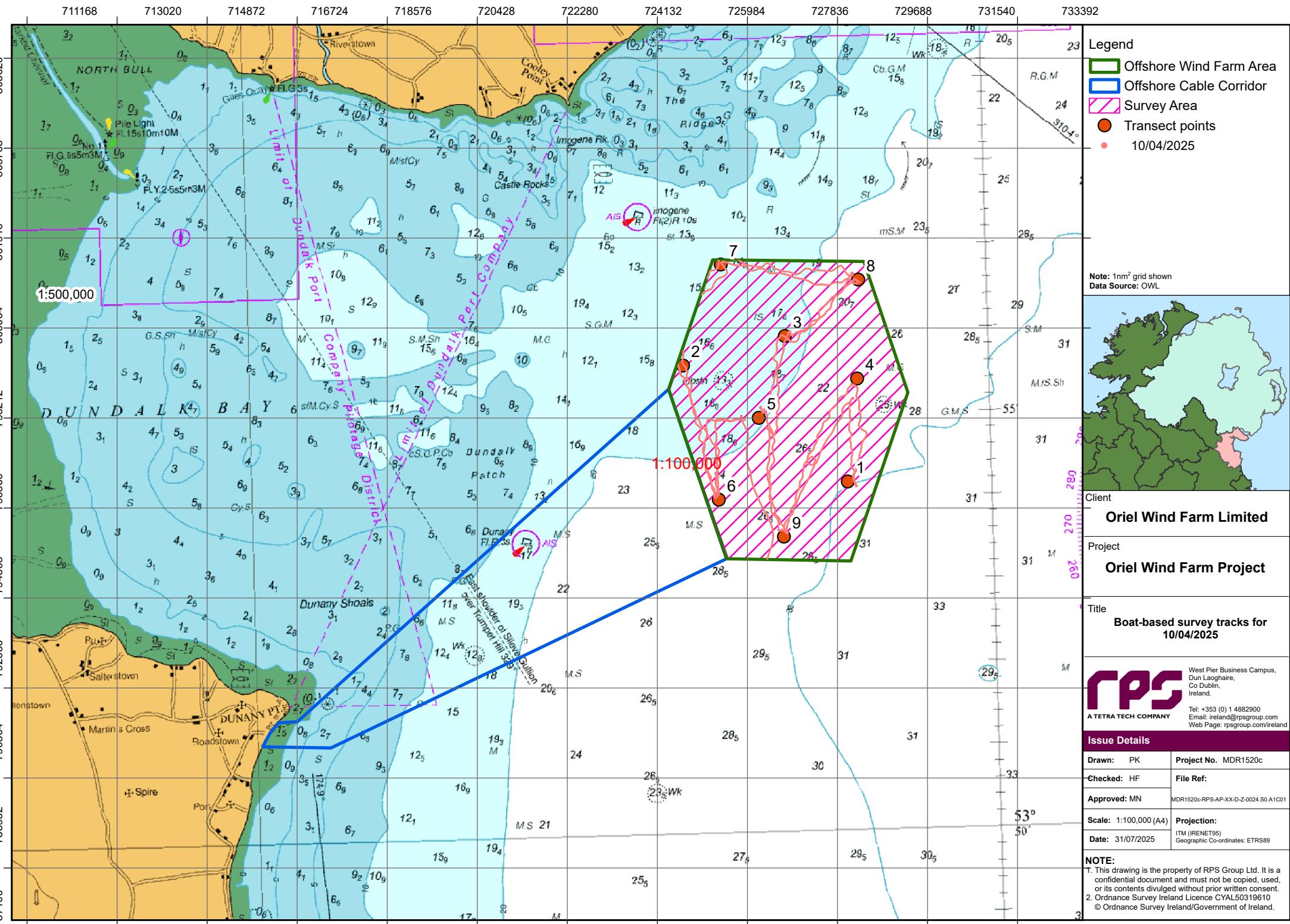
Hannah Fearon (RPS Senior Project Scientist); +353 85 749 4019; hannah.fearon@rps.tetratech.com

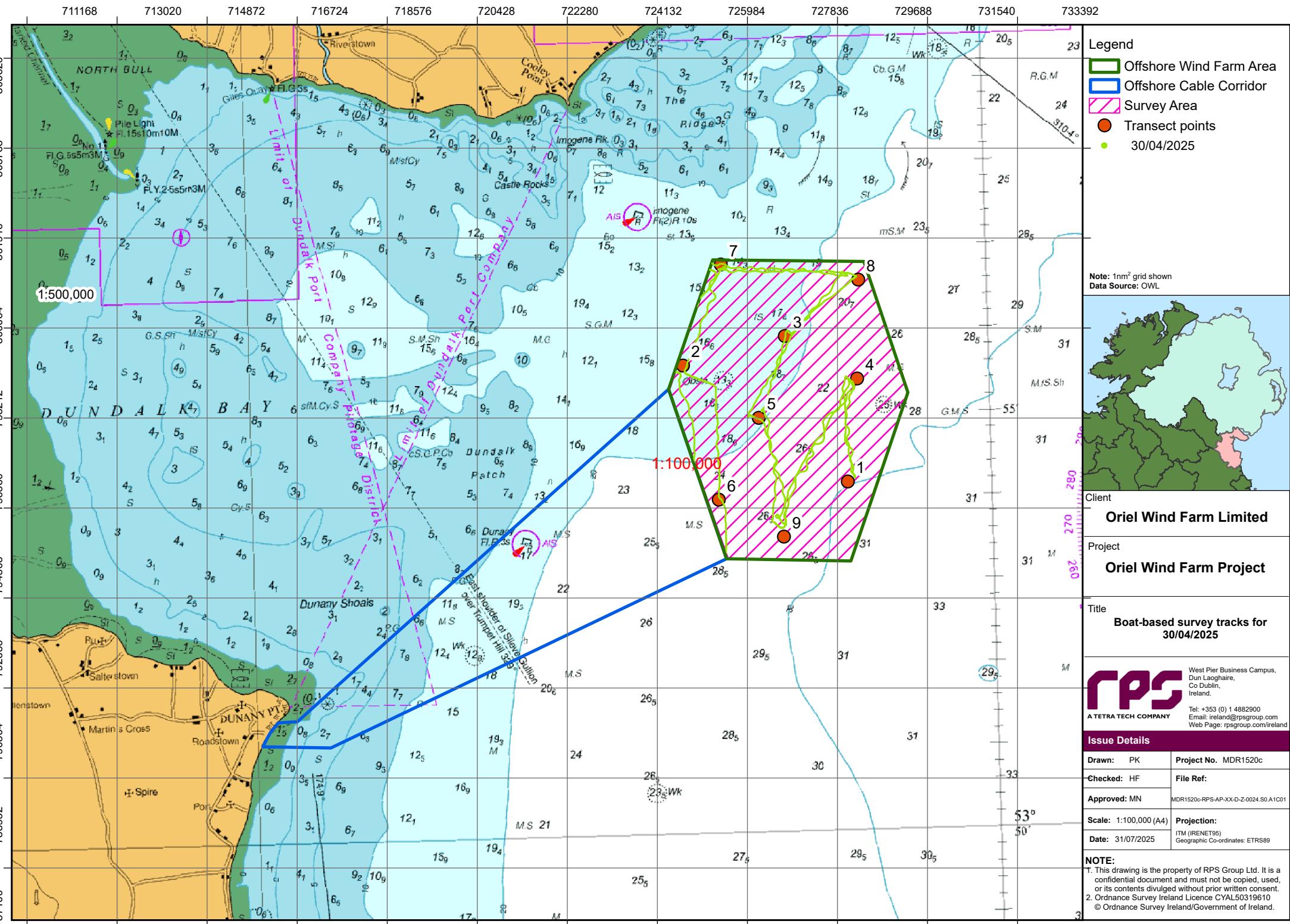
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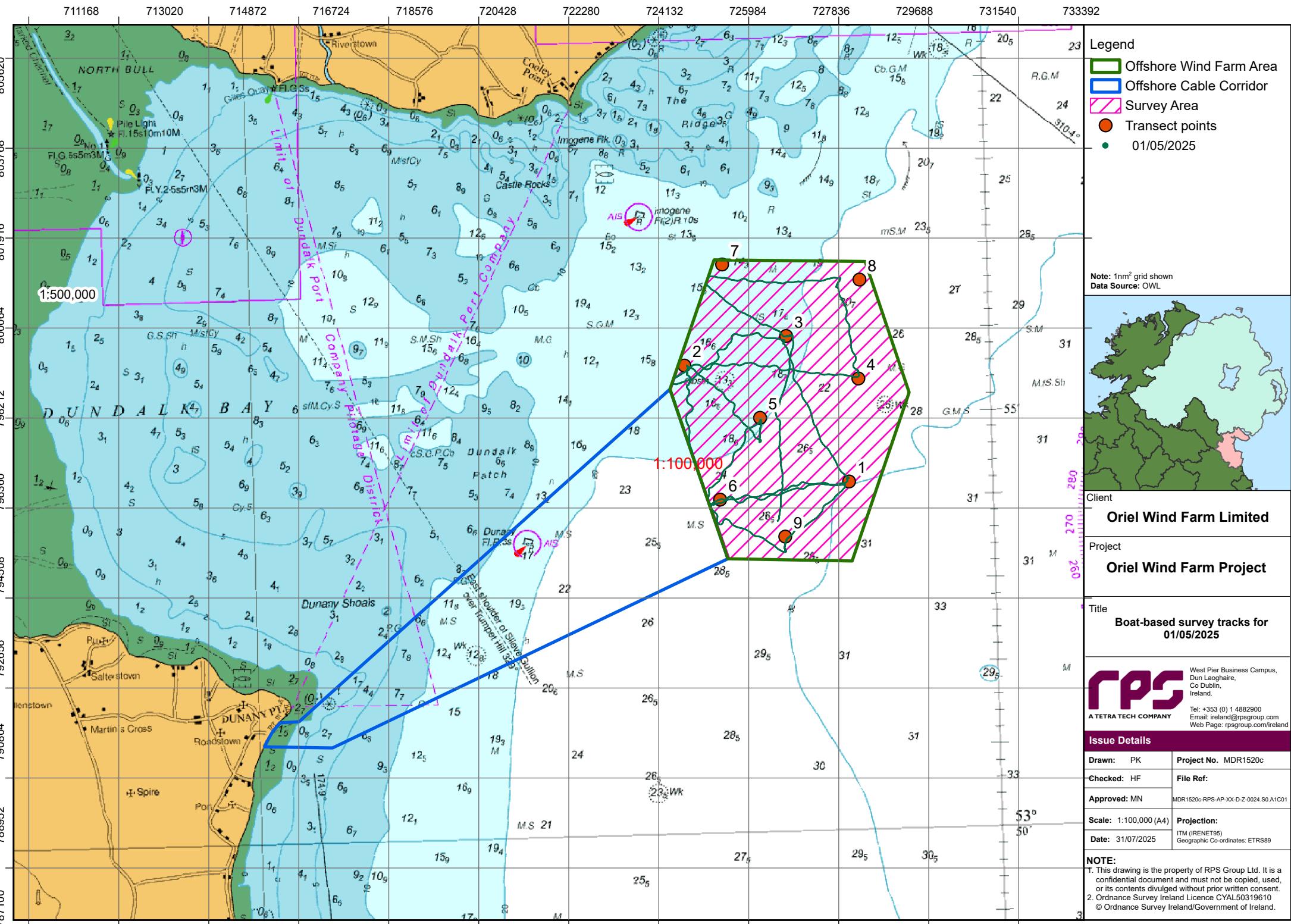
Appendix B
Transect Routes

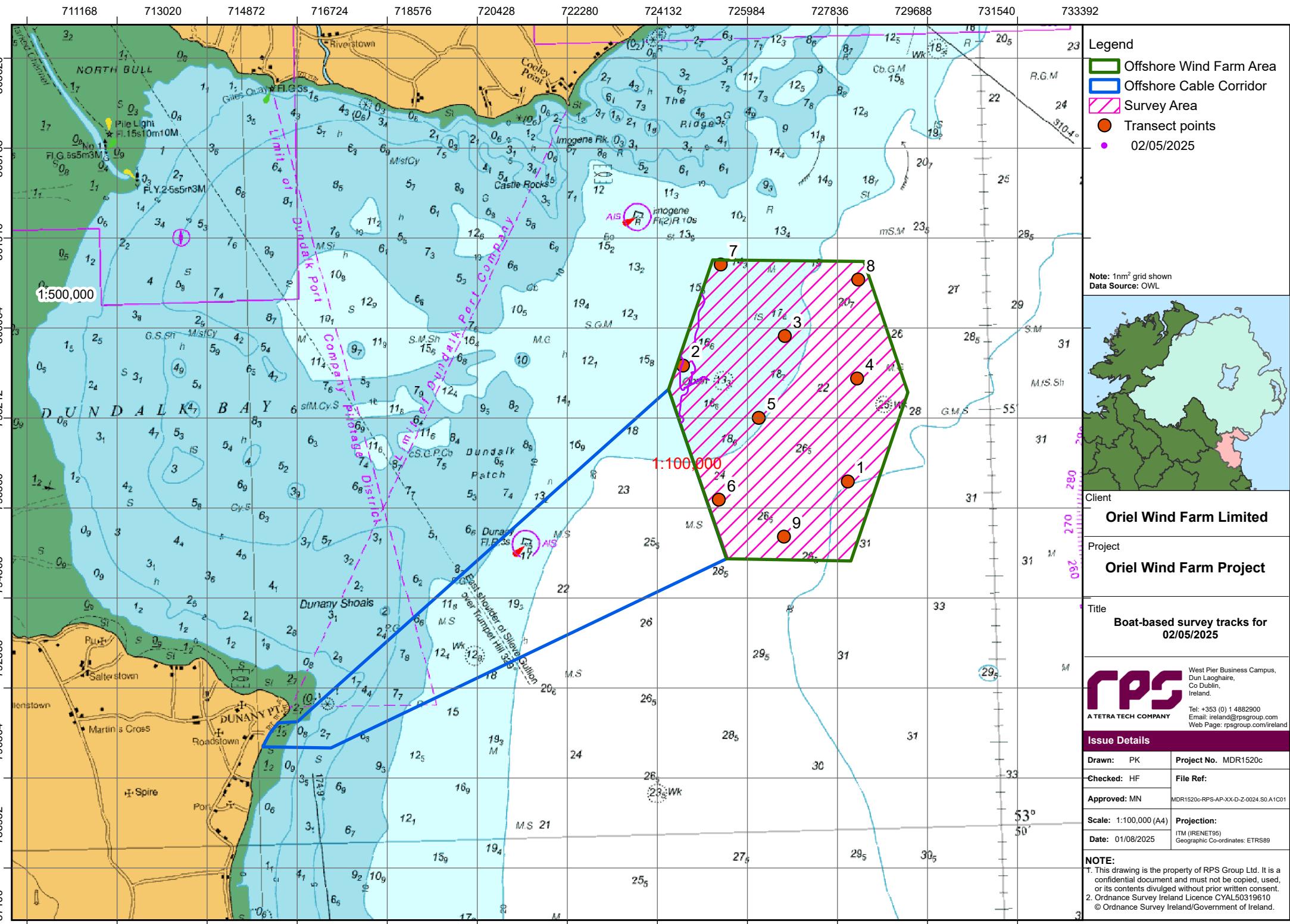


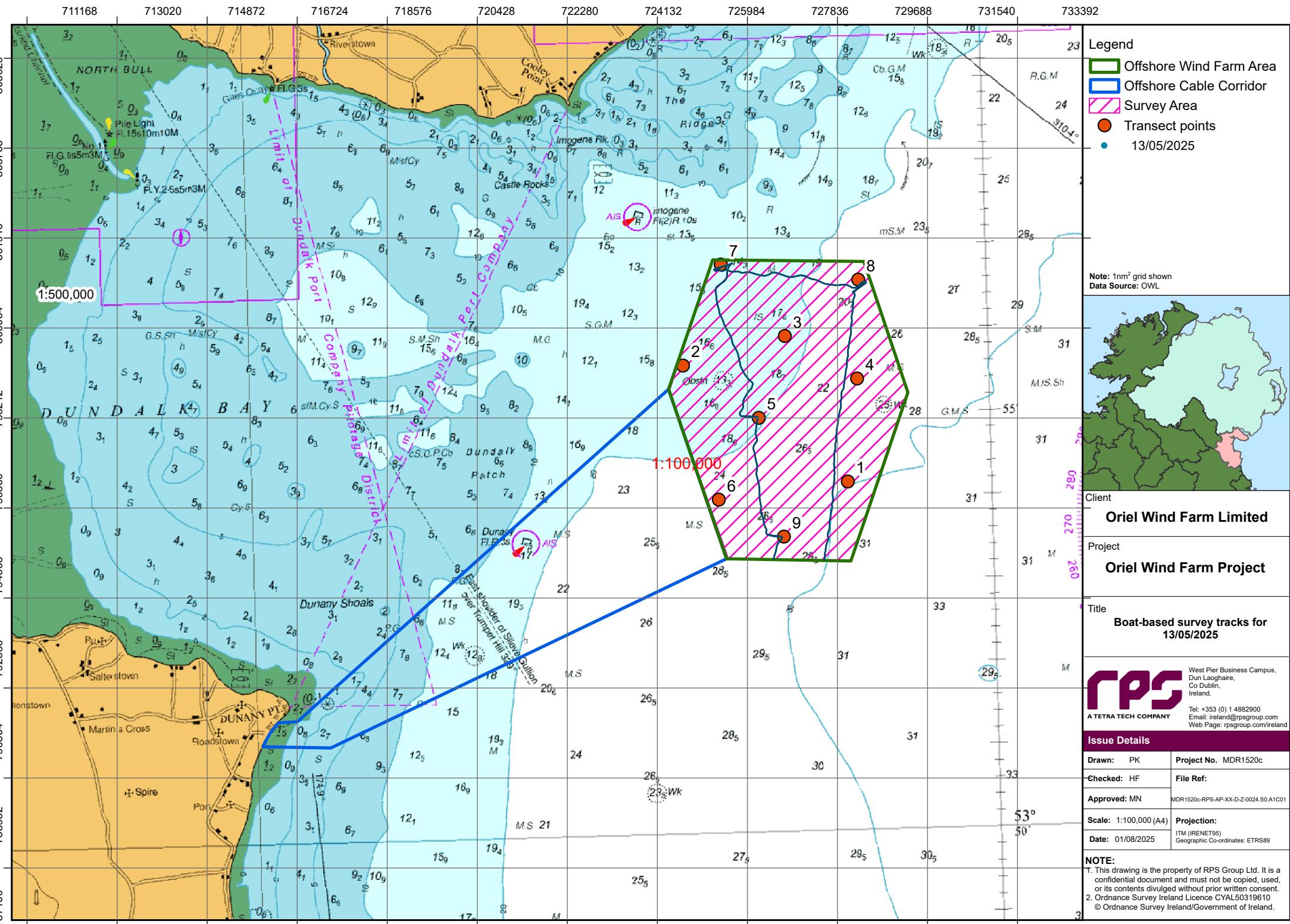


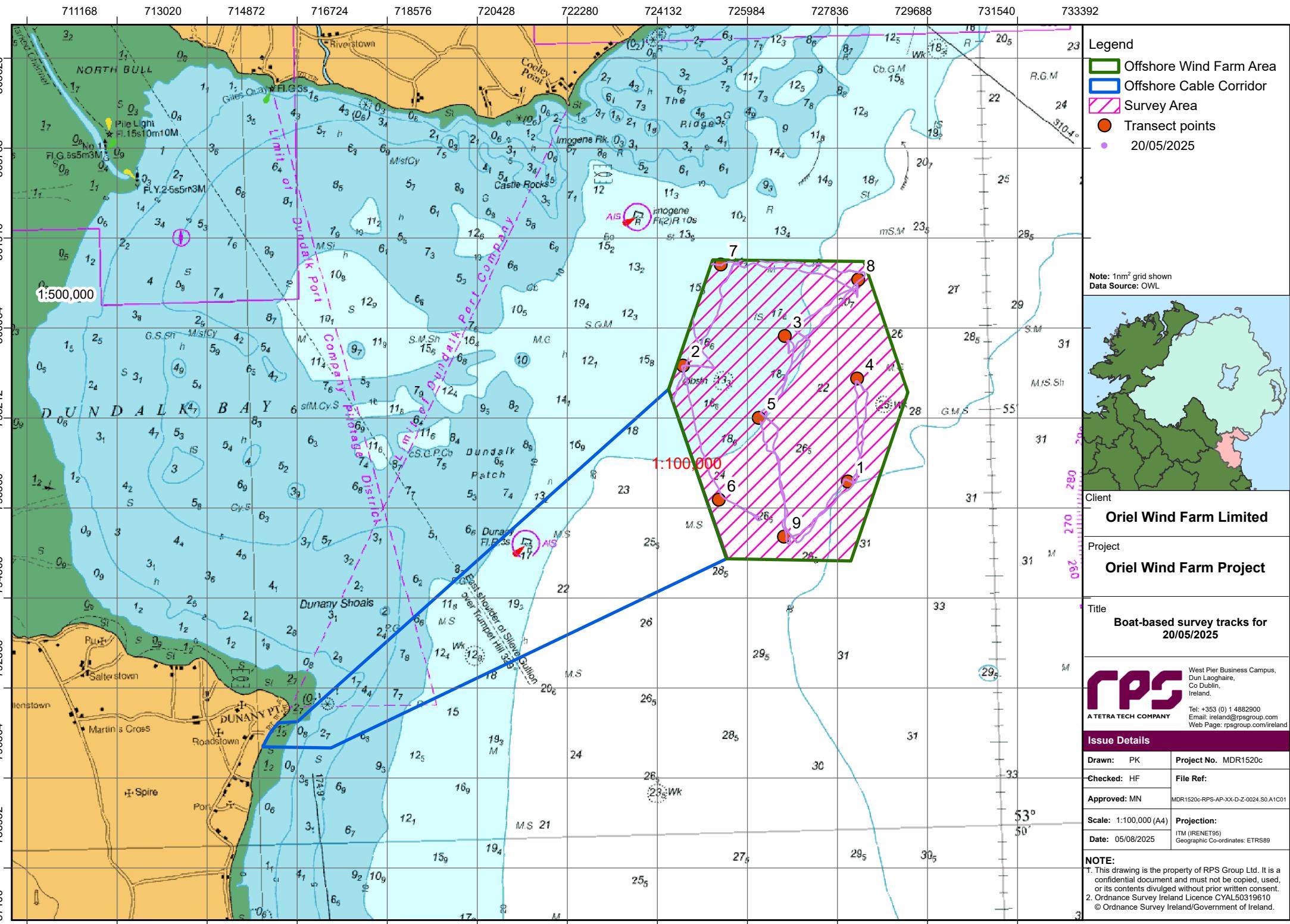












Appendix C

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)
13/03/2025	0	7.8	-1.4	5.8	-
14/03/2025	1	8.2	-1.6	7.6	-
15/03/2025	0	9.1	-4	4.5	-
16/03/2025	0	10.3	1.6	7.5	-
17/03/2025	0	8	4.9	12	-
18/03/2025	0	9.7	-1.1	9.5	-
19/03/2025	0	10.9	-1.5	6.5	-
20/03/2025	0	14.6	3.9	7.1	-
21/03/2025	1.7	13.1	8	7.9	-
22/03/2025	2.3	14.3	6	8.9	-
23/03/2025	0.3	10.4	4.8	12.4	-
24/03/2025	0	14	1	7.9	-
25/03/2025	0	13.1	3.1	7.6	-
26/03/2025	0	14.8	3.5	5.7	-
27/03/2025	1.7	16.1	8	11.3	-
28/03/2025	3.8	10.9	3.7	13.7	37
29/03/2025	0.2	12.4	3.8	11	-
30/03/2025	0	15.5	7	11.1	-
31/03/2025	0	16.5	5.4	5.8	-
01/04/2025	0	13.9	3.1	8.2	-
02/04/2025	0	12.6	6.7	10.2	-
03/04/2025	0.3	14	6	13.5	-
04/04/2025	0	14.5	8	11.7	-
05/04/2025	0	11.8	5.9	11.8	-
06/04/2025	0	14.1	1.2	6.9	-
07/04/2025*	0	14.1	-0.8	5.2	-
08/04/2025*	0	15	0.8	4.3	-
09/04/2025	0	14.3	0.6	5.5	-
10/04/2025*	0	17.7	0.8	3.9	-
11/04/2025	0	19.7	3.9	5.5	-
12/04/2025	0	15	1.8	5.5	-
13/04/2025	0.8	12.8	3.6	7.7	-
14/04/2025	0	13.9	5.4	6.9	-
15/04/2025	1	11.4	4.9	10	-
16/04/2025	24.6	7.8	3.8	12.8	-
17/04/2025	0.2	11.9	1.2	6.3	-
18/04/2025	15.1	9.3	7.4	10.9	-
19/04/2025	14.2	9.9	8.5	8.6	-
20/04/2025	0.7	11.6	7.9	7	-
21/04/2025	8.7	14.3	6.8	6.5	-

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Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Mean Wind Speed (kts)	Max Gust (≥ 34 kts)
22/04/2025	11.6	14	4.1	9.4	-
23/04/2025	0.2	12.9	3.8	9.5	-
24/04/2025	0	15.5	3.1	7.3	-
25/04/2025	8.2	13.5	9.3	9.7	-
26/04/2025	1.5	18	9.5	5.9	-
27/04/2025	0	17.2	11.1	10.2	-
28/04/2025	0	18.2	7.1	5	-
29/04/2025	0	20.1	5.3	5.3	-
30/04/2025*	0	21.7	4.7	5.2	-
01/05/2025*	0	19.1	5.8	6.4	-
02/05/2025*	0	16.1	3.8	6.5	-
03/05/2025	0	15.5	2.7	9.6	-
04/05/2025	0	12.4	1.2	8.8	-
05/05/2025	0	12.3	0.4	7.6	-
06/05/2025	0	15.3	-0.6	4.1	-
07/05/2025	0	16.6	1.8	5.2	-
08/05/2025	0	13.6	2	7	-
09/05/2025	0	15.7	1	5.6	-
10/05/2025	0	17.7	1.8	5.3	-
11/05/2025	2.1	19.3	4.1	5.1	-
12/05/2025	2	17.7	8.9	7.7	-
13/05/2025*	0	18.7	8.8	8.8	-
14/05/2025	0	16	6.6	9.2	-
15/05/2025	0	16.9	5.4	6.3	-
16/05/2025	0	18.3	4.2	6.1	-
17/05/2025	0	16.7	3.2	7.3	-
18/05/2025	0	17.2	4.6	6.8	-
19/05/2025	0	14.3	3.8	8.1	-
20/05/2025*	3.2	17.3	2.9	4.5	-
21/05/2025	0.1	21.8	7.7	6.9	-
22/05/2025	0	16.5	6.6	7.4	-
23/05/2025	2.2	18.3	4.5	7.5	-
24/05/2025	2	18.1	12.9	9.7	-
25/05/2025	3.4	15	8.9	14	35
26/05/2025	6.1	14.2	7.8	11.1	37
27/05/2025*	3.7	13.8	9.3	5.5	-
28/05/2025	4.7	18.6	8.4	7.1	-
29/05/2025	11.4	18.6	11.6	9.1	-
30/05/2025	0.1	21.7	13.9	7.8	-
31/05/2025	0.9	18.8	10.1	9.4	-

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

Appendix D

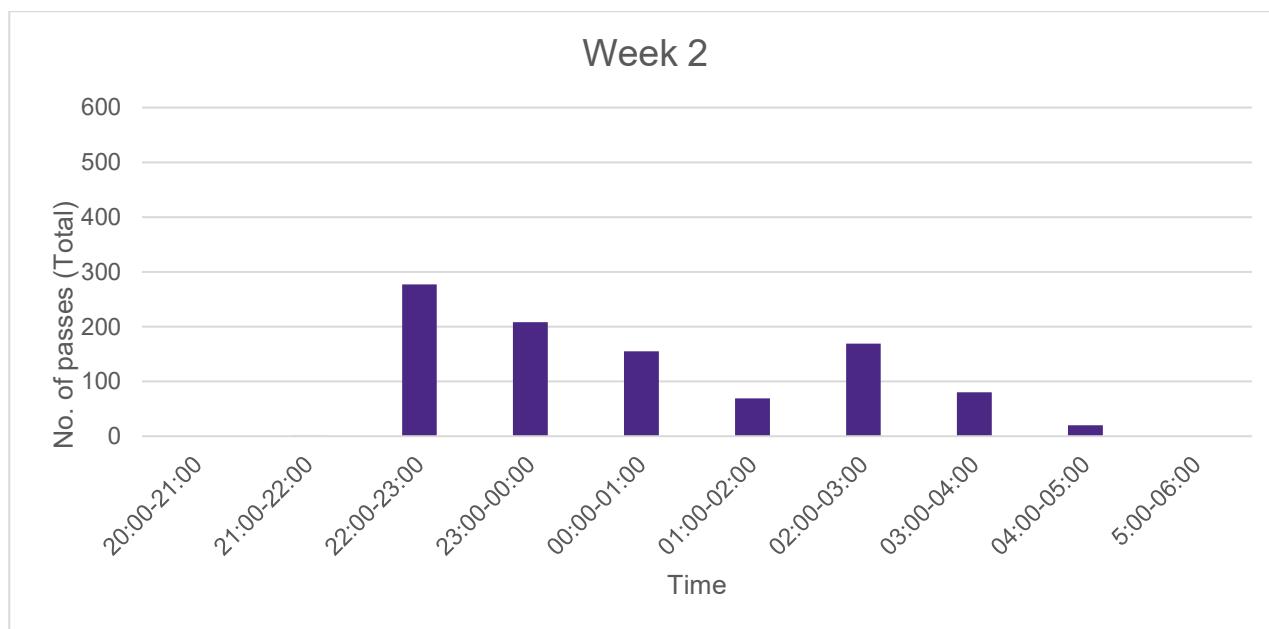
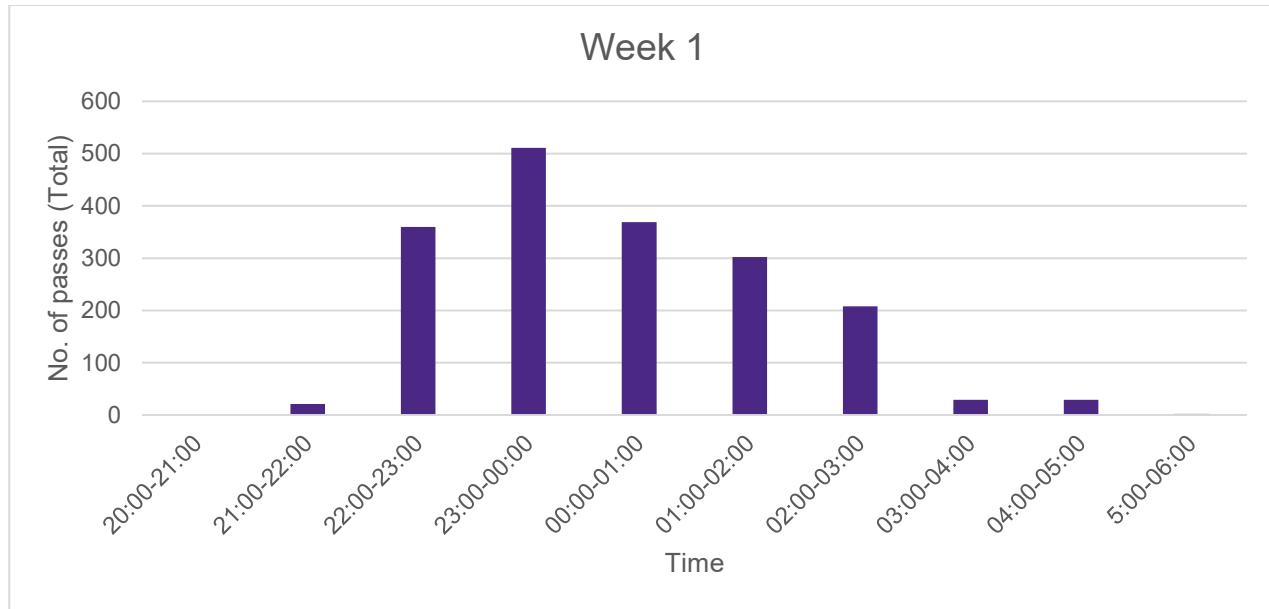
Vessel used for Offshore Bat Surveys - Lisín 1



Appendix E

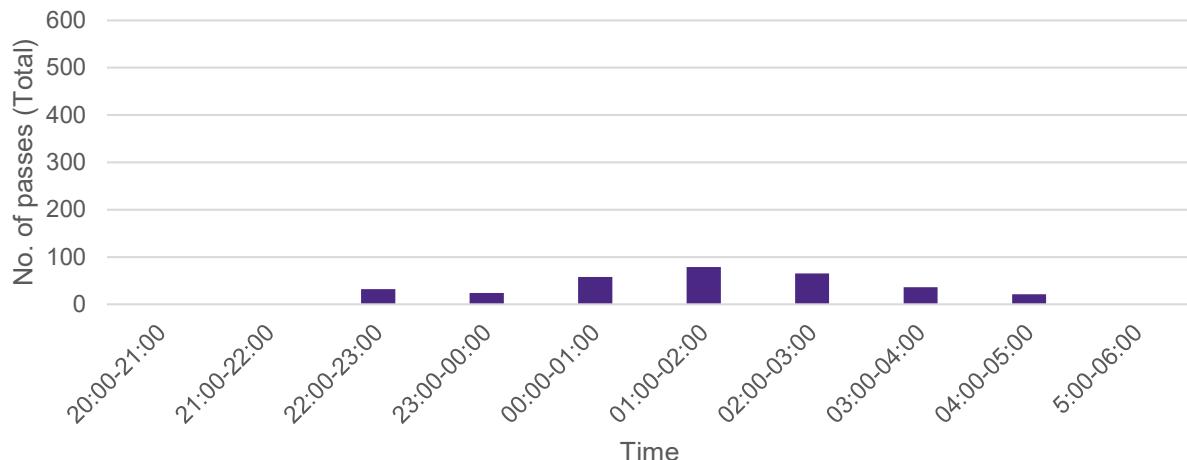
Bat passes in May, by week, time and location for Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat

Common pipistrelle – Templetown Beach

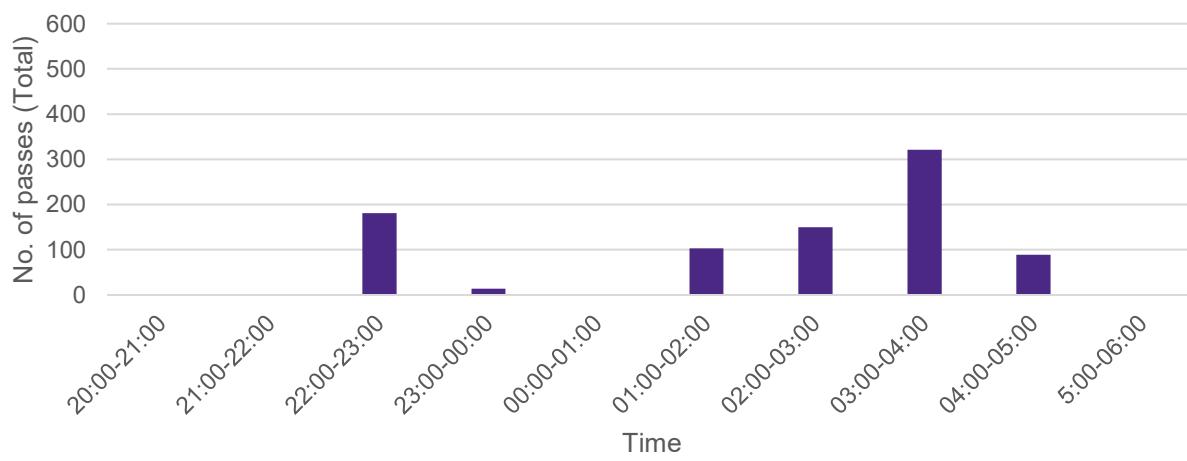


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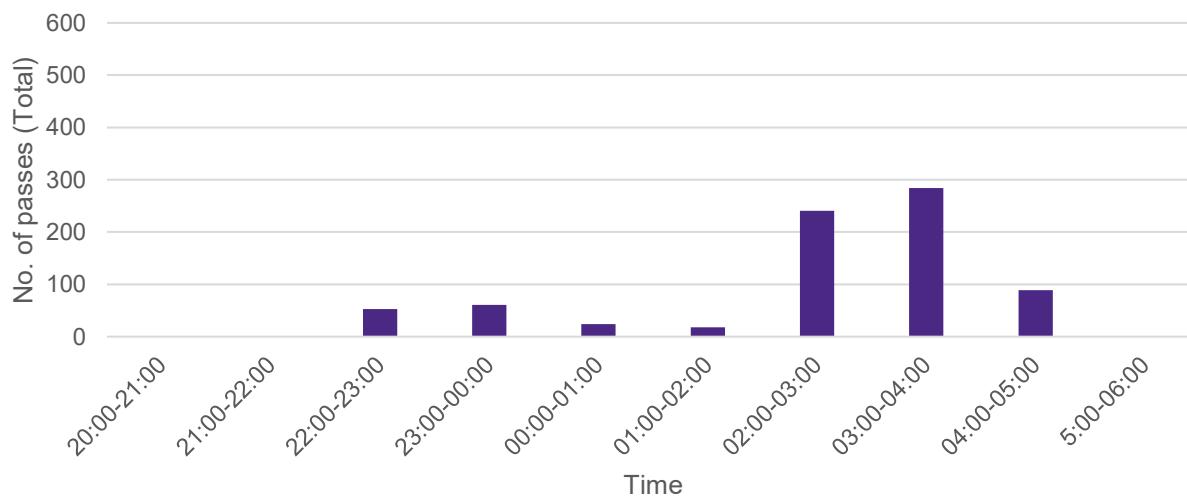
Week 3



Week 4



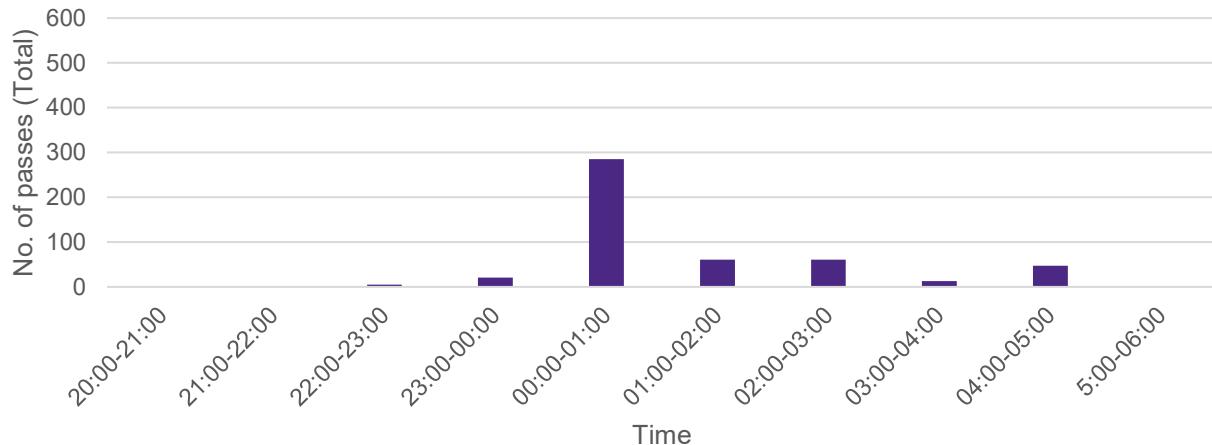
Week 5



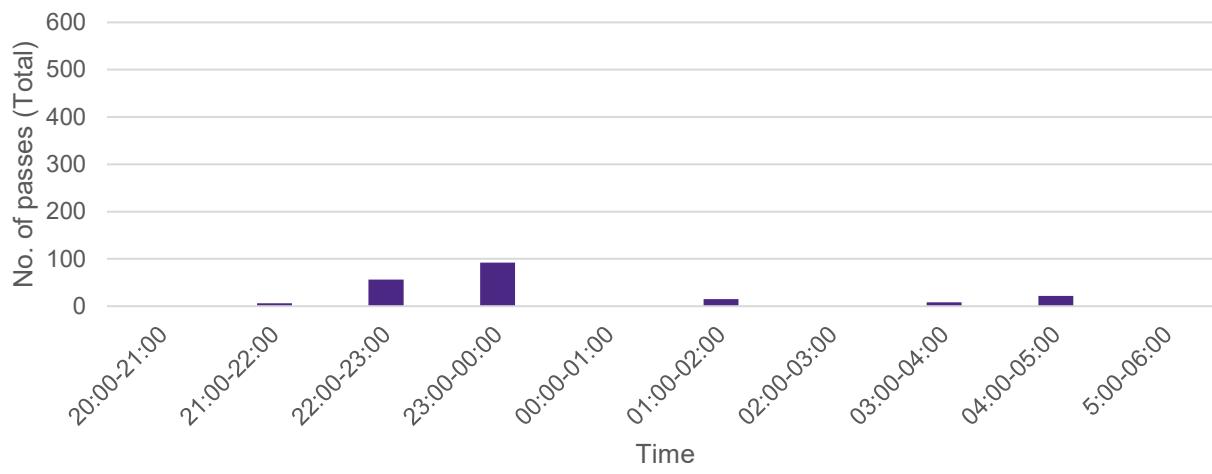
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Common pipistrelle – Dunany Point

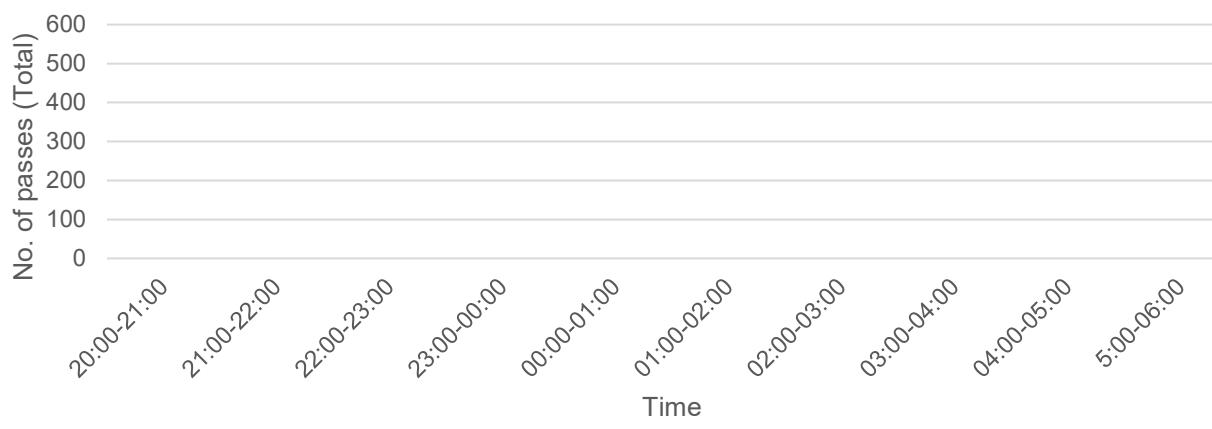
Week 1



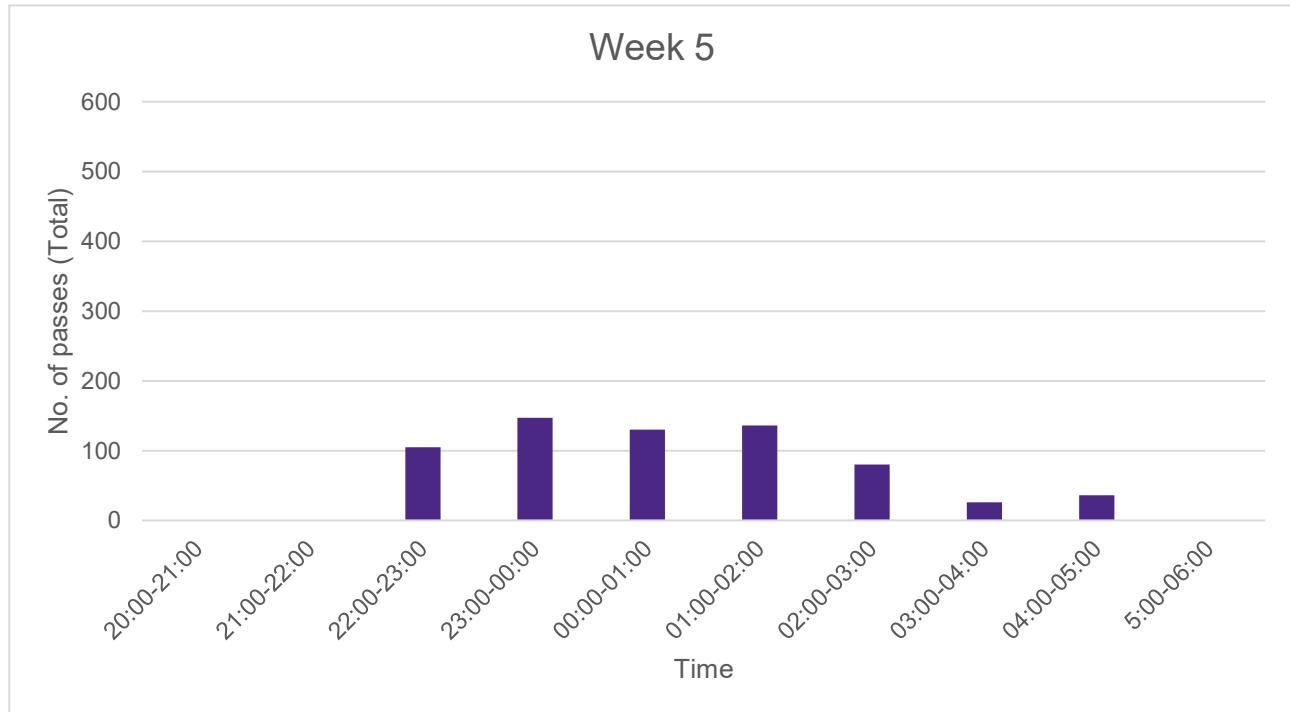
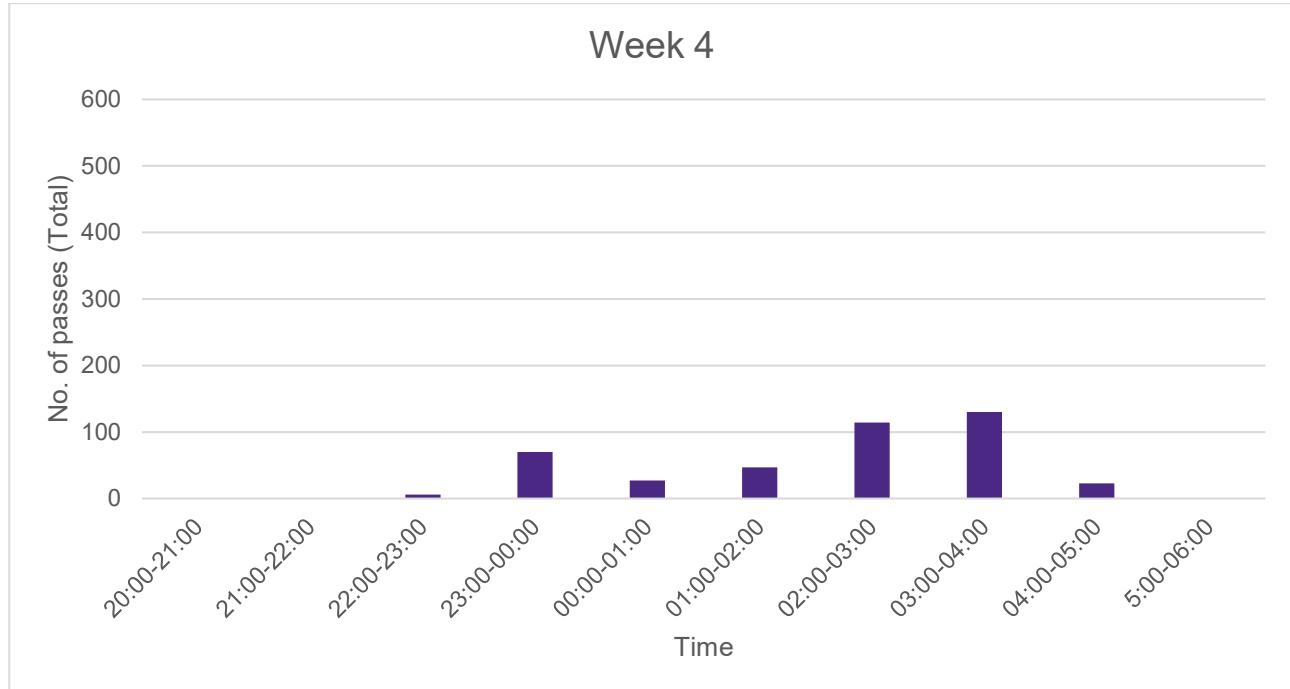
Week 2



Week 3

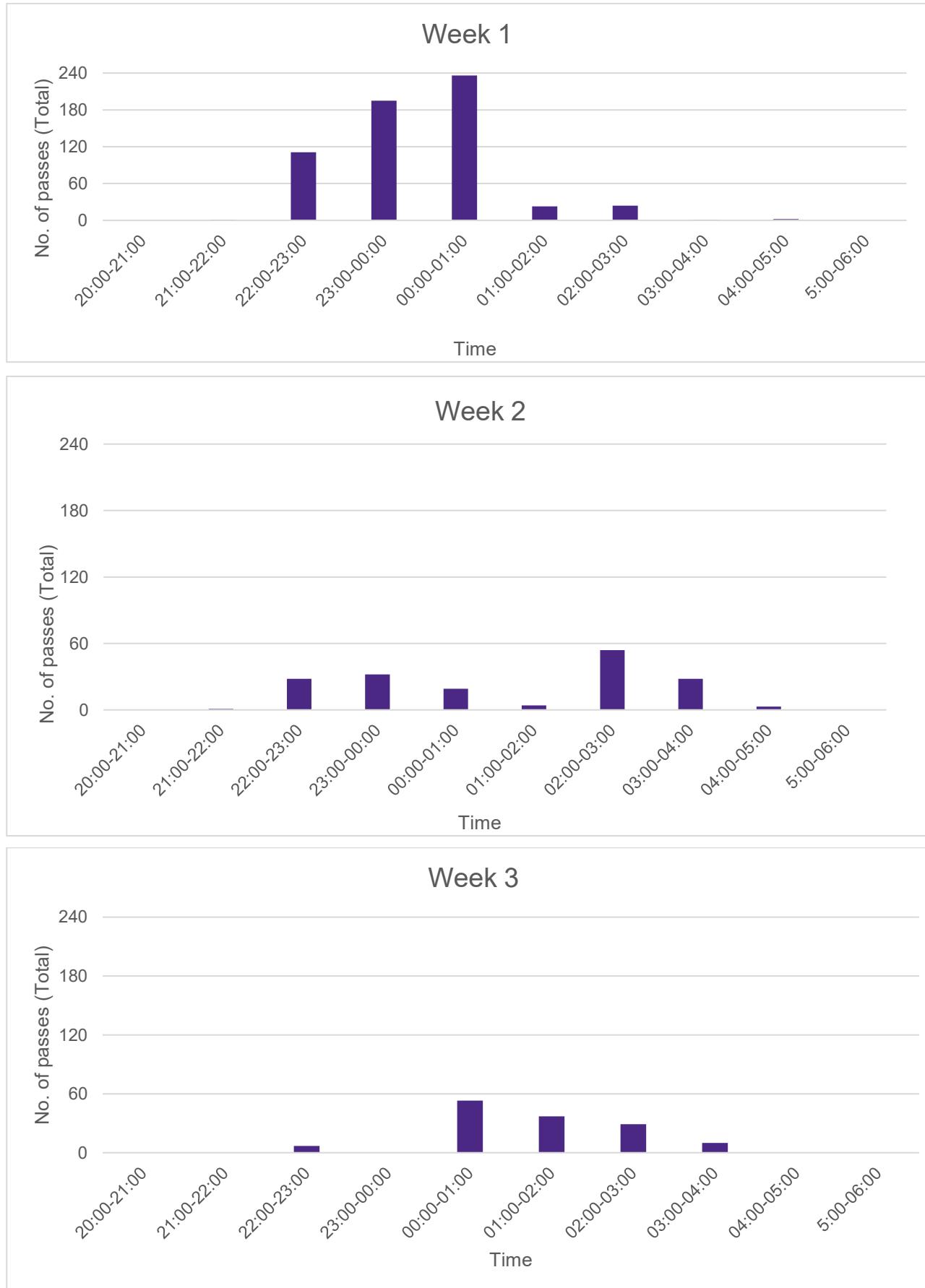


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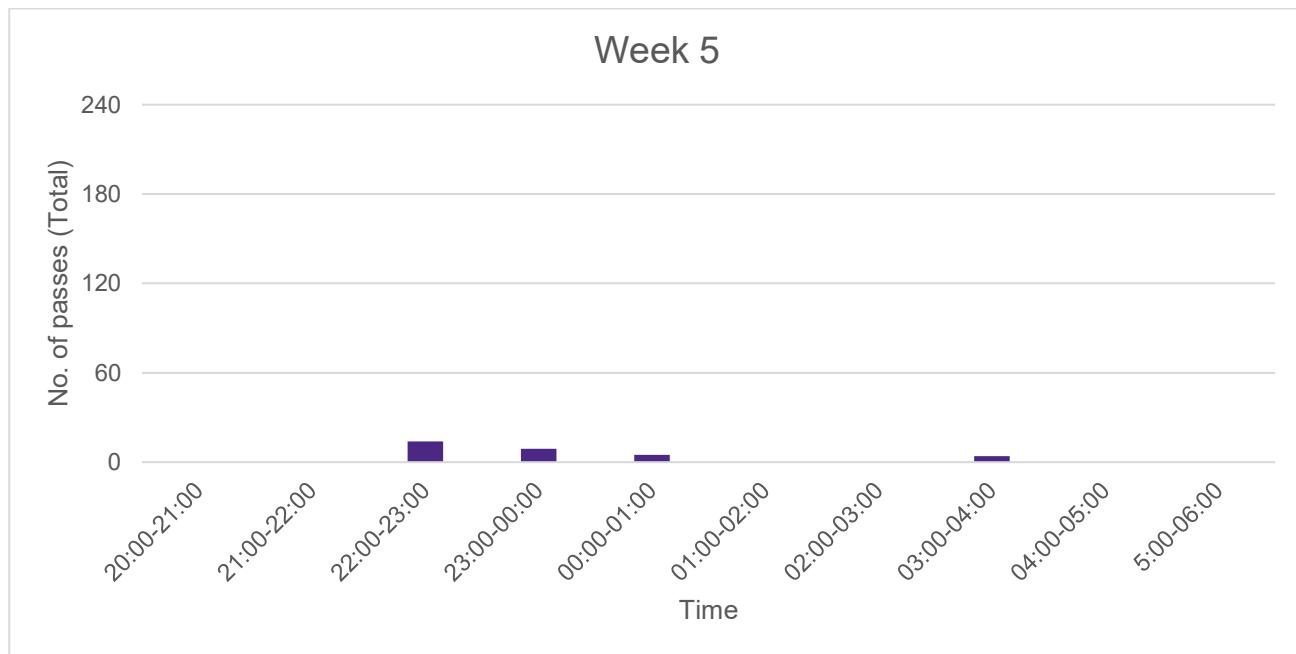
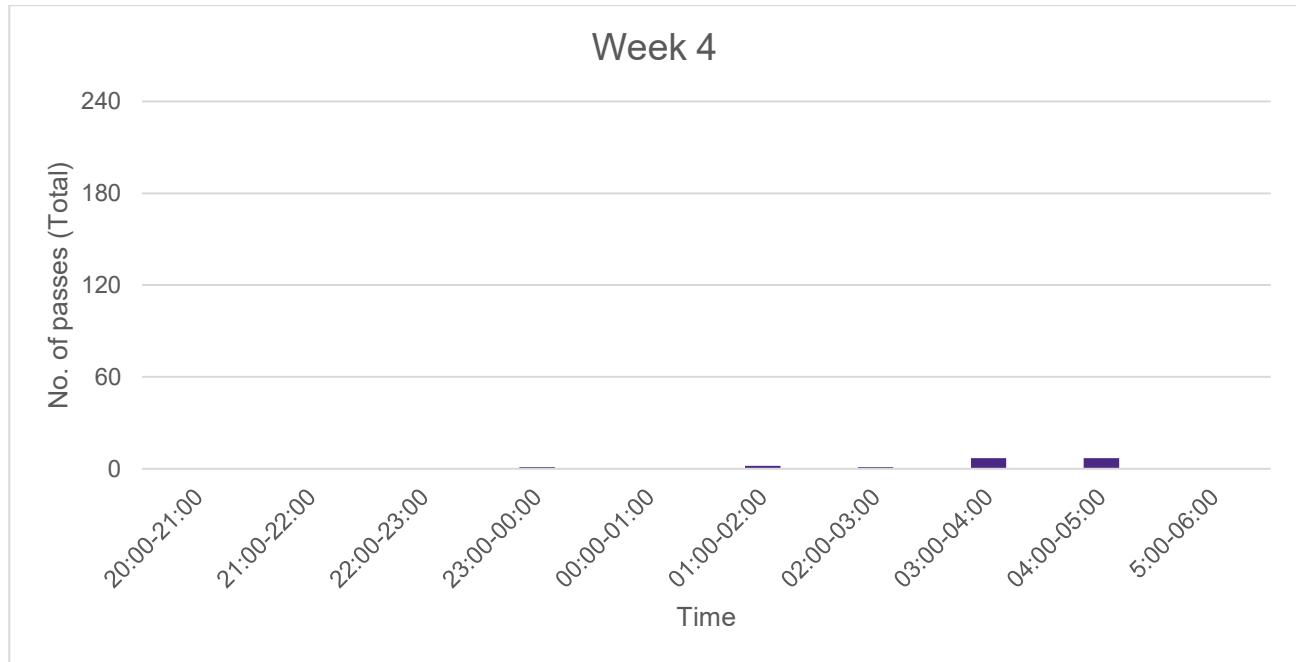


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Soprano pipistrelle – Templetown Beach



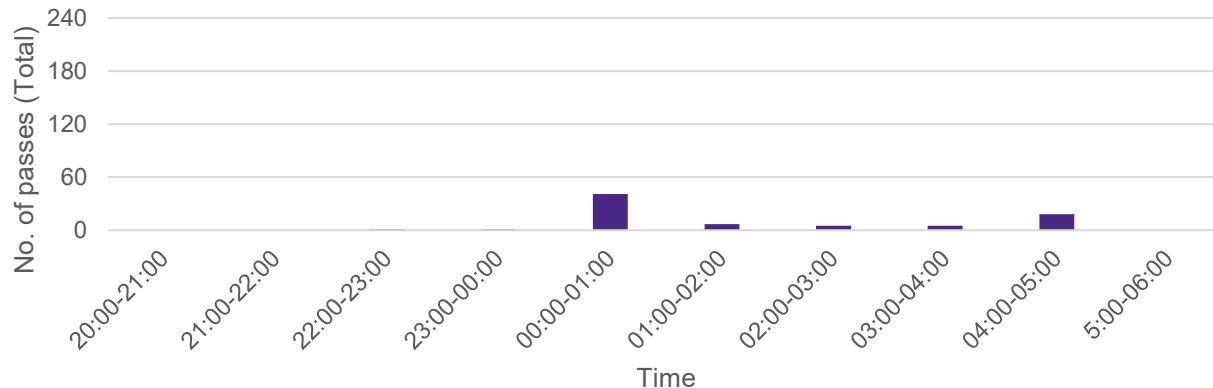
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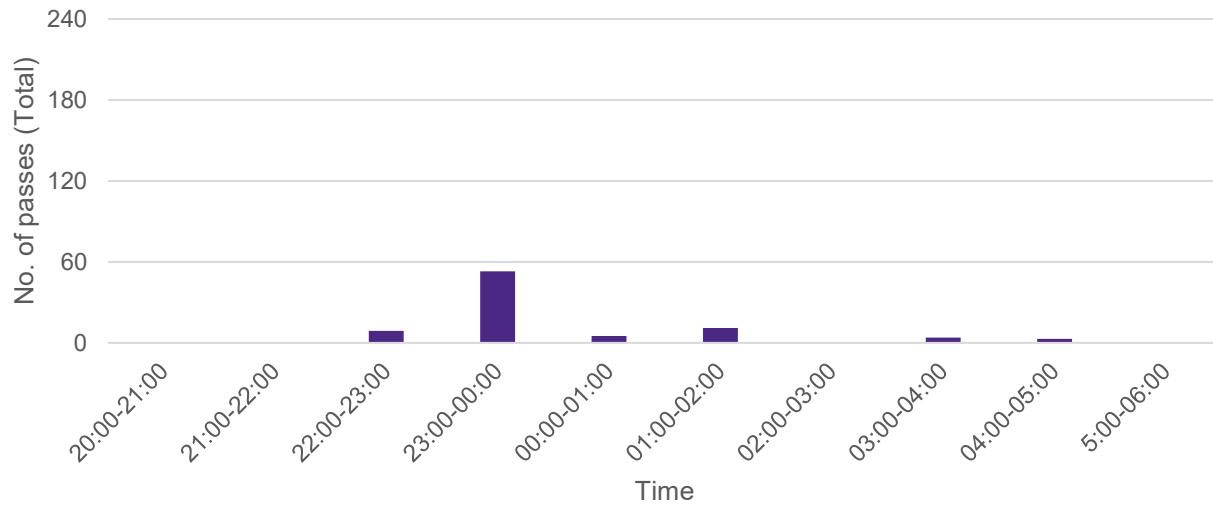
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Soprano pipistrelle – Dunany Point

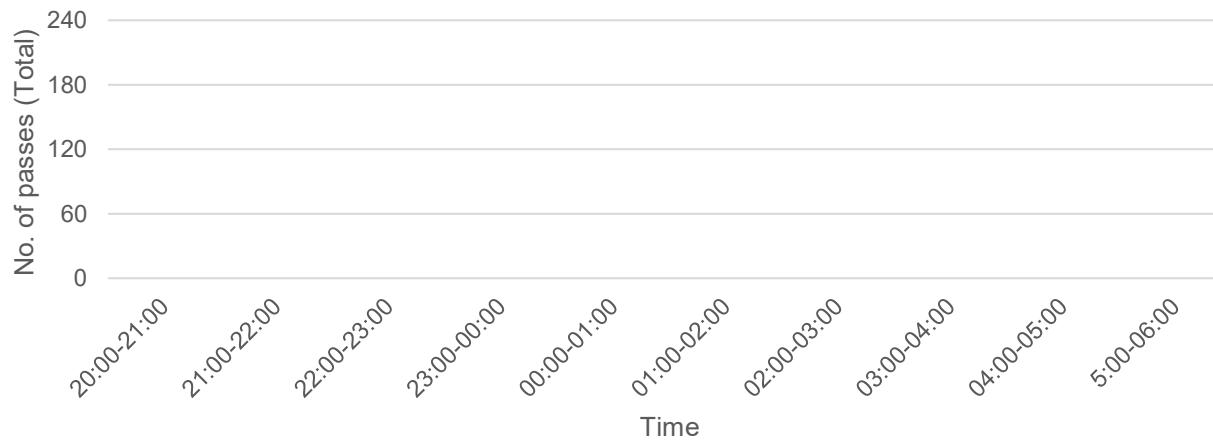
Week 1



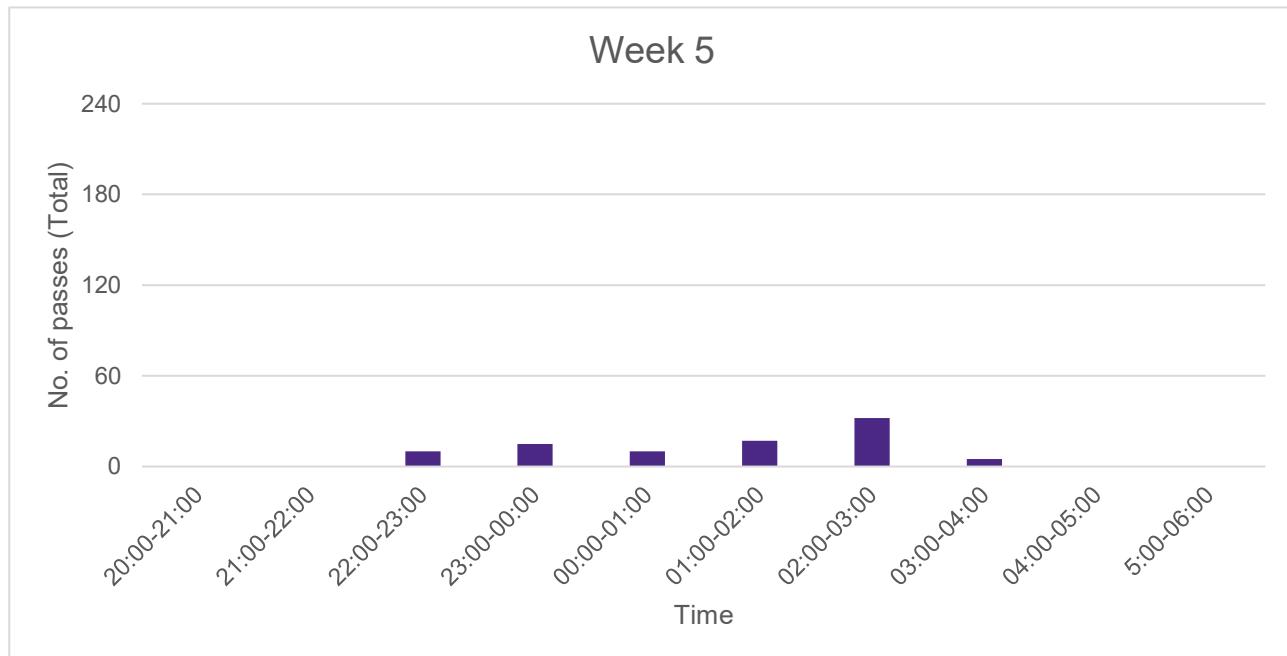
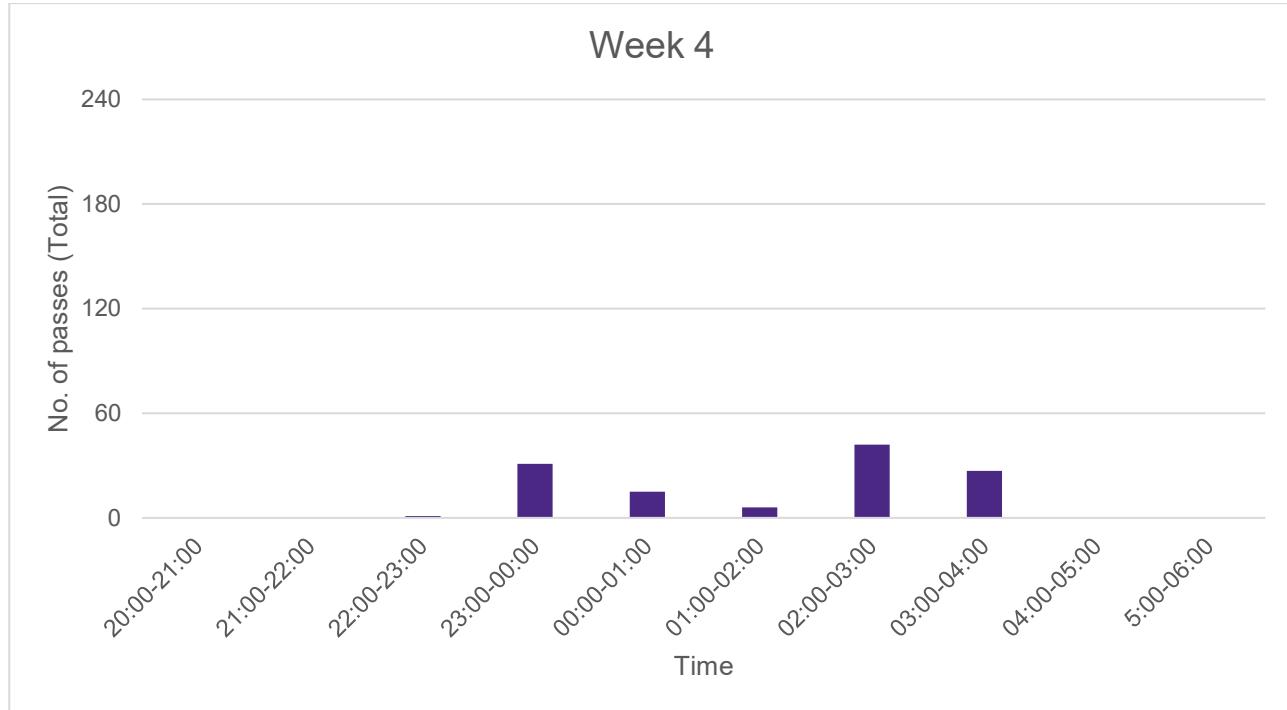
Week 2



Week 3



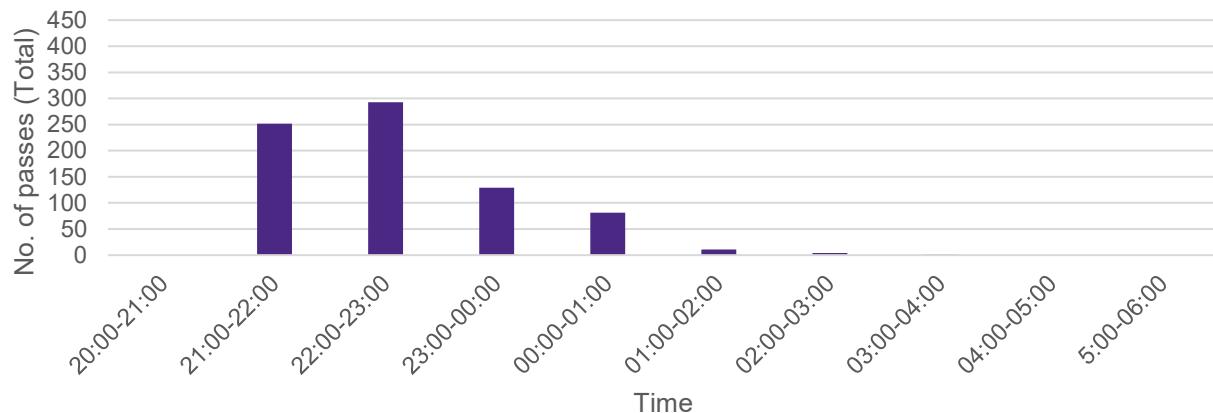
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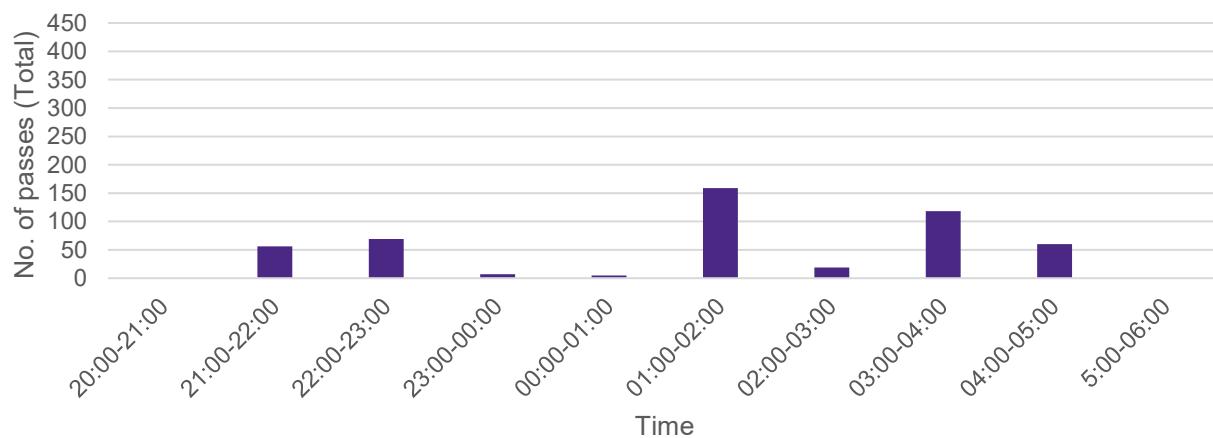
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Leisler's bat – Templetown Beach

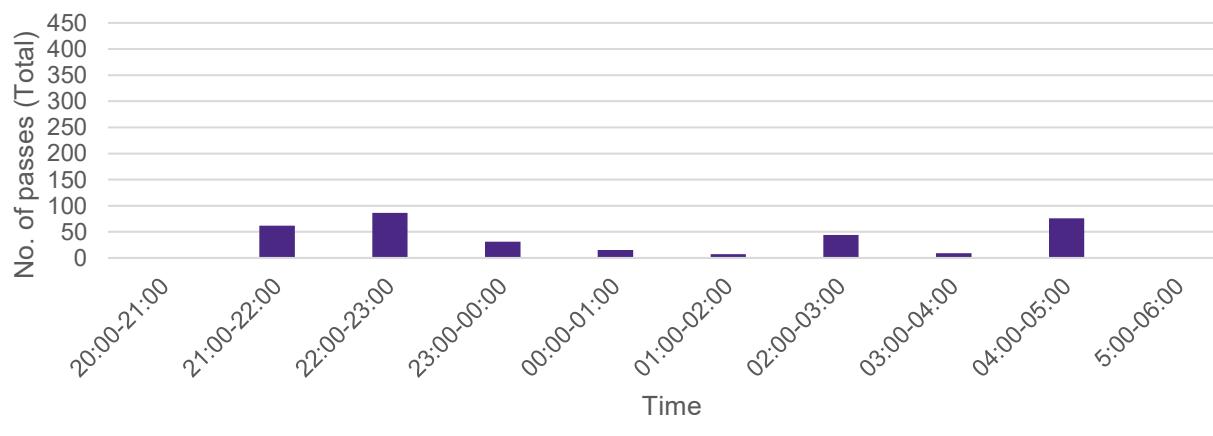
Week 1



Week 2

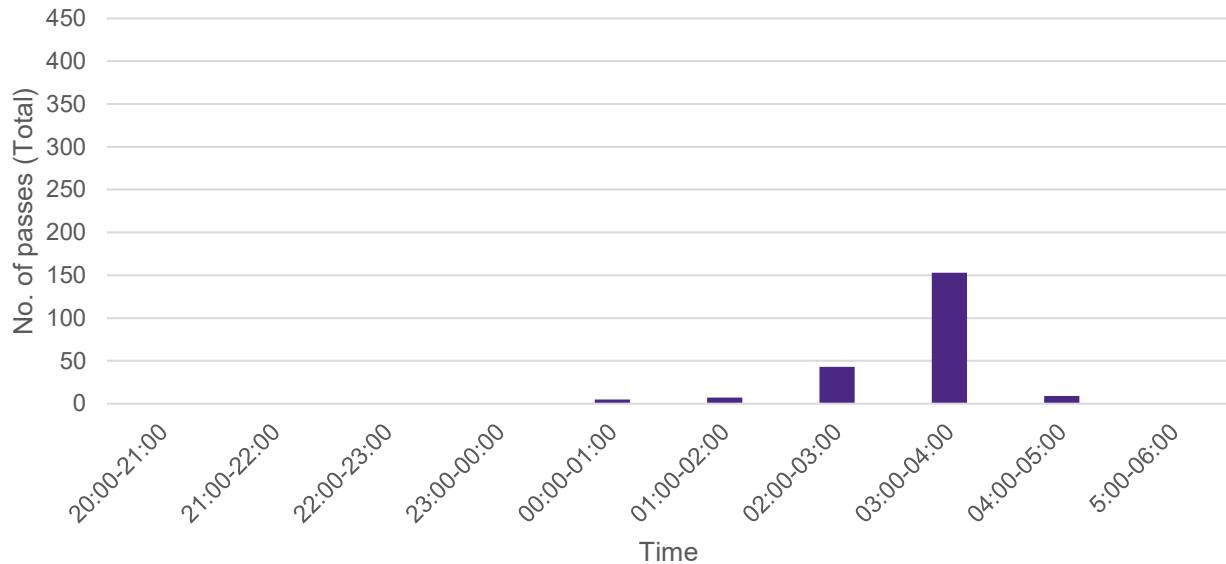


Week 3

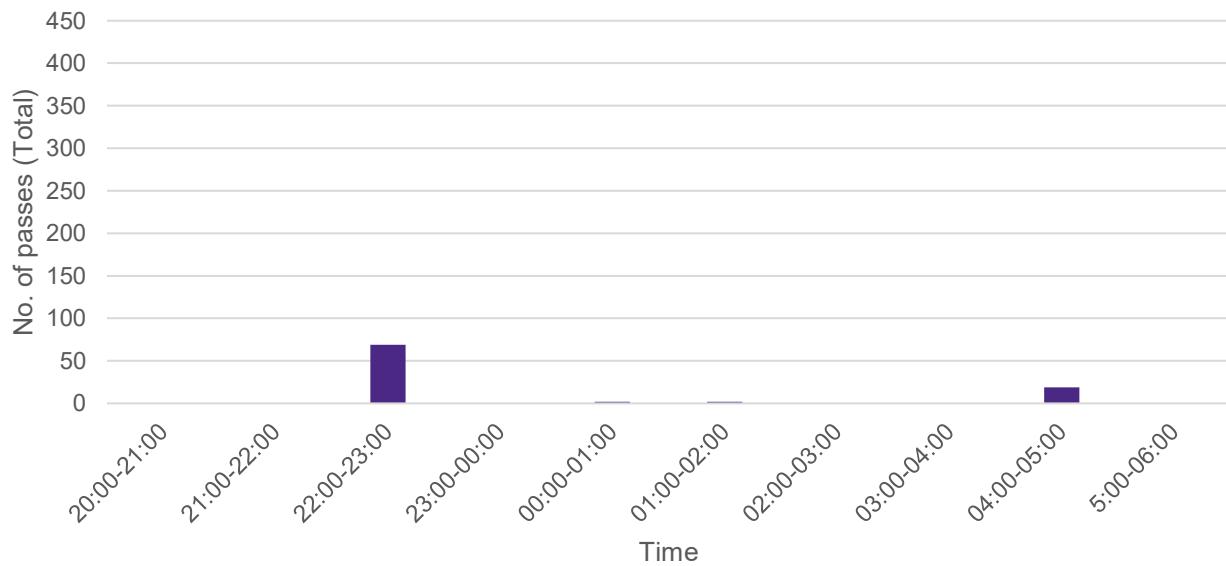


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Week 4



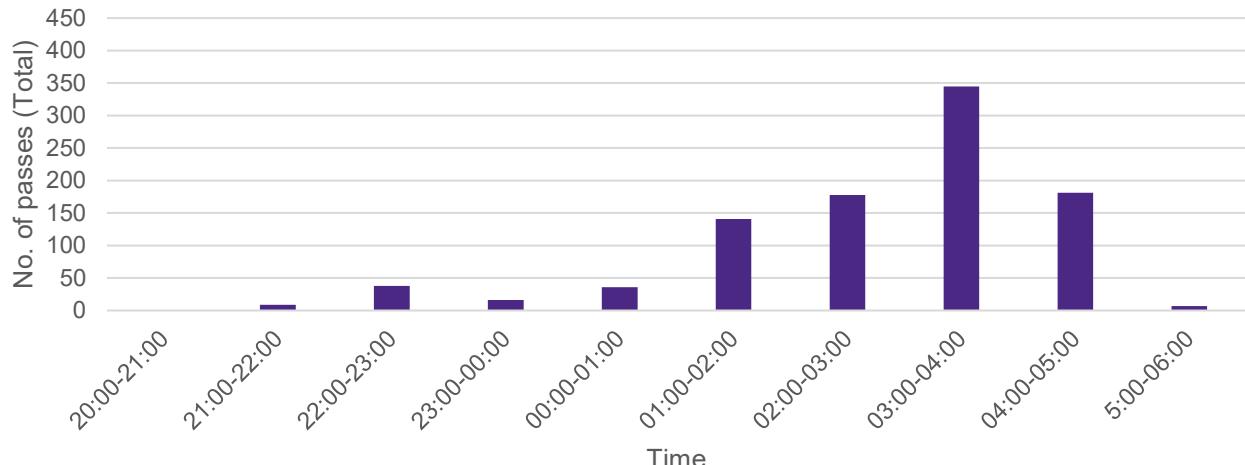
Week 5



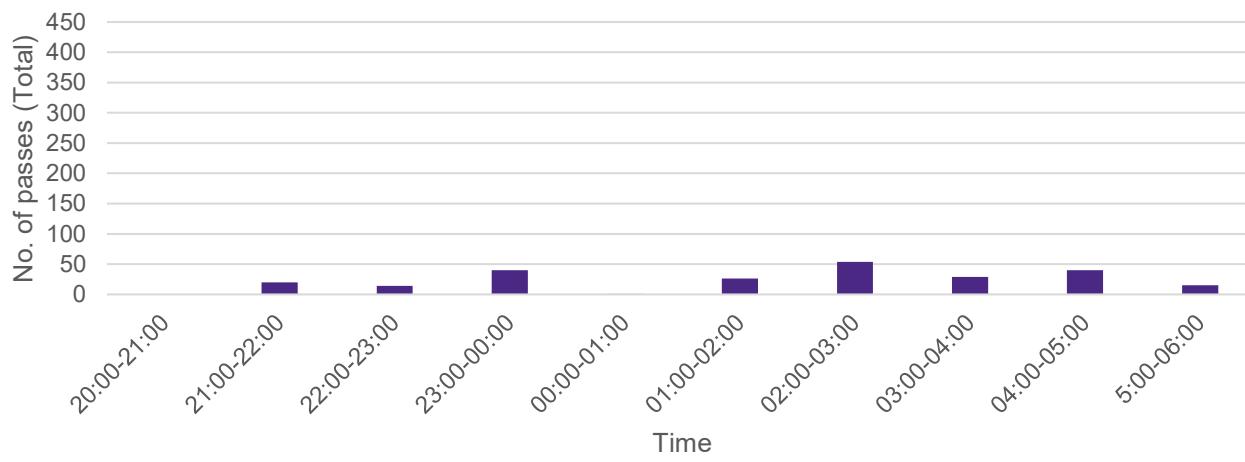
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Leisler's bat – Dunany Point

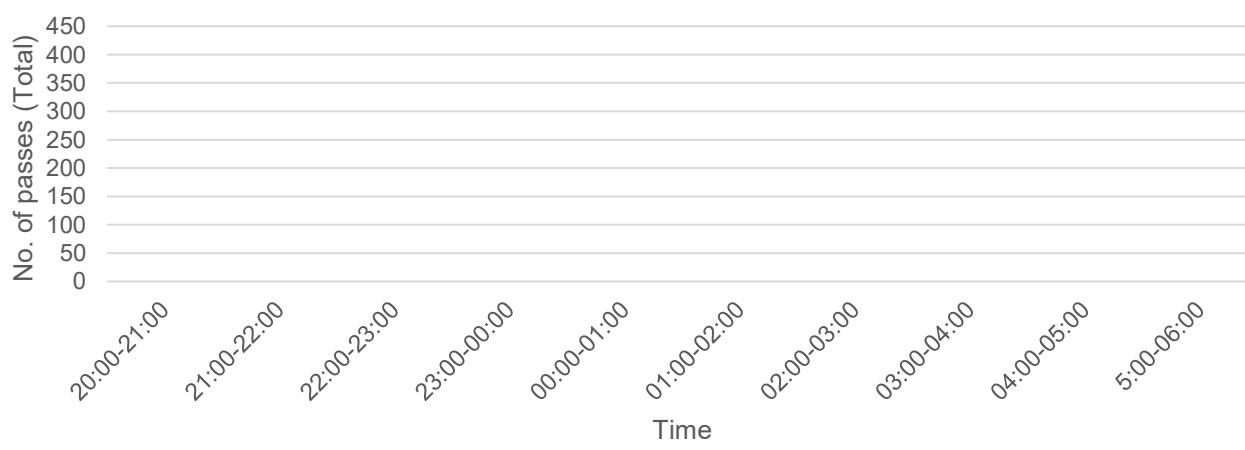
Week 1



Week 2



Week 3



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