TOBIN

Ballincor Wind Farm

RWE Renewables

Screening for Appropriate Assessment and Natura Impact Statement

RWE

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1. INTRODUCTION

1.1 BACKGROUND

RWE Renewables Ireland Limited (hereafter referred to as RWE) are proposing to develop an 11 turbine Wind Farm, 110 kV Substation, Battery Energy Storage System (BESS), Grid Connection Route (GCR) and Turbine Delivery Route (TDR). The project is herein referred to as the 'proposed project'.

TOBIN was commissioned by RWE to prepare Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS). The aim of this report is to inform the AA of the proposed project conducted by the competent authority (in this case An Coimisiún Pleanála), in compliance with Article 6(3) of the EU Habitats Directive (EC 92/43/EEC) on the Conservation of Natural Habitats and Wild Fauna and Flora, the Planning and Development Act 2000 (as amended), and the EU (Birds and Natural Habitats) Regulations 2011 (as amended). The purpose of the assessment is to assist the authority in determining whether the proposed project, alone or in combination with other plans or projects, could significantly impact protected European sites in view of their Conservation Objectives.

1.2 LEGISLATIVE CONTEXT

Directive (2009/147/EC) on the Conservation of wild birds (generally referred to as the 'Birds Directive') and Directive (92/42/EEC) on the conservation of natural habitats and of wild fauna and flora (generally referred to as the 'Habitats Directive') put an obligation on EU Member States to establish the Natura 2000 network of sites for the protection of rare and threatened habitats and species across the EU.

In Ireland the Natura 2000 network of protected European sites comprises Special Protection Areas (SPAs) established under the Birds Directive and Special Areas of Conservation (SACs) established under the Habitats Directive. In Irish legislation, "European sites" are defined to include SACs, SPAs, candidate SACs, candidate SPAs, sites of Community importance and candidate sites of Community importance. The specific designated habitats and/or (non-bird) species for which an SAC are selected are called the 'Qualifying Interests' (QIs), of the site. The specific named bird species for which a SPA is selected is called the 'Special Conservation Interests' (SCIs).

Articles 6(3) and 6(4) of the EU Habitats Directive apply to both SPAs and SACs. These articles provide a structured approach for assessing and, if required, mitigating the effects of development activities on a protected site, ensuring that potential threats to protected areas are thoroughly evaluated and that necessary safeguards or compensatory actions are taken to ensure the integrity of the sites.

Article 6(3) requires that any plan or project, in isolation or in-combination with other plans or projects, likely to significantly affect a SAC or SPA must undergo an AA to evaluate its impact on the conservation objectives defined for the QIs and SCIs for which the sites are designated. Only where the AA determines that there will be no adverse effects on the integrity of the site, can the project be allowed to proceed.

Articles 6(3) states:

> '*Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'*

Article 6(4) addresses situations where significant adverse effects on protected sites are identified as a result of a plan or project. In such cases, the proposed plan or project may not proceed unless the following conditions are met:

- It is demonstrated that no alternative solutions are available that would avoid adverse effects on the integrity of the Natura 2000 site; and
- The plan or project is justified by imperative reasons of overriding public interest (IROPI), which may include considerations relating to human health, public safety, or beneficial consequences of primary importance to the environment.

If these conditions are satisfied, compensatory measures must be implemented to ensure that the overall coherence of the Natura 2000 network is protected. Such measures may include, for example, the restoration or creation of habitats in alternative locations.

Article 6(4) states:

> *'If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*
>
> *Where the site concerned hosts a priority natural habitat type and / or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.'*

The provision for AA is transposed into Irish law by Part XAB of the Planning and Development Act 2000 (as amended). Within this legislation Natura 2000 sites are referred to as European sites. Section 177U (4) of the said Acts provides for screening for AA as follows:

> *'The competent authority shall determine that an appropriate assessment of [...] a proposed development [...] is required if it cannot be excluded, on the basis of objective information, that the [...] proposed development, individually or in combination with other plans or projects, will have a significant adverse effect on a European Site.'*

Section 177U (5) provides as follows:

> *'The competent authority shall determine that an appropriate assessment of a [...] proposed development, [...], is not required if it can be excluded, on the basis of objective information, that the [...] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European Site.'*

An AA should be based on best scientific knowledge, and the competent authority should ensure that expertise such as ecological, geological, and hydrological is utilised, where relevant.

The Court of Justice of the European Union (CJEU) has made a number of rulings in relation to AA, regarding when it is required, its purpose, and the standards it should meet (e.g. '*People over Wind and Peter Sweetman v Coillte*'). Consideration has been given here to the evolution in interpretation and application of directives and national legislation arising from jurisprudence of the European and Irish courts, in respect of Article 6 of the Habitats Directive. A review of Article 6 of the Habitats Directive, Rulings of the European Court Justice (Sundseth & Roth, 2014) and other relevant rulings was undertaken.

1.3 The Appropriate Assessment Process

1.3.1 Overview

The AA process, undertaken in accordance with Article 6(3) of the EU Habitats Directive (92/43/EEC), assesses whether a plan or project, alone or in combination with other plans or projects, is likely to have a significant effect on European sites,

1.3.2 Stages Involved in the Appropriate Assessment

Stage 1: Screening for appropriate assessment/ test of significance

This process identifies the potential for likely significant effects on a European site arising from a proposed plan or project. Its purpose is to determine, on the basis of a preliminary assessment and objective information, whether a plan or project that is not directly connected with or necessary to the management of the site, either alone or in combination with other plans or projects, is likely to have a significant effect on the site in view of its conservation objectives.

Stage 2: Appropriate Assessment

In stage 2, a detailed assessment is undertaken to determine whether a plan or project, alone or in combination with other plans or projects, could have adverse effects on the integrity of any European site in view of its structure, function, and conservation objectives.

Stage 3: Assessment of Alternatives

This stage of the potential process arises where adverse effects on the integrity of a European site cannot be excluded and examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European site. However, in circumstances where there will not be any adverse effects on any European site, the project proponent for the current proposed project places no reliance upon this third stage of the process in the context of this application for planning permission for the proposed project.

Stage 4: Assessment Where Adverse Effects Remain

This is the derogation stage under Article 6(4), which examines whether there are imperative reasons of overriding public interest (IROPI) that justify a plan or project proceeding despite adverse effects on the integrity of a European site having been predicted. Compensatory measures must be identified, proposed and assessed as part of this stage and the European Commission must be notified of the compensatory measures. The project proponent for the current proposed project places no reliance upon this stage of the process in the context of the application for planning permission for the proposed project.

1.4 COMPETENT PERSONS

This report was informed by a suite of field surveys undertaken by several specialists. TOBIN Senior Ecologist John Sherry (B.Sc. [Hons]) was the lead ecologist and author of this report, with contributions from Sinead O'Reilly (B.Sc., M.Res.). This report was senior reviewed by TOBIN Senior Ecologist Meadhbh Costigan (B.A. [Hons], M.Sc., ACIEEM) and Dr. James Forde (B.Sc. [Hons], M.Sc., Ph.D., MCIEEM). All the above are both qualified, experienced and competent ecologists.

John Sherry

John Sherry is a Senior Ecologist with TOBIN Environment and Planning (E&P). He holds a B.Sc. (Hons) in Wildlife Biology from Munster Technological University (formerly the Institute of Technology Tralee) and has over six years of post-graduate experience in ecology and environmental consultancy.

John's experience includes the surveying and reporting of large-scale renewable energy and infrastructure projects, with expertise in the preparation of AA Screening Reports, NIS, Environmental Impact Assessment Reports (EIARs), and Ecological Management Plans. He has extensive field experience in the planning and implementation of ecological surveys, including habitat assessments, non-volant mammal surveys, bat surveys, and ornithological surveys. His primary focus has been on the surveying and reporting of wintering and breeding birds associated with wind energy and other large scale infrastructure developments.

Sinead O'Reilly

Sinead O'Reilly is a Senior Ecologist with the TOBIN E&P division. Sinead has 15 years' post graduate experience in ecology and environmental consultancy. Sinead's experience has involved the renewable energy industry, waste industry, residential and mixed-use developments. Sinead has extensive experience in aquatic surveys (including crayfish trapping, electrofishing, fisheries assessments, biological water quality assessment etc.) as well as experience in terrestrial surveys for protected habitats and species and invasive species. Sinead has written and delivered numerous reports including AA Screenings, NIS reports, Biodiversity Management Plans, Preliminary Ecological Appraisals (PEAs), aquatic reports, invasive species reports, mammal survey reports and other documents for various projects in the renewable energy industry and waste industry as well as residential and commercial industries.

Meadhbh Costigan

Meadhbh Costigan is a Senior Ecologist with TOBIN E&P division. Meadhbh graduated from Trinity College Dublin with a B.A. (Hons) in Natural Science, reading Botany. She then received a M.Sc. in Botany from the University of Kent with training from the Royal Botanic Gardens,

Kew. She has 5 years' experience in environmental consulting, primarily engaged in the preparation of impact assessments and biodiversity chapters for the renewable energy sector. Her work focusses on the identification of Annex I habitat types and the assessment of habitat condition. She applies the information she gathers in the field to provide guidance to clients on avoiding and mitigating adverse effects on natural habitats of community importance. She is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and is an elected member of the CIEEM Irish Section Committee.

Dr. James Forde

James Forde is a Senior Ecologist and Technical Director of the TOBIN E&P division. James holds a B.Sc. (Hons) and M.Sc. degrees in marine ecology, and a Ph.D. in ecology. James is also a full member of CIEEM. James has almost 20 years' academic and environmental consultancy experience. He has an extensive understanding of ecology and appreciation of the objectives and mechanisms of national and international environmental legislation and policy. He has significant experience in preparing and reviewing ecological reports including Screenings for AA, NIS, Ecological Impact Assessment (EcIA) reporting, and EIAR. James has provided strategic technical and environmental advice for developments across a wide range of sectors, including onshore and offshore renewables, telecommunications, flood relief schemes, port and harbour developments, energy generation and transmission.

2. METHODOLOGY

2.1 LEGISLATION AND GUIDANCE

This report has been carried out in accordance with following legislation, guidance and with regard to relevant rulings by the Court of Justice of the European Union (CJEU), the High Court, and the Supreme Court.

- European Commission (EC, 2000). Communication from the Commission on the Precautionary Principle
- European Commission (EC, 2006). Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg
- European Commission (EC, 2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission
- European Commission (EC, 2013) Interpretation Manual of European Union Habitats. Version EUR 28
- European Commission (EC, 2019) Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC
- European Commission (EC, 2021a). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission
- European Commission [EC] (2021b). Guidance document on the strict protection of animal species of Community interest under the Habitats Directive. Publications Office of the European Union, Luxembourg
- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011)
- Planning and Development Acts 2000, as amended including Part XAB
- Planning and Development Regulations 2001, as amended
- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government (DoEHLG, 2010)
- Applications for Approval for Local Authority Developments made to An Bord Pleanála under 177AE of the Planning and Development Act, 2000, as amended (Appropriate Assessment) – Guidelines for Local Authorities (An Bord Pleanála, 2013)
- Fossitt (2000). A Guide to Habitats in Ireland. The Heritage Council, Kilkenny
- Office of the Planning Regulator (OPR, 2021). Appropriate Assessment Screening for Development Management.

2.2 DEFINITIONS

Definitions of conservation status, integrity and significance used in this assessment are defined in accordance with European Commission (EC, 2019) Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC:

- Favourable conservation status (FCS) can only be defined and achieved at the level of the natural range of a species or a habitat type. A broad conservation objective aiming at achieving FCS can therefore only be considered at an appropriate level, such as for example the national, biogeographical or European level. Conservation measures have to correspond to the ecological requirements of the Annex I habitat types and of the Annex II species present on the site. The ecological requirements of those habitat types and species involve all the ecological needs which are deemed necessary to ensure the conservation of the habitat types and species. They can only be defined on a case-by-case basis using best scientific knowledge.
- Precautionary Principle: The application of the precautionary principle in AA has been confirmed by European Court of Justice case law. This principle requires that, where significant effects are likely, uncertain, or unknown at the screening stage, full AA is necessary including the preparation of a NIS.
- The integrity of a European site is defined as the coherent sum of the site's ecological structure, function, and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated.
- A significant effect should be determined with reference to the specific features and environmental conditions of the protected European site potentially affected by a plan or project, taking particular account of the site's Conservation Objectives and ecological characteristics.
- The 'proposed project' refers to an 11 turbine Wind Farm, 110 kV Substation, Battery Energy Storage System (BESS), Grid Connection Route (GCR) and Turbine Delivery Route (TDR)/ Haul Route.
- The 'proposed project site' refers to the lands where the proposed project will take place, inclusive of the GCR and TDR.
- The 'proposed wind farm site' refers specifically to the area enclosed within the red line boundary.

2.3 STUDY/SURVEY AREA

The study area refers to all areas assessed during the desk study and field surveys and gives due consideration to the nature of the proposed project, the size and location of the proposed project and the ecological features likely, or known, to be present. Further details describing the survey area for the surveys undertaken is provided in Section 2.5.

2.4 RELEVANT EUROPEAN SITES

The identification of relevant European sites to be considered in this report was based on the identification of the Zone of Influence (ZoI) of the proposed project, a source-pathway-receptor model of effects, and the likely significance of any identified effects.

2.4.1 Zone of Influence

Guidance in AA of plans and projects in Ireland notes that a distance of 15km is recommended for the identification of relevant European sites (DoEHLG, 2010). For some projects the distance could be much less than 15km, and in some cases less than 100m; however, the appropriate distance must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects.

The proposed project has been evaluated based on an identified ZoI with regard to the potential impact pathways to ecological features (e.g. mobile and static), more details of which can be found in section 5.2. The ZoI of the proposed project for mobile species (e.g. birds, mammals, and fish), and relatively sedentary species and habitats (e.g. peatlands, woodlands, and flora) is considered differently. Mobile species have a 'range' outside of the European site in which they are a QI or a SCI. The range of mobile QI/SCI species varies considerably, from several metres (e.g. in the case of Whorl Snail, *Vertigo* spp.), to hundreds of kilometres (in the case of migratory wetland birds). Whilst relatively sedentary species and habitats are generally considered to have ZoIs within close proximity of the proposed project, they can be significantly affected at considerable distances from a source; for example, where due to hydrological linkages an aquatic habitat or species located many kilometres downstream from a pollution source may be impacted. Hydrological linkages between the proposed project and European sites (and their QIs/SCIs) can occur over substantial distances. However, any magnitude and likelihood of any effect are site specific, depending on the receiving water environment and nature of the potential impact. In the case of the proposed project, a reasonable worst-case ZoI for water pollution is considered to not extend beyond the first water body of depositional nature (e.g. lake water body). Therefore, the ZoI for significant surface water quality effects from the proposed project is defined as the hydrological pathway from the proposed project until the first surface water body of depositional nature is reached.

2.4.2 Source-Pathway-Receptor Model

The likely effects of the proposed project on European sites have been appraised using a source-pathway-receptor model, a standard tool used in environmental assessment (Holdgate, 1979), applied specifically for the proposed project (Figure 2-1).

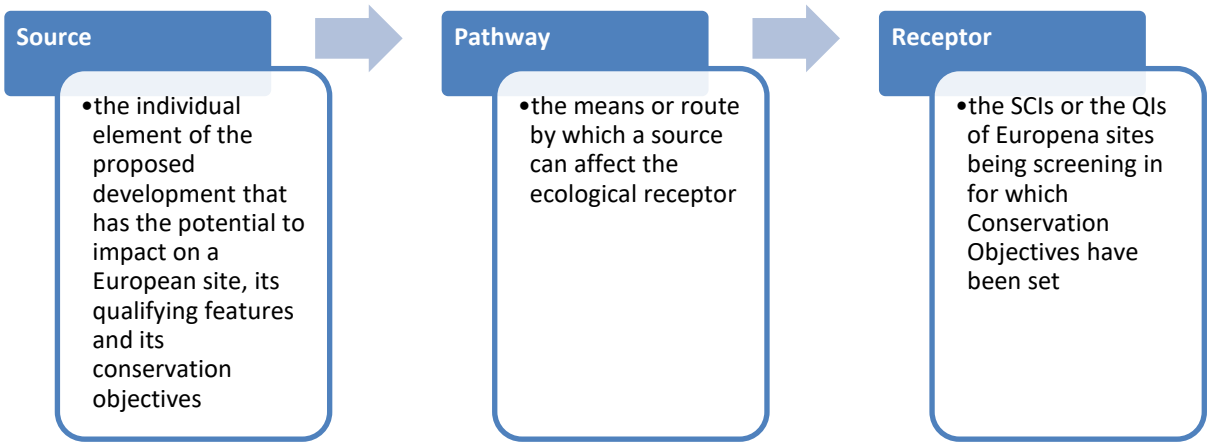


Figure 2-1: Illustration of the Source-Pathway-Receptor Model for the Proposed project

The existence of a pathway is a crucial element in the screening process. If no pathway can be identified between the 'source' and the 'receptor', then no effect can be anticipated on the receptor (OPR, 2021).

2.4.3 Likely Significant Effect

It is relevant to distinguish between 'impact' and 'effect', in the context of AA. The former, 'impact', is considered the outcome of an element of a development on the environment, whereas 'effect' is how that outcome relates to the Conservation Objectives (OPR, 2021).

The threshold for a Likely Significant Effect is treated in the screening exercise as being above a de minimis level. The opinion of the Advocate General in CJEU case C-258/11 outlines:

"The requirement that the effect in question be 'significant' exists in order to lay down *a de minimis* threshold. Plans or projects that have no appreciable effect on a European site are thereby excluded. If all plans or projects capable of having any effect whatsoever on the site were to be caught by Article 6(3), activities on or near the site would risk being impossible by reason of legislative overkill."

In this report, therefore, 'relevant' European sites are those within the potential ZoI of activities where pathways to European sites were identified through the source-pathway-receptor model.

2.5 BASELINE DATA COLLECTION

2.5.1 Desk Study

A desk-based study was completed to gather information on nearby protected areas, habitats and species, the likely location and distribution of designated habitats and species in the general area, as well as the identification of likely issues and concerns relating to the proposed project works and activities.

The desk study comprised a review of the following key datasets and information sources:

- Identification of European sites within the ZoI of the proposed project site through the identification of potential pathways connecting the proposed project and European sites;
- Review of the National Parks and Wildlife Service (NPWS) site synopsis, Natura 2000 data forms and Conservation Objectives for European sites within the proposed project ZoI[1];
- Review of nearby approved developments and their associated ecological reports.
- Review of other plans and projects which may potentially cause cumulative impacts.
- NPWS datasets on Annex I habitats and Annex II species[2];
- National Biodiversity Data Centre (NBDC) records[3];
- Ireland Geospatial Data Hub[4];
- Inland Fisheries Ireland (IFI) research data[5];
- Water Framework Directive (WFD) monitoring information[6];
- Geological Survey Ireland Spatial Resources[7];
- Environmental Protection Agency (EPA) Mapping database[8];
- Recommended Bird Survey Methods To Inform Impact Assessment Of Onshore Wind Farms (Scottish Natural Heritage - SNH, 2017a);
- Using a collision risk model to assess bird collision risks for onshore wind farms (Band, 2024);
- Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms (NatureScot, 2024)
- Assessing the Cumulative Impacts of Onshore Wind Farms on Birds (SNH, 2018);
- Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model (SNH, 2017b);
- Assessing Connectivity with Special Protection Areas (SPAs) (SNH, 2016);
- Monitoring the Impact of Onshore Wind Farms on Birds (SNH, 2009);
- Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland (Mc Guinness *et al.*, 2015);

[1] Available at https://www.npws.ie/protected-sites. Accessed in October 2023.
[2] Available at https://www.npws.ie/maps-and-data (accessed in October 2023,) and from a *Data Request* form was filled and submitted with the National Parks and Wildlife Service on all rare and/or protected species records in December 2024 - response was obtained in January 2025
[3] Available at https://maps.biodiversityireland.ie/. Accessed in October 2023.
[4] Available at https://www.geohive.ie/. Accessed in October 2023.
[5] Available at https://www.fisheriesireland.ie/. Accessed in October 2023.
[6] Available at https://www.catchments.ie/. Accessed in October 2023.
[7] Available at https://www.gsi.ie/en-ie/Pages/default.aspx. Accessed in October 2023.
[8] Available at https://gis.epa.ie/EPAMaps/. Accessed in October 2023.

- BirdWatch Ireland Irish Wetland Bird Survey (I-WeBS)[9];
- Bird Atlas (Balmer et al., 2013; Keller et al., 2020);

Reference was also made to the following policy documents:

- Offaly County Development Plan, 2021 – 2027;
- Tipperary County Development Plan, 2022 – 2028;
- Ireland's 4th National Biodiversity Action Plan, 2023 – 2030 produced by the Department of Culture, Heritage and the Gaeltacht.

2.5.2 Ecological Field Surveys

Multidisciplinary ecological surveys were carried out within the study area by TOBIN ecologists between January 2022 and July 2025 in order to inform the impact assessment of the proposed project. The survey area for the ecological field surveys included all areas within the proposed project site boundary, including along the GCR and works associated with the TDR, as well as locations outside these areas in the case of aquatic surveys. A high level description of these ecological surveys and their locations are described in Section 2.5.2.1 through to Section 2.5.2.4

The aim of the surveys were to determine the presence or absence of protected habitats and species, including Habitats Directive Annex I habitats and Annex II species, as well as bird species protected under Annex I of the Birds Directive or associated with nearby SPAs.

The ecological surveys that were carried out are relevant to the consideration of the potential impacts associated with the proposed project and the likely significant effects on the conservation objectives of the European sites in the vicinity of the proposed project. Specialist surveys conducted include: habitat surveys, otter surveys and river aquatic surveys, all of which are described hereunder.

The data collected during the multidisciplinary survey was robust and allowed TOBIN to draw accurate, definitive and coherent conclusions on the possible effects of the proposed project on ecological receptors with potential relevance to European sites. The data was collected using the ArcGIS Collector application installed on an iPad. The ecological surveys that were carried out are described hereunder.

The ornithological field surveys were undertaken by Ecology Ireland ornithologists within the study area between 2020 and 2024, except the breeding season 2022 (April to September 2022), when no surveys were carried out. The study area for the ornithological field surveys occurred up to 500m from the outermost turbines. The descriptions of the ornithological surveys carried out are described in Section 2.5.2.4.

Additional ecological surveys were undertaken to inform the EIAR (contained within the Planning Application), such as bat and protected mammal surveys. These surveys are not directly relevant to this Appropriate Assessment Report as they do not relate to the qualifying interests or conservation objectives of any European sites considered within the assessment. As

[9] Data were supplied by the Irish Wetland Bird Survey (I-WeBS), a scheme coordinated by BirdWatch Ireland under contract to the National Parks and Wildlife Service of the Department of Housing, Local Government and Heritage

such, they do not inform the assessment of potential effects on European sites and will not be discussed further in the sections below.

2.5.2.1 Habitats and Flora

Habitat and botanical surveys were undertaken during the optimal survey period following the methodology outlined in '*Best Practice Guidance for Habitat Survey and Mapping'* (Smith *et al.*, 2011) and in *'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes'* (NRA, 2009b). The data was recorded, and the habitats encountered during the survey were classified following Fossitt (2000) with reference made to the '*Interpretation Manual of EU Habitats'* (EC, 2013), as appropriate. Reference was also made to guidance within the Cross & Lynn (2013) and Smith & Crowley (2020) documents to support the evaluation of Annex I habitat types including; Bog woodland [91D0], priority *Raised bog [7110] and Degraded raised bog [7120]. The surveys also assessed the suitability of the habitats within the proposed project site to support protected species.

Vegetation species protected under Flora (Protection) Order, 2022 (S.I. No. 235/2022) or listed in the Irish Red Data List of Irish Plants (Wyse-Jackson *et al.*, 2016) were searched for. This included an assessment of the aquatic vegetation community undertaken at any drainage ditches, streams or rivers within the proposed project site to identify any rare macrophyte species or habitats such as Annex I habitat type Water courses of plain to montane levels, with submerged or floating vegetation of the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260].

A search for Invasive Alien Species listed in Part 1 of the Third Schedule of S.I No. 477/2011 – European Communities (Birds and Natural Habitats) Regulations 2011 as amended and listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024) was also conducted throughout the study area.

2.5.2.2 Protected Species

2.5.2.2.1 Marsh Fritillary surveys

Marsh fritillary (*Euphydryas aurinia*) is a colonial butterfly, meaning caterpillars occur in colonies and occupy a protective web or 'larval web' (Phelan *et al.*, 2021). An abundance of Devil's-Bit Scabious (*Succisa pratensis*) is an essential component of suitable marsh fritillary habitat, as it is the larval foodplant of the species (Phelan *et al.*, 2021). Marsh fritillary is listed under Annex II of the Habitats Directive.

To study the presence of Marsh Fritillary at the proposed wind farm site, a detailed survey was carried out September 2023. This survey was informed by prior observations during the multidisciplinary walkover survey, specifically the occurrence of Devil's-Bit Scabious. The larval web survey methodology followed best practice guidance from NBDC Marsh Fritillary Monitoring Scheme[10], to confirm presence/absence of the species within the proposed wind farm site.

2.5.2.2.2 Otter

A search for Otter (*Lutra lutra*) was undertaken during multidisciplinary and aquatic surveys (during various dates between 2022 and 2025) along accessible suitable habitat (waterbodies

[10] Available at https://biodiversityireland.ie/surveys/marsh-fritillary-monitoring-scheme/.

which included rivers and drainage ditches) within the proposed project site plus a 150m buffer (including upstream and downstream of waterbodies), to account for disturbance impacts, following methodologies outlined within the NRA (2008) guidelines and Chanin (2003) '*Monitoring the Otter Lutra Lutra'*. The survey comprised examining all visual evidence of otter such as tracks, spraints, couches, slides, feeding remains or holts.

2.5.2.3 Aquatic Surveys

Aquatic surveys were carried out at the proposed project site on the 2nd and 3rd August 2022, from 26th-30th June 2023 and on the 23rd March 2025. Electrofishing surveys were carried out by TOBIN ecologists between the 8 and 10 July 2024.

These were conducted at representative locations on watercourses draining the proposed project site and within the wider study area selected for surveying. The study area for aquatic surveys is defined as the surface waters potentially affected by the proposed project, including watercourses within the proposed project site as well as those downstream of the proposed project with hydrological connectivity.

A baseline aquatic ecological assessment was carried out on the Little Brosna_040 River Waterbody (RWB) and selected tributaries of the Little Brosna_040 RWB within and downstream of the proposed project site. A baseline aquatic ecological assessment was also carried out at Little Brosna_060 RWB at a proposed watercourse crossing which requires temporary dam and flume instream works.

Aquatic field survey sites were, where feasible, selected relevant to the proposed works areas including installation sites for turbines and road crossings. Sites were selected based on their location within and outside the proposed project red line boundary, available access, previous Q-Value Status from Environmental Protection Agency (EPA) surveys, and stream order, giving a good representation of the overall aquatic ecology throughout the aquatic study area.

The surveys comprised of an evaluation of aquatic habitats, a biotic assessment using aquatic macroinvertebrates, invasive species presence and electrofishing for the presence/absence of protected fish species. Rare / protected / conservation interest aquatic species such as Lamprey spp. were searched for at each survey site. Field surveys were carried out during base flow conditions, where the flow of water within the stream or river has not increased from the contribution of direct runoff from rainfall.

The objective of the surveys was to provide the baseline conditions of the existing freshwater ecology and potential fisheries value of the riverine watercourses, specifically in terms of their importance for species of conservation importance which are listed in Annex II of the Habitats Directive, such as Atlantic Salmon (*Salmo salar*), Lamprey (*Lampetra spp.*) and White-clawed Crayfish (*Austropotamobius pallipes*) as well as salmonid nursery and spawning habitat.

A total of 11 sites on the Little Brosna_040 RWB were selected for an aquatic assessment of the riverine habitat available to support fish and aquatic species, an assessment of the macroinvertebrate community and an analysis of the biological water quality of the watercourse. An additional site, Site 12 was selected for an aquatic assessment of the riverine habitat available to support fish and aquatic species. A biological water quality assessment was not carried out at this site as it was dry.

Survey effort focused on both instream and riparian habitats at each aquatic sampling location. Surveys at each of these sites included a fisheries assessment (fisheries habitat appraisal), macrophyte and (where suitable) biological water quality sampling (Q-sampling) (where suitable). This approach informed the overall aquatic ecological evaluation of each site and ensured that any habitats and species of high conservation value would be detected to best inform mitigation for the proposed project.

2.5.2.3.1 River Fisheries Assessment

River fisheries assessment was carried out utilising elements of the approaches in the Fishery Assessment Methodology (O'Grady, 2006) and '*Ecology of the Atlantic Salmon'* (Hendry & Cragg-Hine, 2003) to broadly characterise the river sites (i.e. channel profiles, substrata etc.).

A broad appraisal/overview of the upstream and downstream habitat at each aquatic site was undertaken to evaluate the wider contribution to salmonid and Lamprey spawning, to assess if the watercourse could support salmonids and to access the general fisheries habitat.

An assessment was made on the suitability of the habitat to support aquatic species of conservation concern listed in Annex II of the Habitats Directive (e.g. White-Clawed Crayfish, River Lamprey (*Lampetra fluviatilis)*, Brook Lamprey (*Lampetra planeri*), Atlantic salmon and Freshwater Pearl Mussel (*Margaritifera margaritifera*). Suitable salmonid spawning and nursery habitats were assessed.

An evaluation of potential Lamprey habitats within the study area was made with reference to methodologies outlined in '*Ecology of the River, Brook, and Sea Lamprey'* (Maitland, 2003) and also NPWS Irish Wildlife Manuals Lamprey surveys (O'Connor, 2007). A visual assessment was carried out on the habitat suitability for Lamprey such as slower flowing water, nursery areas of sandy silt beds, an assessment on potential barriers on migration route, potential spawning areas, suitable hiding places and clean spawning gravels over stretches of running water. Juvenile Lamprey (River/Brook Lamprey ammocetes) habitat was identified from the descriptions given in Maitland (2003).

2.5.2.3.2 Biological Water Quality Sampling

The water quality within each site was obtained from Q-values obtained at each accessible site from kick sampling as part of additional aquatic surveys in relation to the proposed project. Semi-quantitative sampling of benthic (or bottom dwelling) macroinvertebrates was undertaken at seven sites using standard EPA kick-sampling methods (Toner *et al.*, 2005). The Biological River Quality Classification System Quality Rating (Q) System (Toner *et al.*, 2005) was used to obtain a water quality rating and risk status for each site. The resulting species list was used to assign a Biotic Index value (Q-Value) to the sampled streams.

2.5.2.3.3 Fish Stock Assessment

Electrofishing surveys were carried out to establish the presence of support aquatic species of conservation concern listed on Annex II of the Habitat Directive (e.g. White-Clawed Crayfish, River Lamprey, Brook Lamprey and Atlantic Salmon).

Ten-minute electrofishing following the methodology set out by Beaumont (2016) and Matson *et al.*, (2018). The electrofishing methodology and technique also complied with the European Committee for Standardisation (CEN) guidelines for fish stock assessment in wadable rivers (CEN, 2003) and Section 14 licensing requirements. A single anode Smith-Root LR24 backpack

(12V DC input; 300V, 100W DC output) and electrofishing dip nets were used to electrofish sites on watercourses in the vicinity of the proposed project. Electrofishing was conducted under license following a Section 14 application to the Department of the Environment, Climate and Communications (DoECC) to conduct the surveys.

2.5.2.3.4 Protected Aquatic Species Survey

White-clawed Crayfish habitat and presence were assessed at each survey site. An assessment of the habitat to support White-clawed Crayfish was undertaken following methodologies outlined in '*Guidance on Habitat for White-clawed Crayfish'* (Peay, 2002). This included a visual and hand search for suitable refuge such as boulders, crevices, burrows in the bank, the presence of a partial, or even a complete barrier, food source including leaf litter, instream macrophytes, aquatic invertebrates and fish and good water quality absent of pollution.

2.5.2.3.5 Invasive Species Survey

Environmental DNA sampling to detect the presence of the semi aquatic invasive non-native species Alpine Newt (*Ichthyosaura alpestris*) which was recorded in 2022 during a TOBIN ecological survey of the proposed project. Sampling was carried out on 27th August 2024, at four of the 12 aquatic survey sites with an additional site, (Site 13), selected at a drainage ditch within the study area. The survey site lies within one of two known areas for this species to occur in Ireland according to the NBDC (NBDC, 2025b).

2.5.2.3.6 Biosecurity Measures

Strict biosecurity measures were carried out during all surveys, with particular consideration made during the aquatic surveys. All equipment and PPE used was inspected and disinfected with 1% Virkon® solution prior to, and post-survey completion.

2.5.2.4 Avifauna

A range of ornithological field surveys were undertaken by Ecology Ireland within an ornithological study area of 500m from the radius from the outermost turbines between 2020 and 2024, except the breeding season 2022 (April to September 2022), when no surveys were carried out. Winter bird surveys are ongoing (October 2025- March 2026). All ornithological field surveys carried out to inform the proposed project are listed in Table 2-1. The data collected allowed TOBIN to draw accurate, definitive and coherent conclusions for the characterisation of the receiving ornithological environment, and on the possible impacts of the proposed project on ornithological receptors. A description of the surveys undertaken is provided hereunder. Further details of the survey methodologies are presented in the subsequent sections.

Table 2-1: Overview of Ecological Field Surveys Undertaken at the Proposed Project Site

Surveys	Survey Dates	Personnel
Vantage Point surveys (VP1 to VP5)[11]	April 2020 – August 2020	Ecology Ireland
	October 2020 – March 2021	

[11] Ongoing Bird Surveys in Winter 2025

Surveys	Survey Dates	Personnel
	April 2021 – August 2021	
	November 2021 – March 2022	
Vantage Point surveys (VP1 to VP5, VP6 and VP7)	November 2022 – March 2023	Ecology Ireland
	May 2023 – September 2023	
	October 2023 – March 2024	
	May 2024 – September 2024	
Vantage Point Surveys (updated VP1 to VP5)	October 2025 – March 2026	TOBIN
Transect Surveys (T1 to T4)	May 2020 and June 2020	Ecology Ireland
	December 2020 and February 2021	
Transect Surveys (T1 to T6)	November 2022 and February 2023	Ecology Ireland
	May 2023 x 2	
	November 2023 and January 2024	
	May 2024 and June 2024	
Transect Surveys (updated T1 to T6)	October 2025 – March 2026	TOBIN
Hen Harrier Roost Surveys (HHVP1 – HHVP2)	October 2025 – March 2026	TOBIN
Wetland Bird Surveys (I-WeBS)	October 2025 – March 2026	TOBIN
Multi-disciplinary surveys (botanical, aquatic, invertebrate, and mammal surveys)	February and May 2022	TOBIN
	June 2023	
	August 2024	

2.5.2.4.1 Vantage Point Surveys

Standard vantage point (VP) field surveys were undertaken with due regard to guidance by Scottish Natural Heritage (SNH 2017a). The surveys aim to quantify the level of flight activity for bird species and their distribution over the survey area. The primary purpose of the surveys is to provide data to inform a Collision Risk Model (CRM), which makes predictions of mortality from collisions with operational turbines.

2.5.2.4.1.1 Survey Methods

Vantage points are fixed locations, which are strategically positioned to provide a maximum viewshed of the survey area from a minimum number of locations. The surveyed area included the entire wind farm envelope where turbines may be positioned and extended to a 500m radius

from the outermost turbines. The viewshed of a given VP extended to a distance no greater than 2km, and include an arc no greater than 180 degrees, as per best practice guidance (SNH, 2017a).

2.5.2.4.1.1.1 Ecology Ireland Vantage Point Surveys

From April 2020 to March 2022, inclusive, five vantage point locations (VP1 to VP5) were in place for the VP surveys at the proposed wind farm site. Due to changes in the extent of the red line boundary, two additional VP locations, VPA and VPB, were included for VP surveys commencing from November 2022 until the completion of VP surveys at the proposed wind farm site in September 2024.

Vantage Point surveys were carried out across four breeding seasons (2020, 2021, 2023 & 2024), and four winter seasons (2020/2021, 2021/2022, 2022/2023 and 2023/2024).

All bird species heard or seen during the VP watches were noted. Detailed field records were taken of target species (heard or seen) with as much of the following information recorded as possible:

- Species and estimated number;
- Time first observed; Duration of observation; Estimated time on-site; Estimated time off-site (note that the change to the red line boundary from November 2022 was used for estimations of on and off-site times in all survey seasons including 2020 and 2021);
- Flight-line – drawn on a field map and numbered to link with associated field notes;
- Estimated flight height – initial height band estimates and any marked change noted during period of observation: 0-5m Above Ground Level (AGL) (Close to ground); 5-25m AGL (Low Flight); 25-100m AGL (Medium Flight height); >100m AGL (High Flight Height). Observers also provided more detailed estimates of flight height (above-ground level) when the field of view allowed such estimates to be made;
- Any other observations of note: behaviour, association or interaction with other species, etc.

Field surveys were undertaken using appropriate survey equipment as required (e.g. GPS units, binoculars, scope, notebooks, etc.) and during suitable weather conditions. All field observers communicated with two-way radios/mobile phones to allow co-ordination in the event of noteworthy species (e.g. Bird Directive Annex I species) were observed at, or close to the proposed wind farm site.

2.5.2.4.1.1.2 TOBIN Vantage Point Surveys

Vantage Point Surveys were carried out by TOBIN during the Winter Season 2025/2026 between (October to February), at five vantage point locations (VP1 to VP5), to further strengthen the data for the Collision Risk Model. The VP methodology followed guidelines issued by the SNH (2017a). The minimum requirement of 36 hours per VP per season was achieved, totalling 222 hours of VP surveys during the Winter Season 2025/2026.

The timing of watches was tailored to the ecology of the target species present on site, including dawn, day and dusk surveys, to include the full coverage from before sunrise to after sunset. Field information recorded included: dates, VP location, weather, survey start and end time,

species observed, time of observation, number of individuals per observation, height of flight (at five bands: 0-25 m, 26-50 m, 51-150 m, 151-200 m, and > 201 m, duration of flight (in seconds), reference number to flight line. All flight lines of target species were mapped on field sheets. Behavioural observations were also recorded.

2.5.2.4.1.2 Viewshed analysis

The viewshed analysis was carried out using custom R scripts (version 4.4.1; R Core Team, 2024) and location data provided by Ecology Ireland and TOBIN. The purpose was to determine which areas would be visible from specific locations at two heights above ground level: 17 metres and 30 metres. These heights reflect the clearance of the wind turbines being considered for the project.

Two types of landscape data were used to inform this analysis: Digital Terrain Model (DTM), which shows the bare ground surface, and Digital Surface Model (DSM), which includes features such as trees and buildings. This distinction allowed the analysis to take account of any obstacles that might block visibility from the vantage points. The effective viewshed of each VP used Ecology Ireland and TOBIN during VP surveys along with further technical details on the viewshed analysis process can be found in Appendix B.

2.5.2.4.1.3 Collision Risk Model

Collision risk modelling (CRM) uses statistical methods to estimate the likelihood of birds colliding with wind turbines. It relies on flight activity data collected before the wind farm is constructed, which helps to assess the level of risk once the turbines are in operation.

This flight activity data is used to calculate how often birds are likely to fly at turbine height within the risk area of the proposed wind farm site. From this, estimates can be made of how many times birds are expected to pass through the area swept by the turbine blades, known as the rotor swept area, based on how much of the overall airspace this volume occupies.

However, most of these passes do not result in a collision. This is because the blades only occupy a small part of the rotor swept volume at any given moment. A key part of the modelling involves calculating the chance that a bird flying through this space will actually come into contact with a moving blade.

In addition, many birds actively avoid turbines, either by steering clear of the area entirely, or by taking evasive action if they get too close. The model accounts for this by applying an avoidance rate, which reflects the proportion of birds expected to avoid a collision.

The final collision risk is calculated by multiplying the number of expected flights through the rotor swept area by the probability of a collision during a single pass and then adjusting for the avoidance rate and other relevant factors.

A CRM was prepared for the proposed project and can be found in Appendix B. The CRM followed guidance set out by NatureScot (2024) which provides details for carrying out collision risk modelling for onshore wind farm projects. This guidance was developed by Band (2024) from the original Scottish collision risk model (SNH, 2000), and the refinement of this model by Band (2012).

2.5.2.5 Transect Surveys

Both winter and breeding transect surveys were undertaken at the proposed project site to compliment the data obtained during VP surveys. The transect survey followed the method outlined in Bibby et al. (2000), whereby defined linear routes are set through a specific area (i.e. the proposed project).

2.5.2.5.1.1 Ecology Ireland Transect Surveys

Transect surveys were carried out by Ecology Ireland across three summer seasons (2020, 2023 & 2024) and three winter periods (2020/2021, 2022/2023 and 2023/2024).

Several 1km transects were used to achieve maximum coverage of locally representative habitat and bird activity. The transects were walked twice in each survey season, at a standard speed. On each transect, all bird species encountered (seen or heard) within two distance bands (<100m, >100m) from the observer were recorded and their abundance noted.

Notes on aural and visual registrations of bird species were recorded during field surveys. Visual registrations were recorded with the aid of binoculars. See table 7-3 for transect timings. Due to changes in the extent of the site boundary, two additional 1km transects, T5 and T6, were included for transect surveys commencing from November 2022 until the completion of VP surveys at the application site in September 2024.

The location of each transect can be found in Figure 2-3.

2.5.2.5.1.2 TOBIN Transect Surveys

Transect surveys were carried out by TOBIN during the Winter Season 2025/2026 between (October to March), along updated transects (T1 to T6), to further strengthen the data for the ornithological assessment.

The location of each transect can be found in Figure 2-4

2.5.2.6 Hen Harrier Roost Surveys

Hen Harrier roost surveys were undertaken monthly by TOBIN between October 2025 to March 2026 and were aimed to identify active winter Hen Harrier roosts. Hen harrier may roost communally in winter, generally in rank ground vegetation (Clarke and Watson 1997). Suitable roosting habitat is typically restricted to dense vegetation such as heath/bog, plantation forests that had not reached thicket stage, scrub, grassland, crops, dunes, marshes and reedbeds (O'Donoghue, 2021). Although this species breeds in upland areas, wintering birds disperse widely and can frequently be found in lowland areas of the midlands of Ireland.

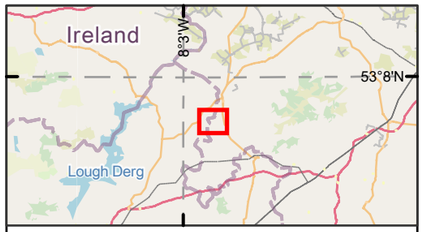
The Hen Harrier Roost Survey methods followed those set out by Gilbert et al. (1998) and the Irish Hen Harrier Winter Roost Survey recommendations from O'Donoghue (2019). Two potential areas for roosting Hen Harrier were identified and each of the locations was surveyed at a vantage point, six times during the wintering season (once per month). Surveyors were in place at least an hour before sunset and recorded all observations of hen harrier until last visible light. Information recorded by surveyors from the vantage points included the number of Hen Harrier entering or exiting a roost, the time, age, and sex, where it was possible to discern.

The Hen Harrier roost vantage points can be found in Figure 2-4.

2.5.2.7 Wetland Bird Surveys (I-WeBS)

The Wetland Bird Survey (I-WeBS) involve conducting monthly counts in wetland habitat locations within the proposed wind farm site and a 10 km buffer. The surveys aimed to assess the distribution and abundance of wintering water birds within the wider surroundings of the Proposed Project and to determine if populations of species were of national or international importance. I-WeBS surveys were undertaken by TOBIN between October 2025 to March 2026 and included a monthly count at each wetland habitat site. Counts were conducted at 'look-see' basis (Bibby et al. 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form according to their species code developed by the British Trust for Ornithology. Information collected included; numbers of wildfowl or wader species, the presence of marked birds (leg-ringed or neck-collared), weather conditions and habitat types.

Wetland Bird Survey (I-WeBS) locations can be found in Figure 2-5



Legend

- Wind Farm Site Boundary
- Proposed Turbine locations
- Proposed Grid Connection Route

Aquatics Survey Locations

- eDNA - eDNA sample
- EF | eDNA| HA - Electrofishing, eDNA sample, Riverine Habitat Assessment
- EF | HA - Electrofishing, Riverine Habitat Assessment
- HA - Riverine Habitat Assessment
- KS | EF | HA - Kick sample, Electrofishing, Riverine Habitat Assessment
- KS | HA - Kick sample, Riverine Habitat Assessment
- KS | HA | eDNA - Kick sample, Riverine Habitat Assessment

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	10/12/2025	First issue	S.P	J.D

Client: RWE

Project:
Ballincor Wind Farm

Title:
Figure 2-2:
Watercourses and Survey Sites Within the Study Area of the Proposed Project

Scale @ A3: 1:20,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2025

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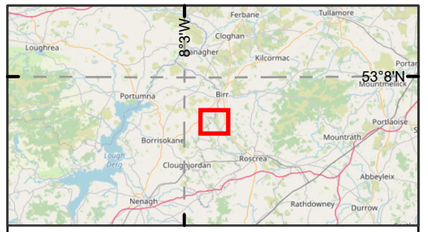
Map Ref: 11333-001.AA-Aq.Hab-P.App.BO-TOB-A

Draft: A



Legend

- Wind Farm Site Boundary
- Proposed Turbine locations
- Site Layout
- VPs
- Transects

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Meters

Spatial Reference
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Rev	Date	Description	By	Chkd.
A	10/12/2025	Draft issue	S.P	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Figure 2-3:
Location of Vantage Points and Transects used over the ornithology survey period March 2020 to September 2024

Scale @ A3: 1:20,000

Prepared by:	Checked by:	Date:
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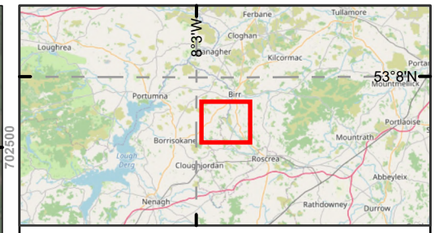

Legend

- Planning Application Boundary
- Site Layout
- Transects
- VPs
- HHVP

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
D01	13/04/2026	Draft issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Figure 2-4:
Location of VP's, Transects and Hen Harrier
VP's during survey period
October 2025 to March 2026

Scale @ A3: 1:35,000

Prepared by:	Checked by:	Date:
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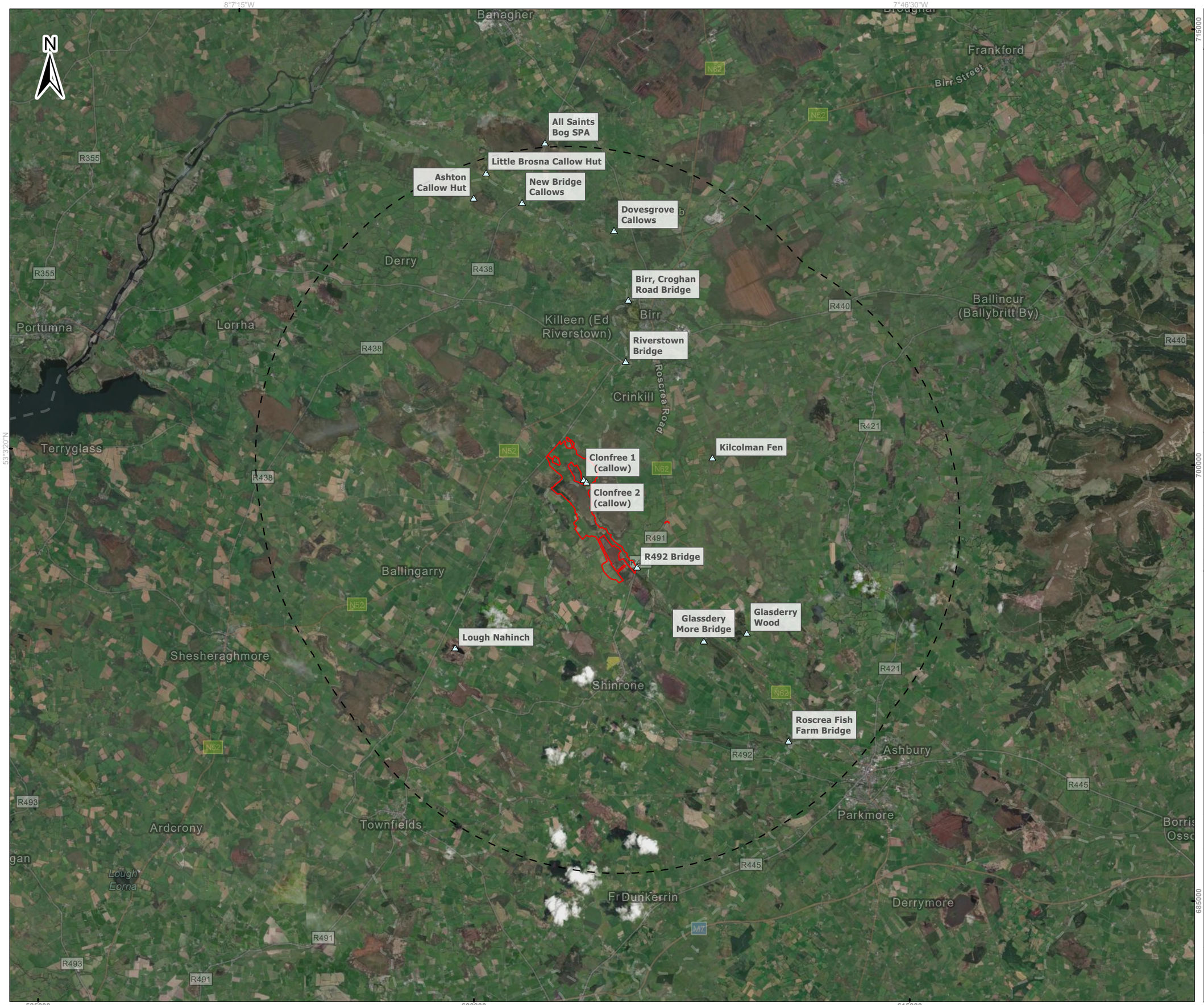
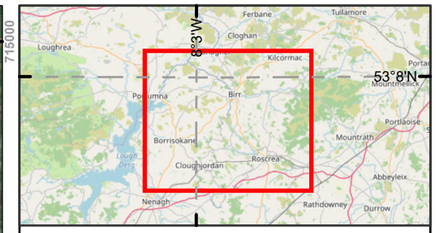
Map Ref: 11333-024-AA..VP-VS.A-TOB-D01

Draft: D01





Legend

- Planning Application Boundary
- 10km Buffer
- Water Bird Site Locations

0 3 6
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
D01	13/04/2026	Draft issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Figure 2-5:
Wetland Bird Surveys (I-WeBS) locations during October 2025 to March 2026

Scale @ A3: 1:120,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-025-AA..WBS-P.App.BO-TOB-D01

Draft: D01

2.6 CONSULTATION

Consultation with various state agencies and environmental Non-Governmental Organisations (NGOs) was undertaken in was undertaken in July 2024 and August 2025 to inform this AA. Ecologically associated state agencies and NGO's, relevant to the proposed project, were contacted in order to obtain any additional information and data, which may be useful in informing this assessment. The following organisations were contacted:

- An Taisce – The National Trust for Ireland
- BirdWatch Ireland (BWI)
- Development Application Unit (DAU) - via the Department of Housing, Local Government and Heritage
- Inland Fisheries Ireland.
- Irish Raptor Study Group
- Irish Red Grouse Conservation Trust
- Irish Wildlife Trust (IWT)
- National Parks and Wildlife Service (NPWS);
- Offaly County Council – Environment
- Tipperary County Council - Environment

Table 2-2 below details the relevant responses received in relation to the proposed project from the above consultees, with regards the Appropriate Assessment. Further information on consultation responses is provided in the environmental impact assessment report (EIAR) Chapter 1, accompanying this planning application.

Table 2-2: Summary of Key Responses from Consultees

Consultee	Consultation response	AA report response
An Taisce – The National Trust for Ireland	Did not have the capacity to respond to consultation.	N/A
BirdWatch Ireland	No response received	N/A
Development Application Unit - via the Department of Housing, Local Government and Heritage	The response outlined that an AA requires up to date, site specific Conservation Objectives for Natura 2000 sites, with all mitigation measures detailed before consent. It is noted that the proposed Wind Farm is adjacent to Sharavogue Bog SAC, where raised bog and fen habitats depend on high water tables, making hydrological impacts a key concern. Cumulative effects must also be considered, including wider hydrological connections, bird flight paths, and other local projects.	This AA has incorporated the most recent site-specific Conservation Objectives (see Section 6), with particular attention to hydrological impacts on Sharavogue Bog SAC and nearby sites. Cumulative effects have also been fully considered in line with guidance (see Section 5.4).

Consultee	Consultation response	AA report response
Inland Fisheries Ireland	The response outlines concerns, particularly regarding the protection of aquatic habitats and riparian zones associated with the Little Brosna River and its tributaries. Provides note on details to be included reports, emphasizing the need for detailed assessments of watercourses affected by construction, including aquatic biodiversity surveys and electrofishing to identify sensitive species. Highlights importance of soil stability and recommend expert evaluation to prevent landslides. Hydrology and drainage management during both construction and operation phases are critical to avoid erosion and pollution. IFI also highlights the risks of sediment release from road construction, the need for proper waste and pollutant containment, and careful planning of watercourse crossings.	A comprehensive suite of aquatic surveys (including electrofishing) has been completed covering all the project areas, these can be found in 2.5.2.3 . All potential impacts on important aquatic features have been assessed fully in sections 5 and 6. mitigation required following the identification potential impacts on important aquatic features has been fully described in section 6.2. Issues around soil/peat stability has been addressed in Chapter 9 (Hydrology and Hydrogeology) of the EIAR as part of this planning application.
Irish Raptor Study Group	No response received	N/A
Irish Red Grouse Conservation Trust	No response received	N/A
Irish Wildlife Trust	Did not have the capacity to respond to consultation.	N/A
National Parks and Wildlife Service	Information on sensitive fauna species protected habitats was obtained following a data request. The information received, was reviewed and included within the existing environment section, where relevant.	The information received, was reviewed and included within the existing environment section, where relevant (see section 4)
Offaly County Council – Environment Department	No response received	N/A
Tipperary County Council – Environment Department	No response received	N/A

3. DESCRIPTION OF THE PROPOSED PROJECT

3.1 PROJECT SITE LOCATION

Wind Farm Site

The proposed project is located within townlands of Curralanty, Ballincor, Cloonaheen, Co. Offaly Clonfree, and Cronekill and Carrig, Co. Tipperary between Sharavogue in Co. Offaly and Carrig, Co. Tipperary. The proposed GCR (including the proposed substation, BESS and connection masts) is located within the townland of Cronekill, Co. Tipperary. The proposed wind farm is located on the north County Tipperary and west Offaly border and approximately 5km southwest of Birr, Co. Offaly.

The proposed wind farm site has an area of approximately 355 hectares (ha), primarily consisting of agricultural land, forestry plantation and peatland. The predominant land use/activities on the site of the proposed wind farm are primarily agricultural with mixed broadleaf and coniferous forestry and areas of cutover peatland that is extensively modified/drained due to agricultural activity and turf cutting. The proposed wind farm site is situated west of the Little Brosna_040 RWB, while agricultural and forestry lands surround the site from the north, south, and west with elevations ranging from 45m to 65m above ordnance datum (OD).

The proposed wind farm site will be accessed by the regional road (R492) and the local road network at two locations. The primary site entrance is located on the R492 approximately 2.5km southeast of the Sharavogue N62 and R492.

The proposed project site is outlined by the red line in Figure 3-1.

Grid Connection Route

The GCR spans approximately 12.23 km, running north from the proposed Ballincor Wind Farm 110 kV on-site substation in County Tipperary to the existing ESB Dallow 110 kV Substation in County Offaly. The first 8.57km of the Grid connection route will be in County Tipperary, with the final 3.66km of the Grid Connection Route being in County Offaly. The underground cable (UGC) will travel along public road networks and private lands.

Location of Works on the TDR

It is proposed that turbine components will be delivered via Foynes Port, Co. Limerick. From here, it will travel to the proposed wind farm site entrance via N69, N18, M7, R435, R445, N62, and R492 road.

Works are required to allow the turbine components to be moved to the site. Works range from hedgerow trimming/clearing to facilitate oversail of turbine blades to the temporary placement of hardcore to allow for a suitable surface for the oversize vehicles to pass over. The current planning applications include the proposed temporary works required for turbine delivery at Sharavogue Cross Roads.

Limited excavations are required for the proposed TDR. Works comprise primarily of overrun areas near roundabouts, with off-road excavations required near Sharavogue crossroads.

3.2 Overview of The Proposed Project

RWE Renewables Ireland Ltd. propose to supply 61.6 - 74.8 megawatt (MW) power to the Irish electricity network via tail fed 110 kV underground cables (approximately 12.23 km cable length) to the existing 110 kV substation in the townland of Clondallow, Co. Offaly. It is envisaged that one application will be submitted, to an Coimisiún Pleanala (ACP) for all components of the proposed project, namely the wind farm, on site substation, met mast and connection to 110 kV Dallow Substation. A full description of project is included in Section 2.6 of Chater 2.

The proposed project is a renewable energy development and will constitute the provision of:

- Works along the public road and private land for a 12.23 km grid connection to the existing Dallow 110 kV substation including installation of 17 joint bays along the grid connection route ("GCR") which runs across the townlands of Cronekill, Castletown, Clondallow, Birr, Kylenamuck, Tinnakilly, Ballyloughnane, Killeen, Croghan, in Co. Offaly and Townparks, Dovegrove, Woodfield or Tullynisk, and Ross in Co. Tipperary;
- Upgrading of existing access tracks, construction of new founded access roads and floating roads within the proposed wind farm and a founded road for the GCR at Clondallow, Birr, Co. Offaly;
- Turbine Delivery Accommodation works, road surfacing works, temporary wall/vegetation removal, load bearing surface will be laid to provide a minimum 4.5 m running width and a 5.5 m clearance width for turbine delivery at Sharavogue crossroads, Sharavogue, Co. Offaly.
- Assembly of 11 Wind Turbine Generators (including tower sections, nacelle, hub, rotor blades) with an estimated capacity of 61.6 to 77 MW and a blade tip height between 179.5 and 180m, rotor diameter between 149 to 163m, hub height of between 98.5 and 105m metres.
- Associated hardstanding and turbine foundations at each turbine location;
- Upgrading of existing access tracks, construction of new founded access roads and floating roads within the proposed wind farm. Total length of internal access roads is 9.7 km, and upgrades of two site entrances on R492 and L1071;
- Erection of 104 m permanent meteorological mast and including lightening pole;
- All associated excavation, earthworks and spoil management, Surface water drainage system and sediment control; Installation of new clear span watercourse or drain crossings on proposed wind farm site; Excavation and restoration of three borrow pits (borrow pit 1 to borrow pit 3) and one peat deposition area;
- Wheel wash, security fencing & hut;
- Four Temporary construction compounds including site office and staff facilities;
- Installation of 33 kV medium voltage electrical and communication cabling underground between the proposed turbines and the proposed on-site substation and associated ancillary works; All electrical plant and infrastructure and grid ancillary services equipment;
- 110kV electricity on-site substation and switch rooms; including one EirGrid control building containing welfare facilities and storeroom, wastewater and rainwater holding tank;
- One Independent Power Producer (IPP) control building containing HV switch room, site offices, welfare facilities, wastewater holding tank;

- One Battery energy storage system (BESS) control building containing worker welfare facilities and equipment store, wastewater holding tank; 90 BESS container units, inverters, underground water storage tank and associated works;
- All associated infrastructure and services including site works and temporary construction signage,
- Operational stage site signage;
- All related site works and ancillary development including berms, landscaping, and soil excavation;
- Tree felling (7.2 ha) and hedgerow removal (1.1 km) to facilitate construction and operation of the proposed project,
- Biodiversity enhancement including hedgerow replanting (1.3 km), peatland enhancement, tree planting.

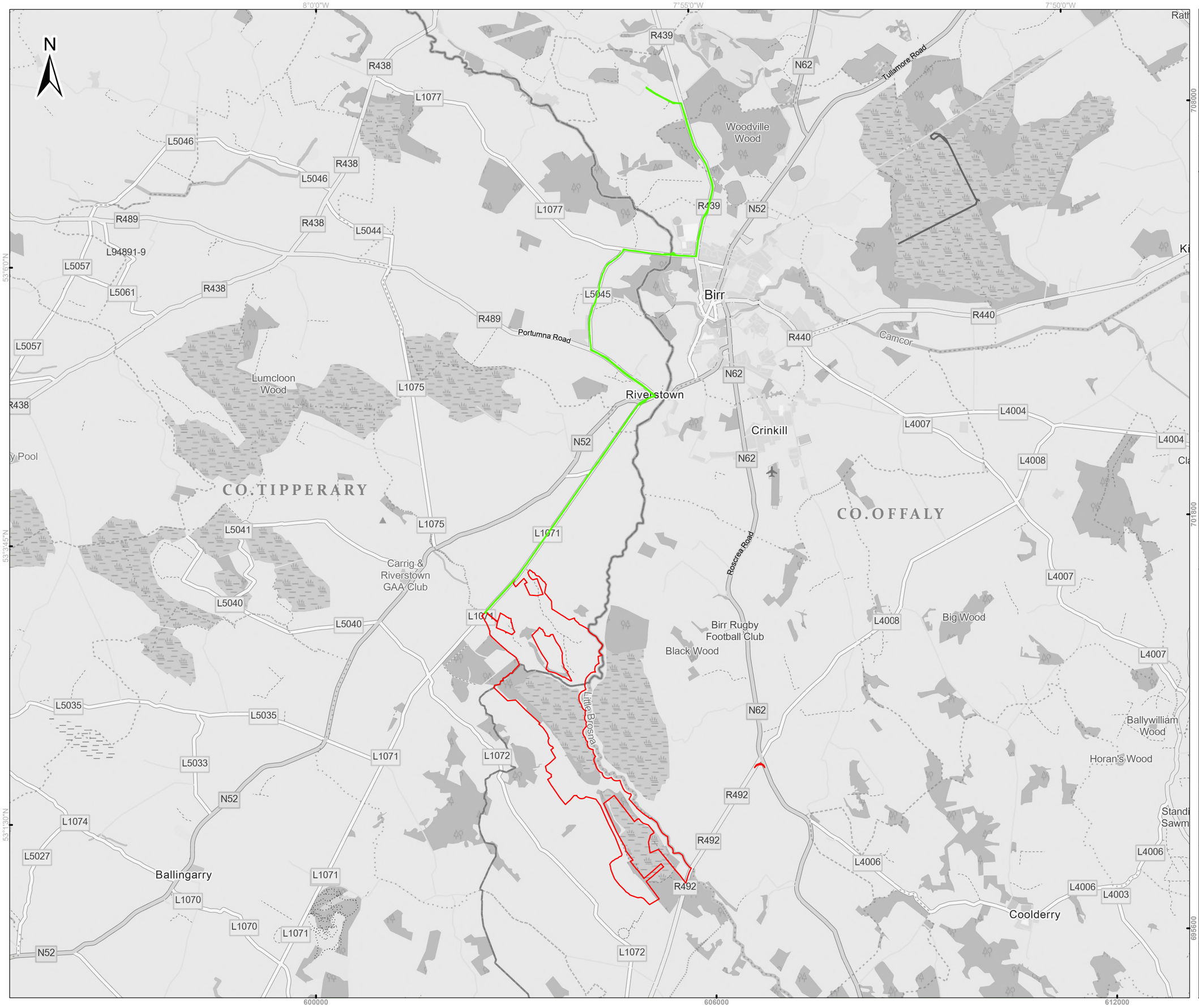
The installation of a Battery Energy Storage System (BESS) will have the future ability to store excess power being generated from the wind farm and will release it back into the grid when there is a demand for it.

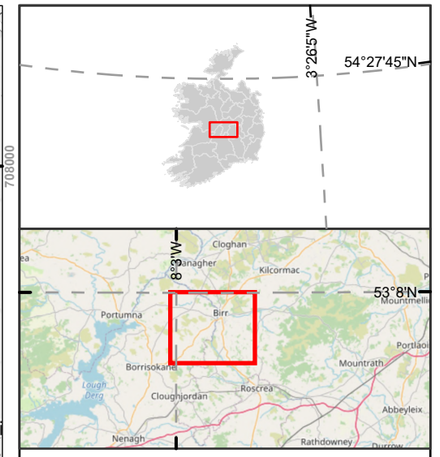
This promotes energy conservation and grid optimisation while making electricity more affordable and accessible to consumers.

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought for the proposed project, excluding works on the on road sections of TDR. The proposed GCR will remain as a permanent part of the national infrastructure, which will be operated by the Transmission System Operator, EirGrid and owned by ESB the Transmission System Owner.

The general layouts of the proposed wind farm site (the area within the red line boundary) and the broader proposed project site (including the GCR and TDR) are presented in Figure 3-1 and Figure 3-2. The layout show the proposed locations of the wind turbines, associated hardstanding areas, BESS, electrical substation, clear span bridge, meteorological mast, temporary construction compounds, borrow pits, internal access roads, the main site entrance, and the GCR and TDR.

The following section describe all elements of the proposed project including any works required on public roads to accommodate turbine delivery. The proposed project in its entirety has been considered and assessed as part of the NIS.





Legend

- Wind Farm Site Boundary
- Proposed Grid Connection Route

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	10/12/2025	First issue	S.P	J.D

Client: RWE

Project:
Ballincor Wind Farm

Title:
Figure 3-1:
Site Location of Proposed Ballincor Wind Farm

Scale @ A3:	1:52,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2025

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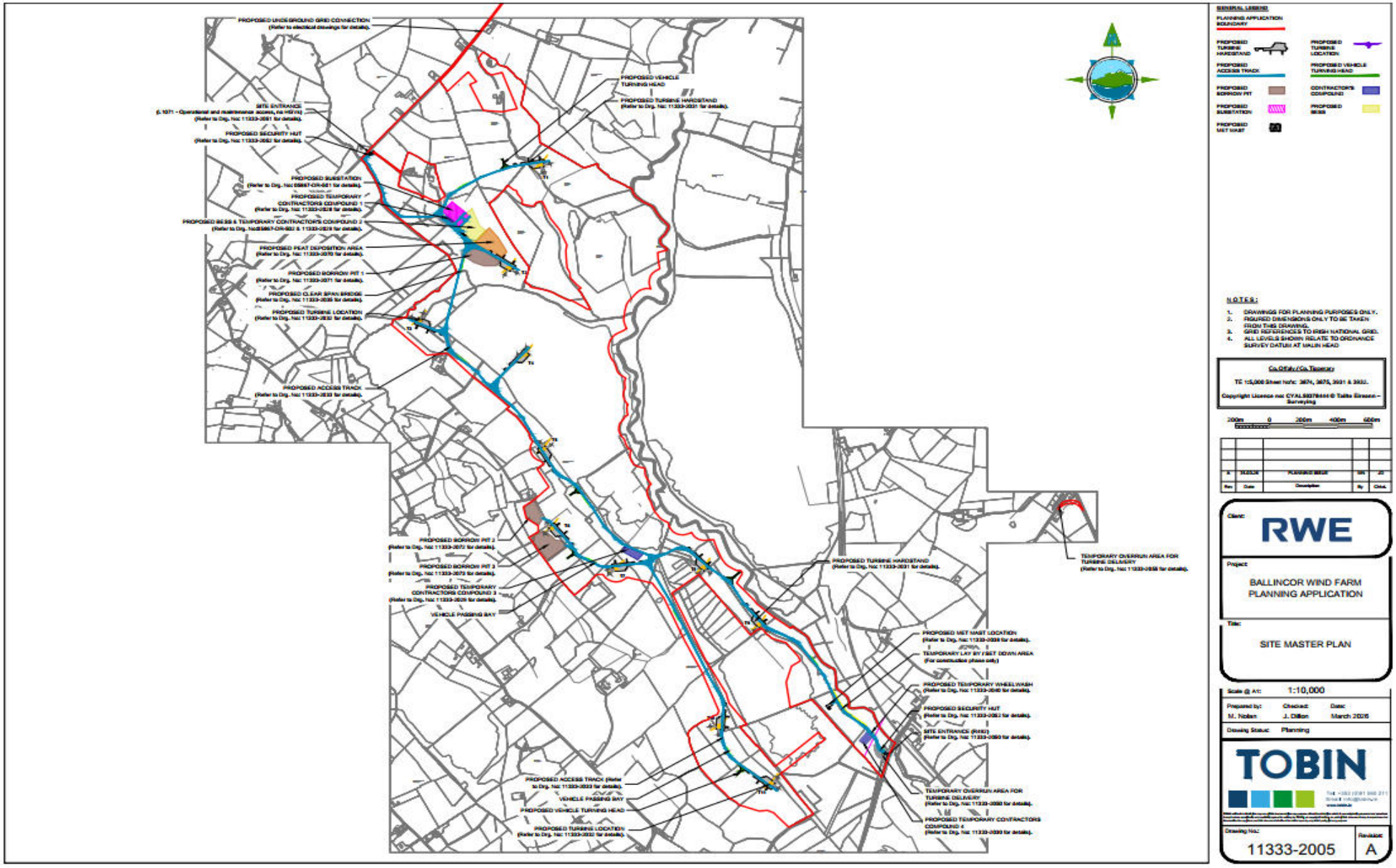
Map Ref: 11333-003.AA-P.App.BO-AE-TOB-A

Draft: A

Figure 3-2: Proposed Wind Farm - Site Master plan (drawing 11333-2005)



3.3 Construction Phase Activities

A description of the proposed construction phase activities is provided hereunder.

3.3.1 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared for the proposed project and is included alongside this report. All mitigation measures within this report have been incorporated within the CEMP. The construction contractor will be responsible for implementing the mitigation measures specified in the EIAR and CEMP and for communicating the requirements with all staff on-site. Their implementation of the mitigation measures will be overseen by the supervising site staff, including the Environmental Manager, Ecological Clerk of Works (ECoW), site supervisor, archaeologists and/or geotechnical engineers, as appropriate.

3.3.2 Construction Working Hours and Duration

It is expected that the entire construction phase, including civil, electrical and grid works, and WTG assembly will take approximately 24 months. With the exception of commercial forestry felling, woodland, hedgerow, treeline and scrub clearance will commence outside the breeding birds season, which runs from the 1st of March to the 31st of August. If any minor clearance or trimming is required within those dates, or if the initial vegetation clearance extends past the 1st of March due to unsuitable weather conditions, the works will be preceded by an ecological survey (from a qualified and suitably experienced ecologist) to ensure there are no sensitivities associated with the action.

The construction phase can be broken down into 5 no. main phases as follows (there will be overlap between these):

- 18 months – Civils (including forestry felling and vegetation clearance, drainage, construction of site access tracks, hardstands, turbine foundations)
- 9 months – Electrical grid connection/substation installation and commissioning
- 12 months – Site electrical (installing between turbines and substation, pulling cables)
- 4 months – Turbine deliveries and erection
- 3 months – Commissioning

The construction phase will include up to 120 peak staff onsite. Normal working hours during the construction phase are expected to be Monday to Friday 07.00 to 19.00 hours (inclusive) and Saturdays 08.00 to 14.00 (inclusive) unless otherwise agreed in writing with Tipperary and Offaly County Council. Work outside of the core hours may be required for concrete pours for each turbine foundation due to the volume of concrete required for each turbine foundation. To accommodate the delivery of large turbine components along public routes, the delivery of these oversized loads will typically occur in late evenings.

Work on Sundays or public holidays will only occur under exceptional circumstances or in the event of an emergency. Additional emergency works outside of normal working hours may also be necessary.

Some temporary task lighting may be required during construction depending on the time of year and sunlight levels.

3.3.3 Site Clearance

The proposed project will involve site preparation and access arrangements to facilitate site clearance, earth works, along with temporary infrastructure to manage site operations minimising potential environmental disruption.

It is envisioned that the removal and disturbance of earth, drainage ditches, vegetation, treelines, hedgerows, within the site, along the GCR and the works area of the TDR will be required in order to accommodate the upgrading of existing site entrances, access tracks, the instalment of culverts and the construction of new site tracks and facilitate the works. Any disturbed areas will be fully reinstated in so far as is practicable following the completion of the site clearance works.

Temporary construction compound/material storage areas will be located within the proposed red line boundary

3.3.4 Earthworks

Earthworks will be carried out for the overall development of the wind farm. A summary of the earthworks required has been described below.

3.3.4.1 Vegetation Clearance

Advance clearance of some hedgerows, topsoil, subsoil, peat and vegetation in preparation for construction phase will be required to facilitate the construction activities,. Where forest or roadside drainage channels are located alongside the access tracks (as they occur frequently through the site), they will be moved as required.

A total area of habitat, approximately 28.98ha, will be removed entirely from the proposed project site to allow for the development. This includes permanent habitat loss of 20.43ha and 2.2km of habitat and the temporary loss of 8.55ha habitat. The type and size of habitat loss is shown in Table 3-1.

Table 3-1: Habitat Loss within the Proposed Project

Habitat	Size of Permanent Habitat Loss (Ha)	Size of Temporary Habitat Loss (Ha)
BC1 - Arable crops	0.7992	0.1316
BL3 - Buildings and artificial surfaces	0.0668	0
GA1 - Improved agricultural grassland	6.9917	7.1101
GS2 - Dry meadows and grassy verges	0.2112	0.0019
GS4 - Wet grassland	3.9782	0.6477
PB4 - Cutover bog	0.6160	0

Habitat	Size of Permanent Habitat Loss (Ha)	Size of Temporary Habitat Loss (Ha)
WD1 - (Mixed) broadleaved woodland	0.9096	0
WD4 - Conifer plantation	3.2304	0.0373
WN1 - Oak-birch-holly woodland	0.0179	0
WN7 - Bog woodland	2.8173	0
WS1 - Scrub	0.4750	0.5078
WS2 - Immature woodland	0.3070	0.1172
Linear Habitat	**Size of Permanent Habitat Loss (m)**	
FW2 - Depositing/ lowland rivers	4	
FW4 - Drainage ditches	690	
WL1 - Hedgerows	1191	
WL2 - Treelines	333	

3.3.4.2 Soil Storage

The management of all excavated soils and peat will be conducted in accordance with the Soils Management Plan outlined in the CEMP. Topsoil will be stripped and stockpiled at a designated temporary storage location within the site (see Figure 3-2). General excavated material will be stored at the three temporarily compound storage area within the proposed project site. At the borrow pits, spoil to be removed and stored in a temporary stockpile with appropriate gradient (i.e. 1:2) and confined to within the boundary of the borrow pits, on flat ground. The stockpile will be placed at a minimum distance of 50m from the nearest drainage ditch or watercourse on the proposed wind farm site. A minimum distance of 15m from the nearest drainage ditch or watercourse will be implemented on the proposed GCR. Silt fencing will be installed along all drainage ditches and watercourses during construction. Appropriate mitigation will be used to ensure the protection of downgradient watercourses (i.e. the use of silt fences, collector drains, Siltbuster, etc.).

Silt fencing will also be installed around each soil stockpile to prevent runoff of suspended solids laden surface water and soil erosion. No permanent spoil or stockpiles will be left on site. Silt fencing will be installed along all drainage ditches during construction. Any disturbed areas will be fully reinstated following the completion of the works.

Any topsoil or peat excavated during the construction of access roads on the site will be reused on-site for berms, landscaping, and along the margins of the access roads. Additionally, topsoil will be repurposed for landscaping and reinstatement around turbine bases and hardstanding areas. The borrow pits will be reinstated with any mineral soils that have been temporarily stockpiled on site, or any spoil remaining once landscaping works have been completed. Any

peat excavated during the construction of access roads on the site will be reused on-site for berms, landscaping, and along the margins of the access roads.

All remaining excavation material will be disposed of offsite as byproducts and, in accordance with Waste Legislation (Waste Management Act 1996 – 2025).

All fill material arriving to site will be stored in designated areas, inorder to minimise the need for on-site storage. The delivery locations will not be located near any drainage ditches or watercourses.

3.3.4.3 Access roads

The construction of new site access roads to each turbine, the substation, met mast, BESS and the widening of existing site roads and site entrances is required. Topsoil will be removed and stone from the onsite borrow pits will be placed down to form the road foundation. The stone will be compacted using a roller or other similar approved compaction method. The access road will then be surfaced using a permeable gravel contain CL804 material (crushed stone, rock, or gravel) where required (i.e., in areas of soft ground). Further details on access road construction are included below in section 3.3.6.

3.3.4.4 Borrow Pits

It is proposed that three borrow pits will be constructed in order to provide a source for the majority of stone material requirements within the site. The pits are located north and west of T6 and south of the BESS. These pits cover a total area of approximately 4.2ha. The proposed borrow pits will be located on very gently sloping terrain. During the extraction of the borrow pits, removed spoil will be stored in a temporary stockpile with appropriate gradient (i.e. 1:2) and appropriate mitigation will be used to ensure the protection of downgradient watercourses (i.e. the use of silt fences, collector drains, Siltbuster etc.).

All of the spoil temporary stockpiles will be located on relatively flat areas with the exception to where material is side cast from small/narrow pieces of infrastructure. Once the material has been extracted from each borrow pit, the borrow pits will be reinstated with any soils that have been temporarily stockpiled on site, or any spoil remaining once landscaping works have been completed before been made secure using permanent stock proof fencing.

3.3.4.5 Embankment

An embankment and a fence will be constructed around the perimeter of each turbine base to prevent construction traffic from driving into the excavated hole and also to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc..

3.3.4.6 Cable trenches

Underground cable trenches are necessary within the proposed project site. This includes Cable Trench Excavation and laying underground cable trenches and cabling connecting the wind farm and subsequently to the proposed on-site 110 kV substation, BESS, lighting and CCTV.

No more than a 100m section of trench will be opened at any one time. The second 100m section will only be excavated once most of the reinstatement has been completed on the first section.

The excavated trench will be dewatered, if required, from a sump installed within the low section of the opened trench and dirty water will be fully and appropriately attenuated, through silt bags, before being appropriately discharged to vegetation or surface water drainage feature. Silt will be disposed of in accordance with the Waste Management Act as Amended.

Where the cable route intersects with culverts, the culvert will remain in place (where possible) and the ducting will be installed either above or below the culvert to provide minimum separation distances in accordance with ESBN and Uisce Éireann specifications.

Cables within the wind farm or along the GCR will cross rivers, protected bridges, cattle pass or existing drains. Off line HDDs will be undertaken at the protected bridge and Little Brosna river crossing. The watercourses crossing on the proposed wind farm will be undertaken using clear span bridges. HDD will be utilised for protected bridges, cattle pass or existing drains. This will include the removal of hedges and treelines and culverting 300m of the existing drainage ditches located within the site to allow for the access track, the instalment of clear span bridges or culverts inside the site. Trenching and backfilling would be carried out by a track excavator and a dumper or tractor and trailer.

The drainage ditch culvert will be a culvert pipe placed inside the drain and permeable gravel will be placed on top. The pipe will have a gentle slope in line with the existing drains. Each drain culvert is typically 6m x 1m in diameter.

Excavated material will be placed to the side and reused as backfilling material and smoothed off using the excavator bucket to minimise runoff where appropriate. Excess material will not be stored in the vicinity of any watercourse and will be re-used on site for borrow pit reinstatement and local landscaping. In the case of any material deemed as contaminated, a licenced waste carrier will transfer to an appropriate waste facility.

If culverts require removal for ducting installation, a suitable method of damming the water source and pumping the water around the work area will be set out in a method statement and agreed with the relevant stakeholders. Once the cable ducts are installed, the culvert will be reinstated to match existing levels and dimensions. If works of this nature are required, the contractor will liaise with IFI in advance of works.

3.3.4.7 Joint Bays and Associated Chambers

Joints bays (total of 17) will be installed along the GCR to facilitate the jointing of two lengths of underground cables. These will be installed at various separation distances approximately between every 450m – 850m Joint bays are typically 2.6m x 6m x 1.75m pre-cast concrete structures installed below ground level.

Before starting construction, the area around the edge of the joint bay, used by heavy vehicles, will be surfaced with a geo-composite cover (Terram or similar) and stone aggregate if required to minimise ground damage. Roadside drains within the temporary works area of the joint bay will be culverted and check dams made from stone or geo-composite covered sandbags, will be inserted upstream and downstream of these culverts to intercept any solids generated during the works. If the ground slopes from the working area toward a watercourse or drainage ditch, a silt fence with straw bales will be interposed between the works area and the watercourse or drainage ditch.

A pit will be excavated for joint bay construction, including for a sump in one corner. Approximately 75mm of blinding concrete (for in situ construction) or 50mm thick sand (for pre-cast concrete construction) will then be laid on 200 mm thick Clause 804 granular material.

A 200mm thick reinforced concrete floor slab with sump and starter bars and 200mm thick reinforced concrete sidewalls will then be constructed.

The formwork will then be removed and backfilled with suitable backfill material in grassed areas or Clause 804 material once the ducting has been placed in the bay. The pre-cast concrete sections will be placed on sand bedding. Where joint bays are located under the road surface, the joint bay will be backfilled with compacted layers of Clause 804 and the road surface temporarily reinstated.

Following the completion of jointing and duct sealing works in the joint bay, cement-bound sand in approximately 200mm layers is placed and compacted to the level of the cable joint base to provide vertical support. Additional layers of cement-bound sand are added and compacted until the cement-bound sand is level with the top of the joint. An additional 100mm cement-bound sand layer is then added. It is then backfilled with cement-bound sand to a depth of 250mm below surface and the area is then permanent reinstated.

If the joint bay needs to be dewatered, this will be pumped to a percolation area if the soil is not saturated, otherwise a settlement tank will be used to remove any solids from the dewatering process.

All excavated material will be stored near the excavations and reused for reinstatement works. Any soil required for reinstatement that will be temporarily stockpiled on site. This work will be carried out using a tracked excavator (wheeled excavator where required) and a tracked dumper or tractor and trailer. The stock pile will be placed at least 50m back from the nearest watercourse on level ground and will be ringed at the base by silt fencing and be regularly monitored by a designated competent person for signs of solids escape. In which case an additional line of silt fencing with straw bales will be added to contain any solids in run-off.

Temporary storage of cement bound sand (if required) will be on hardstand areas only where there is no direct drainage to surface waters.

3.3.4.8 Landscaping

A total of 1.3km of hedgerow will be replanted in certain locations of the proposed project particularly at areas with current open views of the site which will require dense screening. Any species being replanted will be from the 'favourable' list of 'native tree, shrub and climbers' outlined in Appendix D of the Heritage Council's '*Best Practise Guidance on Hedgerow Surveying, Data Collation and Appraisal*' (Foulkes *et al.,* 2013). All internal and external hedgerow field boundaries will be planting of whip transplants of the following native hedgerow species; Hawthorn, Blackthorn, Elder, Hazel, Spindle, Holly, Dog Rose, Rowan, Bird Cherry, Crab Apple, Alder, Guelder rose, and Willow sp.

Larger "standard" tree species such as sessile oak (*Quercus petraea*), pedunculate oak (*Quercus robur*) and Scots pine (*Pinus sylvestris*) will be planted occasionally and allowed to grow large to create structural diversity in the linear habitat. Bolstering the existing hedgerow with under-planting and inter-planting of whip transplants will ensuring dense and consistent screening of the project site. Advanced nursery stock in the form of 8-10cm girth trees will be used to fill any

noticeable gaps within the existing perimeter hedgerow network to bolster existing perimeter and internal hedgerows.

Native trees and hedgerow species will be planted around the outside of the northern access road and BESS site fence and around the red line boundary providing connection to existing hedgerows and treelines. Within the substation and BESS, no exposed topsoil will be reseeded within the red line boundary, this will be covered in permeable gravel.

3.3.5 Construction Compounds

Compounds will be constructed to facilitate construction, operation and maintenance staff. During construction, four temporary compounds will be used for the storage of machinery and materials, staff welfare facilities, staff parking, excavation material storage and hardstands for storing materials. The compounds will be located within the proposed red line boundary. Any soils and stone removed during construction will be temporarily stored for later use in reinstatement and landscaping. Stone and soils will also be used towards reinstatement of the nearest onsite borrow pits.

Oils and fuels will be stored in an appropriately bunded area within the temporary construction compounds.

Materials are transported around the site by means of teleporter/small dumpers/tractor and trailer. The compounds are located as follows:

- Compound No. 1 will be located at the BESS
- Compound No. 2 will be located to the south of the proposed Substation
- Compound No. 3 will be located within the western boundary, near Turbine no. 7
- Compound No. 4 will be located will be located within the southern boundary, near the southern site access

At the end of the construction phase, the compounds will be removed, and the area will be covered in soil and replanted with grassland or forestry.

3.3.6 Site Access and Internal Roads

3.3.6.1 Site Entrances

The site will be accessed by two site entrances, located on the R492 (Co. Offaly) and L1071 (Co. Tipperary). The access sites will be designed in accordance with the Transport Infrastructure Ireland's DN-GEO-03060 (May 2023) Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions).

The existing site entrance from the R492 will be upgraded during the construction phase. This site entrance will be the main site access/egress point for the construction phase to accommodate construction vehicles. A permitted entrance from the L1071 local road will be established as an operational phase site access point.

3.3.6.2 Internal Access Roads

New internal access roads of circa 9km will be constructed and any existing tracks will be upgraded to allow the transport of components and construction materials.

The internal roads will be approximately 5m in width, and up to 9.5m at passing bays, road bends and on the final approaches to turbine hardstands. When the topsoil has been removed and/or the formation layer (bedrock/firm subsoils) has been reached, stone from the onsite borrow pits will be placed to form the track foundation. The sub grade will be compacted with the use of a roller or other similar approved compaction method. The top dressing will be added to the tracks at this point. Tracked excavators will be used to carry out excavations.

Where an existing track needs to be widened, it will be carried out on both sides, and the same steps taken as described in the new track construction above. Where forest or drainage channels are located alongside the track (as they occur frequently through the site), they will be moved as required during dry weather periods.

All on-site access tracks will be maintained for the duration of the construction and operational phases of the project.

3.3.6.3 Floating roads

The construction methodology for permanent floating roads, is summarised as follows:

- A geotextile separation layer is placed on the existing ground surface.
- A biaxial geogrid is then placed over the geotextile.
- Where the CBR of the underlying material is >1%, 400mm of class 1A/6F2/6I/6J material followed by 100 mm of a compacted Clause 804 will be used for a running layer to give a total road thickness of 500m.
- Where CBR of the underlying material is <1%, 300 mm of Class 1A/6F2/6I/6J material will be placed, followed by a second layer of biaxial geogrid, followed by 300 mm of Class 1A/6F2/6I/6J material, followed by a 100 mm of a compacted Clause 804 running layer for a total road thickness of 700 mm.
- Permanent floating roads for wind farm access will be designed to a running width of 5.0m.

3.3.6.4 TDR

Wind turbines will be delivered on the TDR from Foynes Port along N69, N18, M7, R435, R445, Dublin Road, N62, R492 on a Superwing Carrier trailer. The base and mid towers will be carried on a 4+7 clamp trailer. The hub, nacelle housing, and top towers will be delivered on a six-axle step frame trailer.

Temporary accommodation works are necessary to facilitate the delivery of oversized loads of turbine components. These works include vegetation to be trimmed, road signs, bollards, and lighting columns to be temporarily removed, and load bearing surface to be laid in overrun areas. to facilitate the oversail of turbine blades and allow the oversize vehicles to pass. An offroad section is required at Sharavogue Crossroads at the R492 and N62 junction. Proposed temporary works will be required for turbine delivery within private lands at this location.

3.3.6.5 Machinery

The main construction machinery on site using the roads will include an excavator, compaction rollers, crane, transport lorries, cement lorries, HGVs, flatbed trucks, dump trucks, piling rigs and tractor and trailers. Articulated lorries will be used to deliver pre-cast concrete slabs and battery storage containers. These will be lifted into place via a crane. Dump trucks/tipper lorries will be used to deliver gravel to site and also to remove vegetation and soil from site. Construction material will be transported onto and around the main site by means of HGVs, flatbed trucks, dump trucks, teleporter, tractor and trailer.

3.3.7 Turbines

The proposed wind farm will have an estimated Export Capacity (EC) in the range of 61.6 - 74.8MW. Each turbine has a tip height of between 179.5m and 180m, rotor diameter of between 149m and 163m, hub height of between 98m and 105m.

The Wind Turbine Generators (WTG) will be installed on site using cranes. Crane pads will be established at each WTG location for the installation, assembly and maintenance of the WTG's. The turbines will be of the generic three bladed, tubular tower model with horizontal axis. The rotor blades are bolted to the central hub, which is connected to the nacelle. The turbine tower which is delivered to site in three to six sections. Once the turbine components arrive on site, they will be placed on the hardstand in a designated lay down area prior to assembly.

The components will then be bolted to the steel base, which is cast into the concrete foundation. The turbine tower is then assembled on top of the concrete foundations.

Further details of the turbine construction, components and power Export Capacity (EC) is provided in the EIAR.

3.3.8 Hardstands

Hardstanding areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection.

For the hardstand foundation, overburden will be stripped off using an excavator and will be stockpiled. The sides of the excavated areas will be sloped sufficiently (2:1 for mineral soil, 1:1 for rock) to ensure that slippage does not occur. Excavations will be approximately 4m deep.

Hardstanding formation will consist of a minimum 500mm hardcore on geo-textile membrane. The hardstand area subbase material will be sourced on site. This is predicted to be approximately 110,000 m^3 of gravel/stone material, obtained primarily from the onsite borrow pits and the surface 150mm layer of stone from local quarries. Stone will be placed and compacted in layers to minimum 500mm depth.

Each turbine foundation will require between 550-1,000m^3 of concrete which will be sourced from offsite suppliers. No batching of concrete will occur on site. Each turbine to be erected on a reinforced concrete base. Each hardstanding area consists of a main crane pad hardstanding of 40m x 75m to accommodate the crane during turbine assembly and erection. The hardstanding areas cover the WTG foundations once the turbine foundation is in place and facilitate parking for operation and maintenance staff. The surrounding site areas will be

surfaced using a permeable gravel surface. A drainage ditch will be formed, within the excavated width and along the sides of the hard standing.

3.3.9 Electrical Works

3.3.9.1 Local Electricity Supply

As part of the proposed project, a local electricity supply will be required as a power supply to the proposed substation for light, heat and power purposes, and to the proposed met mast. The local supply will be designed and constructed by ESB Networks. No significant works are anticipated for this (placement of local poles with cable from a nearby power line), as it will be similar to what normally occurs for new house connections. Standard overhead electricity poles and cables will be installed.

3.3.9.2 Grid Connection Route

It is proposed to supply power from the Ballincor Wind Farm to the Irish electricity network via tail fed 110 kV UGC to the existing ESB Dallow 110 kV Substation in the townland of Clondallow Co. Offaly. The 110 kV grid connection will consist entirely of UGC. On-site electrical works, including internal cable network, as well as off-site connection works to the national grid, will be carried out. Detailed construction methodologies are provided in the Construction Environmental Management Plan (CEMP).

3.3.9.2.1 110 kV Underground Cable Trenches

The UGC shall form a 110 kV connection from the Ballincor Wind Farm, the substation, BESS and Dallow 110 kV substation. A double circuit trench will be required for the 110 kV Grid Connection UGC. The site cabling for power and communication cables will be in trenches within the internal access roads. Internal cables connecting the wind turbines to the substation will be laid within or immediately adjacent to the onsite access roads. All cables will be laid in underground ducts by open trenching and HDD where required.

HDD is required at three locations along the GCR during UGC installation. HDD will be carried out at three locations along the GCR.

1. The first HDD is at Riverstown Village, required to avoid a protected bridge (TN-N52-088-00);
2. The second is under the L-1077 Croghan Road at a Cattle Pass;
3. The third is at the Little Brosna River, where it will cross from the public road into the private lands on the north side Croghan Bridge and under the river.

For the HDD, a works area of circa. 40m² (to be confirmed by a specialist drilling contractor) will be fenced on both sides of crossing. Further details of the HDD methodology is provided in Chapter 2 (Description of the proposed project) of the EIAR.

Connection works from the proposed onsite substation to Dallow 110 kV Substation will involve the installation of ducting, joint bays and ancillary infrastructure along the existing road network. This will require delivery of plant and construction materials, followed by excavation, laying of cables and subsequent reinstatement of trenches and road surfaces. The 110 kV cables will be installed within the internal access roads in the proposed wind farm site and within the

existing public road corridor. The cables will be laid in trenches as per ESBN and EirGrid Specification.

The UGC will consist of 3 no. 160 mm diameter HDPE power cable ducts, 2 no. 125 mm diameter HDPE fibre communications duct and a 125mm Earth Continuity Conductor (EEC) duct to be installed in an excavated trench between the proposed wind farm substation and existing Dallow 110 kV Substation.

The standard trench is 825mm wide, and 1315mm deep, with variations in this design to adapt to service crossings and watercourse crossings, etc., where applicable.

For the cable trench excavation, trenches are excavated, ducts installed, generally laid on a bed of Cement Bound Granular Mixture (CGBM) and surrounded with CGBM, and trenches backfilled at ground level with stone by a track machine throughout the site. The top of the trench will generally be finished at ground level with stone as per EirGrid/ESB specifications (or in the case of trenches within public roads, it will be finished in a suitable road surface (at a minimum to the pre-existing standard) that will be agreed with the local authority in advance of works. Where contaminants are found (or where bitumen-based materials are present) in excavated material, it will be removed from site by a licensed operator and disposed at an appropriately licenced facility.

Detailed construction methodologies of the UGC trenches are provided in the CEMP.

3.3.10 Onsite Substation

It is proposed to construct one onsite 110 kV electricity substation that will provide a connection point between the proposed wind farm and the proposed grid connection point at the existing 110 kV Dallow substation.

The construction and electrical components of the on-site substation will be to EirGrid and ESB standards. The dimensions of the proposed substation and IPP compound will be 140m in length by 85m in width. The substation footprint will include one control building and electrical components necessary to export generated power from the wind to the transmission system. A second building will be required for switching procedure with site offices and welfare facilities. The third building will service the BESS site.

The three buildings will be constructed using traditional techniques for constructing small buildings (i.e. concrete block walls, timber and slate tile roof). Foundations will be built for all of the proposed electrical infrastructure. All the electrical equipment will be installed to EirGrid/ESB requirements. Internal cables connecting the wind turbines to the substation will be laid in underground ducts within or immediately adjacent to the onsite access roads by open trenching.

3.3.11 Met Mast

One meteorological mast is proposed to the south of T8 (See Figure 3-2). The mast will be equipped with wind monitoring equipment at various heights. The mast will be a free-standing lattice structure of 104m in height.

An access track (3.5m in width) will extend towards the mast location from the existing forestry track. Associated drainage infrastructure will be extended from the access road. A small stone

crane pad will be constructed in front of the proposed mast location. General construction methods for the above access track and hard standing will match those described for wind farm access tracks and hard standings.

The foundation will be excavated followed by shuttering, steel fixing and concrete pouring by ready mix truck. Excavation and concrete operations will be carried out in accordance with the CEMP. The foundation will be 10m x 10m x 1.8m in size. Following crane setup, the mast sections will be delivered and unloaded by truck and sections will be lifted by crane into place. The Mast sections will be bolted and lightning protection and other ancillary components will be fixed to the mast.

3.3.12 Battery Energy Storage System (BESS)

A BESS is proposed the east of the proposed substation. The BESS is a series of (self-contained) containers and ancillary structures that will be placed on a reinforced concrete slab and surrounding gravel surface (1.6ha). Topsoil will be removed at each battery storage location, and the soil will be excavated to the proposed levels using an excavator. The battery enclosures and associated equipment will then be placed on reinforce poured and precast concrete slabs. The surrounding area will then be surfaced using a permeable gravel.
All infrastructure will be placed within the perimeter fence that will be installed inside of the existing field boundaries. The BESS will be located adjacent to the IPP compound on the County Tipperary part of the site and will be heavily screened from view from local residential properties and public roads.

3.3.13 Watercourse Crossings and Drainage

The site and adjacent lands include man-made drains which flow into the Little Brosna_040 RWB at various locations. These are primarily used to assist in the drainage of forestry, peatland and agricultural land-use. The Little Brosna_040 RWB and some drainage ditches will be crossed to facilitate the construction of access roads and cabling throughout the site and along the GCR.

There will be a total of 22 watercourse crossings, these include crossing 18 drainage ditches, and four rivers (Little Brosna_040 RWB). Within the wind farm site along access roads, 14 drainage ditches will be culverted with culverts and one river crossing, will have a clear span bridge installed.

Along the GCR, there will be four drains crossing and three river crossings. On the river crossings, there will be a HDD crossing on the Little Brosna_050, and a circular culvert and dam flume on the Little Brosna_060. No new watercourse crossings or modification of existing culverts are required for the works along the proposed TDR. The proposed crossing locations within the wind farm site and along the GCR are detailed in Figure 3-2.

Table 3-2: Watercourse Crossings within the Proposed Project

Watercourse Crossing	Proposed Crossing methodology	Location (ITM)	RWB_Code	EPA Name	EPA Segment Code	EPA code	In-Stream works required?
			Within Wind Farm				
Little Brosna_040	Clear Span Bridge	603063, 699545	IE_SH_25L020700	Holy Well Clohaskin	25_3276	25H28	No
Drainage channel	Precast Culvert	605553, 696438	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	605446, 696597	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	605247, 696839	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	605127, 697039	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	604857, 697261	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	604623, 697562	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	604529, 697631	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	604227, 697703	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	604198, 697602	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	603515, 698418	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	603309, 698877	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	602960, 699180	N/A	N/A	N/A	N/A	No

Watercourse Crossing	Proposed Crossing methodology	Location (ITM)	RWB_Code	EPA Name	EPA Segment Code	EPA code	In-Stream works required?
Drainage channel	Precast Culvert	602947, 699911	N/A	N/A	N/A	N/A	No
Drainage channel	Precast Culvert	604373, 697253	N/A	N/A	N/A	N/A	No
			Along GCR				
Little Brosna_050 RWB	HDD at Croghan Bridge	605314, 705681	IE_SH_25L020700	Little Brosna	25_628	25L02	No
Little Brosna_060 RWB	Undercrossing of existing culvert	605540, 707711	IE_SH_25L021000	Ross 25	25_1129	25R43	No
Little Brosna_060 RWB	Dam/Flume, instream works	605350, 707969	IE_SH_25L021000	Woodfield 25	25_241	25W29	Yes
Drainage channel	Box culvert <1 m clearance on drain	604521, 703006	N/A	N/A	N/A	N/A	No
Drainage channel	box culvert under road <1 m above drain	604765, 703816	N/A	N/A	N/A	N/A	No
Drainage channel	drain - buried culvert - overcrossing	605851, 706321	N/A	N/A	N/A	N/A	No
Drainage channel	overcrossing culvert	605633, 707419	N/A	N/A	N/A	N/A	No

3.3.13.1 Water Crossings within the Proposed Wind farm Site

3.3.13.1.1 Clear Span Bridge

A clear span bridge is proposed to cross the Little Brosna_040 RWB (EPA name Holy Well Clohaskin) between T2 and T3 on the proposed project.

At this watercourse crossing, the site access tracks will firstly be constructed to allow easy access to the works area. Sediment control measures including silt fences will be installed before the works occur within 10m of the river. Topsoil will then be stripped from the foundation footprint on either side of the watercourse, taking care to avoid disturbing the river/stream bed or banks. No excavations will be permitted within the river channel. Suitable stone fill material (clause 804 or similar) will be added in layers and compacted to form the base of the foundation. The precast clear-span bridge will be placed onto this either as one or more pieces using a mobile crane. There will be no requirement for large-scale casting of wet concrete. The construction work (in particular the initial excavation and stone compaction) will only take place during a dry weather period. Following the bridge construction, barriers will be attached to the sides of the bridge structure, and the site access tracks will be constructed over the structure. On installed, cabling will be built into the bridge deck formation.

3.3.13.1.2 Culverts

Where plastic or concrete culverts are required for forest /field drainage ditch crossings by new or upgraded roads, they will be installed with a minimum gradient of 1%. The pipe will be placed into the drain bed, and some of the underlying material will be placed within the pipe. The use of corrugated culverts will aid in the retention of sediment, thereby naturalising the culvert bed. Large stones will be placed at the culvert outfall to dissipate any flow and reduce the potential for erosion. The culverts will be inspected regularly to ensure they do not become blocked.

3.3.13.2 Water crossing on GCR

A total of three EPA watercourses and four drainage ditch channels crossings along the GCR. The watercourse crossings will include one HDD location, undercrossing or culverts and one dam/flume crossing. The route also contains minor forestry/field/road drains. These will be crossed using open trench crossings during dry periods.

A total of three watercourse crossings are required along the proposed GCR, namely; Little Brosna_050 RWB (Little Brosna River) and Little Brosna_060 RWB (Ross 25 and Woodfield 25).

Execution of a horizontal directional drill (HDD) will be used to install the proposed GCR cable under the Little Brosna_050 RWB (Little Brosna River),

HDD is required at the Little Brosna River, where it will cross from the public road into the private lands on the north side of the road crossing Croghan Bridge over the river. The river will be crossed within the private land on both sides of the river by HDD. For the HDD, a works area of circa. 40m² (to be confirmed by a specialist drilling contractor) will be fenced on both sides of crossing.

3.3.13.3 Drainage

The existing drainage systems for access roads will largely be retained. However, a drainage system will be constructed alongside all turbine hardstands, internal access tracks, the substation, BESS, and the temporary construction compounds. Where road widening is

necessary on existing roads, existing roadside swales will be relocated to accommodate the expansion. All new access tracks will be constructed with a 2.5% camber to aid drainage and surface water runoff.

The design of access roads and associated drainage infrastructure will follow natural contours as much as possible to minimise road and swale gradients. This approach will reduce velocities within the swales, thereby reduce erosion. Where necessary, existing access roads will be upgraded. If the current drainage infrastructure does not adequately prevent the mixing of clean and dirty water, improvements will be made by implementing the drainage methods proposed for new access roads.

The drainage infrastructure will be developed concurrently with the site access construction, followed by the establishment of turbine hardstanding areas and foundations.

At turbine hardstands, an interceptor drain will be formed around the upgradient perimeter of the turbine and hardstand to divert the clean water away from the works. This will outfall out at the lowest point level to a spreader. Water within the excavation will be treated via a settlement pond and level spreader. If the water has a heavy silt load, then an additional measure such as a Siltbuster will be employed.

The GCR route also requires crossing minor forestry/field/road drains. These will be crossed using a culvert.

More details can be found in the surface water management plan (SWMP) in Appendix C.

3.3.13.4 Settlement Ponds

A number of permanent and temporary settlement ponds will be established along roadways and areas of high construction activity (adjacent to turbine foundations, borrow pits, construction compounds etc) to minimise silt laden run-off entering the drainage network.

The settlement ponds will be designed to provide sufficient retention time and a low velocity to allow suspended solids to fall out of suspension prior to allowing the water to outfall to the receiving environment. A retention time of two hours will be applied in designing the ponds, as recommended by CIRIA C648, to ensure adequate silt settlement. The designing pond outfalls will be engineered to handle flows associated with a 1-in-100-year event. Clean surface water discharge will be attenuated to greenfield rates.

The proposed locations of the settlement ponds, and details of same are shown on Figure 3-2.

3.3.14 Lighting and CCTV

It is proposed to include 20 lighting poles for artificial lighting on the site. There are specific requirements for lighting at a substation to ensure safety, security, and operational efficiency. These will operate as motion lights with the exception of the buildings. It is also proposed to install four pole mounted CCTV cameras at field boundaries throughout the site on site for security purposes. The proposal is to include cameras at all major corners around the perimeter of the site. The proposed height of the CCTV poles is approximately 4.5m from ground level. The CCTV would be remotely monitored via a 24/7 operational team who would alert all relevant personnel in the event of a break-in or vandalism at the site. The cameras will only be focused on the site to avoid any possibility of monitoring any neighbouring dwellings.

3.3.15 Fencing

Temporary fencing will be constructed around the perimeter of each turbine base to prevent construction traffic from driving into the excavated hole and also to demarcate the working area.

Perimeter fencing will be constructed around the met mast, BESS, substation compound for security and safety purposes. Paladin fencing (chain link) 2.4m will be installed. Two entrance gates, no gate to allow animals access. Fencing is erected at least 5m away from existing boundary hedgerows/fencing.

For the BESS, a solid wood fence is proposed to be constructed to a height of 4m around the site. There will be no gap at the base of the fence, to prevent mammals entering the site and interacting with development components. Ensuring that mammals cannot enter the site or interact with the components, helps prevent potential harm to wildlife while also protecting the site's infrastructure from any disturbances caused by animals. There will also be two access gates located within the site fence and a private pedestrian entrance in the northern boundary fence.

Perimeter fencing will be constructed around the substation compound for security and safety purposes.

3.3.16 Forestry

A small portion of the proposed wind farm is located within an area of planted forestry located within private lands. There will be a requirement to fell some of this forestry in the areas immediately around the footprint of the wind farm infrastructure. The total area of forestry to be felled is estimated to be 7.2 ha.

3.3.17 Waste and Waste Facilities

A Waste Management Plan for the proposed project has been incorporated into the CEMP. It is not envisaged that works will generate significant construction waste, such as hardcore stone, and gravel. Although every effort will be made to recycle and re-use of materials on site, some waste may require to be disposed off-site.

During construction, waste will be collected and sorted at source and stored in designated containers at the temporary compound. Efforts will be made to limit waste generation through prevention, export off site as a byproduct, reduction, reuse, and recovery, wherever feasible. Any remaining waste will be transported to licensed facilities for disposal. This approach complies with the Waste Management Act of 1996 (as amended), following the principles of the European Waste Management Hierarchy and National Waste Management Guidelines.

Where contaminants are found during ground stripping or trench digging (or where bitumen-based materials are present) in excavated material, it will be removed from site by a licensed operator and disposed at an appropriately licenced facility. Should any excess drilling fluid occur during directional drilling, it will be contained and removed for disposal at a licensed waste site .

It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off-site by a permitted waste

collector to a wastewater treatment plant. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be integrated with the on-site electrical equipment for alarm notification that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the site.

3.4 Proposed Operational Phase Activities

Following the completion of the construction phase works, the proposed project will be commissioned. During commissioning a series of electrical testing, mechanical testing, performance evaluation and corrections reporting are undertaken to confirm the equipment has been correctly installed and will operation safely and efficiently. Once commissioned, the proposed project will begin operating.

Once operational, it is estimated that the wind farm will support 2-3 full-time long term, high quality technical jobs on site in operation and maintenance as well as a more significant number of jobs in ancillary functions. The operational phase activities will be minimal and will include site management, intermittent maintenance works, calibration of equipment, replacement of faulty or damaged structures and related hardware within the proposed project site. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane.

A dedicated compound will be constructed to facilitate construction, operation and maintenance staff, as well as necessary equipment and spare parts. Regular maintenance typically conducted twice annually, will be scheduled to ensure the efficient operation of the wind farm. The 110 kV substation components and site tracks will also require periodic maintenance in accordance with appropriate operation maintenance plans, procedures and health and safety plans.

During the operational phase, vehicles will be required to occasional use the site entrances from the R492 and the L1071 local road.

All on-site roads will be maintained for the duration of the operational phase of the project. Access tracks, drainage and each WTG would be subject to a routine maintenance, with construction machinery required to assist occasionally.

The 110 kV substation components and site tracks will also require periodic maintenance in accordance with appropriate operation maintenance plans, procedures and health and safety plans.

Lithium batteries are classified as hazardous waste. Should any batteries need replacing during the operational phase, these will be removed using approved waste management companies. Limited operational waste generated within the site. Where waste arisings occur these will be removed from site to an approved facility.

3.5 Decommissioning and Restoration Phase Activities

The projected lifetime of the proposed project is 35 years. At the end of the project lifetime, the system and infrastructure turbines, BESS infrastructure and met mast at the site will be removed. However, the GCR infrastructure, including the substation and other electrical equipment, will be integrated into the national grid and will remain operational.

Cranes will be used to dismantle above-ground turbine parts, which will then be transported off-site for recycling. The turbine foundations which will be left in place, with their pedestals covered with topsoil over to allow natural re-vegetation. The turbine hard standings and foundation pedestals will be covered with topsoil, originally stripped during construction, and landscaped to promote natural re-vegetation. The existing site access roads and hard standings around the turbines will remain in place after decommissioning and will continue to serve for forestry or agricultural purposes.

It is anticipated that the entire decommissioning phase will be completed within six months. A comprehensive decommissioning plan will be established and agreed upon prior to the start of construction with Offaly and Tipperary County Councils.

The main activities involved with the decommissioning phase will comprise of the following:

- The Wind Farm will be disconnected from the power grid
- The battery storage facility will be disconnected from the power grid
- All site infrastructure shall be removed and recycled off-site by an approved recycling facility with exception of the turbine foundations and site access roads
- Site overhead (if any) and underground electrical interconnection and distribution cables shall be removed and recycled off-site by an approved recycling facility
- All concrete bases will be broken up and removed off site to an approved facility
- The ground will then be re-levelled to original contours using imported soil where necessary and reseeded with grass
- Electrical equipment and electronic devices will be removed and recycled off site by an approved Waste Electrical and Electronic Equipment (WEEE) recycler
- Lithium batteries will be removed from site by an approved waste management company
- Security systems, CCTV, associated supports and wiring will be dismantled and removed off-site for recycling by an approved recycling facility
- Fencing and security gates shall be dismantled and removed off site for recycling by an approved recycler
- The above activities will be carried out in accordance with timescales conditioned within the planning permission

4. DESCRIPTION OF THE EXISTING ENVIRONMENT

A description of the existing environment is provided hereunder, informed by a comprehensive desktop assessment of available data (NPWS, NBDC, BSBI and other data listed in Section 2.5.1) within the 10km grid squares containing and adjoining the project (S09 and N00). This includes records of rare and/ or protected habitats, flora and fauna species and INNS within the vicinity of the proposed project. A full description of the multidisciplinary ecological field surveys results is also provided in Section 4.2.

4.1 DESKTOP REVIEW RESULTS

4.1.1 Hydrology – Surface Water

The proposed project is located within the Lower Shannon Catchment (25B) and the Little Brosna_SC_020 sub catchment. The southern portion of the proposed GCR is located within the LittleBrosna_SC_020 sub catchment area, while the northern portion of the GCR is located within the Shannon [Lower] _SC_060.

The Surface Water Body (SWB) Little Brosna_040 River Water Body (RWB), (Water Framework Directive [WFD] Waterbody code: IE_SH_25L020700) is located within the red line boundary of the proposed project, to the north and northeast. A number of drainage ditches within the proposed project are connected to the Little Brosna_040 RWB. The proposed GCR crosses the Little Brosna_050 RWB and the Little Brosna_060 RWB. The location of these SWBs can be seen in Figure 4-1.

The Little Brosna_040 RWB is located within the Sharavogue Bog SAC (000585). The proposed project is hydrologically connected to the Sharavogue Bog SAC via drainage ditches and the Little Brosna_040 RWB. The Little Brosna_050 RWB and the Little Brosna_060 RWB are located upstream of the River Shannon Callows SAC (000216). The GCR is hydrologically connected to the River Shannon Callows SAC.

A search of the EPA Unified GIS Application[12] and the EPA Catchments database (EPA 2025)[13] was conducted for the water quality status of watercourses located within the ZoI. Table 4-1 lists the most recent Q-value assessment available of relevant EPA monitoring stations located upstream, and downstream of the proposed project providing data on overall water quality in the area.

Based on the data presented in the table, the overall water quality in the area surrounding the proposed wind farm and proposed GCR has been of moderate to good status over the past 50 years, since regular monitoring commenced, with Q-values being consistently between Q3-4 and Q5 with the exception of 2023, where the Little Brosna had a poor status, with a Q-value of 3.

The EPA's published WFD status classification of the Little Brosna_030 RWB for the period 2019-2024, reported this surface waterbody was of 'Good' status for the period 2019-2024. It is considered 'Not at Risk' of not achieving a 'Good' status in 2027 (EPA, 2025).

[12] Available at https://gis.epa.ie/EPAMaps/. Accessed in August 2025
[13] Available at https://www.catchments.ie/. Accessed in August 2025

The EPAs' published WFD status classification of the Little Brosna_040 RWB for the period 2016-2021, reported this surface waterbody was of 'Moderate' status for the period 2016-2021[14]. It is considered 'At Risk' of not achieving a 'Good' status in 2027 (EPA, 2025).

The EPAs' published WFD status classification of the Little Brosna_050 RWB for the period 2016-2021, reported this surface waterbody was of 'Moderate' status for the period 2016-2021. It is considered 'At Risk' of not achieving a 'Good' status in 2027 (EPA, 2025).

The EPAs' published WFD status classification of the Little Brosna_060 RWB for the period 2016-2021, reported this surface waterbody was of 'Good' status for the period 2016-2021. It is considered 'Not at Risk' of not achieving a 'Good' status in 2027 (EPA, 2025).

Table 4-1: Latest water quality at relevant EPA monitoring locations

Watercourse	Station name	Station code	Year	Q-Value	Status
Little Brosna_030	Little Brosna - Brosna Br (nr Brosna Station)	RS25L020500	1987	4	Good
Little Brosna_030	Sharavogue Br (SW of S. Ho) (d/s on RHS)	RS25L020600	2023	4	Good
Little Brosna_ 040	Riverstown Bridge	RS25L020700	2023	3	Poor
Little Brosna_ 050	0800-Croghan Bridge	RS25L020800	1993	4	Good
Little Brosna_ 050	Little Brosna - 100m d/s Croghan Br	RS25L020810	2021	3-4	Moderate
Little Brosna_ 060	0900 - Derrinsallow Br	RS25L020900	1985	5	High

4.1.1.1 Flooding

The OPW provides information on flood risk throughout Ireland. The OPWs National Preliminary Flood Risk Assessment (PFRA) 2012 mapping[15], indicates multiple areas of pluvial flooding within the proposed wind farm site, however this pluvial flooding is not expected to affect any of the turbines or access roads. Fluvial flooding as part of the PFRA mapping indicates flooding to T8 and T9, as well as areas on the access roads to the north of the wind farm site.

The OPW predicted flood mapping produced as part of the Catchment Flood Risk Assessment and Management (CFRAM) Study indicates that the proposed wind farm site is liable to fluvial flooding in a 1 in a 100-year (1% AEP) and 1 in 1000- year (0.1% AEP) event. T1, T2, T8 and T9

[14] https://www.catchments.ie/data/?_gl=1*sxdz57*_ga*MTM1NjE3NTIyMS4xNjcwODU2NTI3*_ga_TPK2CK9KEX*MTcwOTYzOTQ2OC4xNDYuMC4xNzA5NjM5NDY4LjAuMC4w#/waterbody/IE_WE_35B050100?_k=goyzpq

[15] OPW Flood Risk Management (floodinfo.ie)

and two of the site access roads to the southeast of the wind farm site, are liable to fluvial flooding in a mid-range future scenario event.

The proposed wind farm site is not at risk of coastal or groundwater flooding. The closest past flood event is located approximately 1.7 km to the southeast of the proposed wind farm site. Recurring flooding is mapped along the GCR at Cappaneale, Birr. The reasoning for the recurrence of flooding at this location is an area of low-lying land where a stream overflows its banks after extreme heavy rain.

4.1.2 Hydrogeology - Groundwater

The proposed project is located within the Shinrone groundwater body (GWB) (groundwater body code: IE_SH_G_205). The proposed GCR is present within the Birr GWB (groundwater body code: IE_SH_G_041), Birr Gravels GWB (groundwater body code: IE_SH_G_244) and Banagher GWB (groundwater body code: IE_SH_G_040). The proposed TDR works are located within the Shinrone GWB. The location of these GWBs can be seen in Figure 4.1. Based on Chapter 9 (Hydrology and Hydrogeology) groundwater water vulnerability is moderate to low on the proposed wind farm.

4.1.2.1 Groundwater Quality

The EPAs' published and latest available WFD status classification for the period 2016-2021 indicates that each of the GWB's are at 'Good' qualitative (chemical) status and 'Good' quantitative status (i.e., not overexploited), thus at 'Good' status overall and meeting WFD 'Good status' objectives and 'Not At Risk' of failing to achieve WFD 'Good' status objectives in 2027 (EPA, 2025).

4.1.2.2 Groundwater Flow

For most of the proposed project the groundwater vulnerability is 'Low' and only in the central part of the proposed wind farm site has vulnerability is 'moderate' (GSI, 2003).

Reference to the GSI National Aquifer Map indicates that the proposed wind farm site is predominantly underlain by a Locally Important Aquifer (LI) - Bedrock which is Moderately Productive only in Local Zones. The subsoil deposits overlying the bedrock are not considered to be of sufficient lateral extent or dept to represent an aquifer body. A small proportion to the north of the proposed wind farm site is underlain by a Regionally Important Aquifer (Rkd) - Karstified (diffuse).

The proposed GCR is situated on the boundary between the Locally Important Aquifer and the Regionally Important Aquifer. It traverses a portion of the Regionally Important Aquifer before crossing a Locally Important Gravel Aquifer (LG), located approximately 5.20km to the northeast of the proposed wind farm site where the existing Dallow 110 kV substation is located.

The proposed TDR works at Sharavogue Crossroads are located within the Locally Important Aquifer.

Water levels in the Shinrone GWB (GSI, 2003a) are shallow; they are less than 15m below surface. In general, groundwater flow is concentrated in the upper 15m of the aquifer. Groundwater flow paths are generally short on the order of 30-300m, with groundwater discharging to the streams and rivers that traverse the aquifer. Groundwater flow directions are

expected to approximately follow the local surface water catchments. There is no regional flow system in this aquifer (GSI, 2003a).

Groundwater in the Birr GWB (GSI,2004) flows diffusely through fissures, joints and along bedding planes. Groundwater is generally unconfined in this GWB. Water levels will broadly reflect the topography within the body however topographic highs formed by some esker ridges have been shown to have no effect on the water table due to the permeable nature of the deposits. Static water levels in this GWB are found ranging from 1-8m below surface.

Groundwater flow is mainly in the upper 15 m of the Banagher GWB (GSI 2003b). In the bedrock aquifers, groundwater flow paths are generally shallow and short on the order of 30-300 m long, with groundwater discharging to the streams and rivers that traverse the aquifer. Local groundwater flows are determined by the local topography. Examination of data in the GSI well database shows that water levels are shallow, less than 10m below surface.

4.1.2.3 Groundwater Vulnerability

The Vulnerability Mapping Guidelines (i.e., Groundwater Protection Schemes Report (DoELG *et al.*, 1999) allow for the assignment of groundwater vulnerability ratings from "Extreme" to "Low", depending upon the subsoil type and thickness. The groundwater vulnerability throughout the proposed wind farm is predominantly classified as Moderate with areas of High and Extreme vulnerability where bedrock is at or within 1m of the surface, particularly to the north of the wind farm site in the vicinity of T1. The GCR passes through areas ranging from Moderate to Extreme where bedrock is at or within 1m of the surface. The proposed TDR works are located in an area with a Moderate vulnerability rating.

4.1.3 Habitats and Flora

4.1.3.1 Habitats

NPWS Article 17 data and reports (NPWS, 2019a), shows there are records of eight Annex I habitats within the 10km grid squares (S09 and N00) surrounding the proposed project. These include:

- priority *Active raised bog [7110];
- Degraded raised bogs [7120];
- Alkaline fens [7230];
- priority *Vegetation Orchid-rich calcareous grassland [6210];
- Depressions on peat substrates of the Rhynchosporion [7150]; and,
- Old oak woodland [91A0].

The presence or absence of these Annex I habitats within the proposed project site was confirmed during the field surveys (see section 4.2).

4.1.3.2 Protected Flora Species

A review of the NPWS Flora Protection Map (NPWS, 2025a) show record of Slender Cottongrass (*Eriophorum gracile*), a plant species listed under the Flora Protection Order (FPO) within the 10km grid squares encompassing the study area. This plant species was recorded in

2015 and 1997, within the raised bog and degraded raised bog habitat, 1.1km east of the proposed wind farm site and within the Sharavogue Bog SAC.

Data obtained from NPWS from a sensitive data request also included the above record. No other protected flora species have previously been recorded within the 10km grid squares N00 and S09 or within the proposed project site over the past 20 years.

4.1.4 Fauna

A search of NPWS Article 17 data (NPWS, 2019b), and NBDC database (2025a) was carried out for protected fauna within the 10km grid squares encompassing the study area. These protected fauna species are shown in Table 4-3 below.

4.1.4.1 Otter

There are twelve records of Otter (*Lutra lutra*) within the 10km grid squares encompassing the study area. The nearest record of Otter is otter spraint, recorded in 2010, 5.3km south of the proposed project wind farm. The nearest record to the GCR is roadkill recorded in 2007 and located 4.3km east of the GCR.

4.1.4.2 Marsh Fritillary

The species is widespread in Ireland and can be reasonably common if suitable habitat is present. Although widespread, it is also listed as vulnerable on the red list of Irish butterflies (Regan *et al.* 2010) due to habitat loss and degradation. The species is protected under Annex II of the Habitats Directive and is listed under the Wildlife Acts. There is one record of Marsh Fritillary (at Caterpillar in webs) within grid square S09 and N00 grid squares, both recorded in 2016. There are several historic records of this species within these grid squares dating back to 1901.

4.1.4.3 Desmoulin's Whorl Snail

There are three records of this species within N00 recorded in 2005 and located 2.4km northeast of the TDR works and 4.3km from the proposed wind farm site.

4.1.4.4 Geyer's Whorl Snail

There are six records of Geyer's Whorl Snail recorded within N00 in 2005 and located 2.4km northeast of the TDR works and 4.3km from the proposed wind farm site.

4.1.4.5 White Clawed Crayfish

Current records from the NBDC (2025a) show one recent record of White Clawed Crayfish present within the S09 grid square. This was recorded in 2021 within Rock (Birr)_010 RWB, which flows north into the Little Brosna_040 RWB. This record is located 4km east of the proposed wind farm site, 4.6km southeast of the GCR and 2km northeast of the proposed TDR.

There is also one record within the N00 grid squares. This was recorded in 2021 within the Little Brosna_040 RWB in 2021, approximately 4km downstream of the proposed wind farm site and 150m from the GCR. Additionally, records from Article 17 spatial data (NPWS, 2019d) were also reviewed and show their present within the catchment.

4.1.4.6 Freshwater Pearl Mussel

The study area is not located within a Margaritifera Sensitive Area. Records from Article 17 spatial data (NPWS, 2019d) were also reviewed and show their complete absence from within the catchment.

4.1.5 Birds

EU Birds Directive Article 12 species datasets, published by NPWS every six years in compliance with the Directive, were downloaded from the NPWS website and overlain on the proposed project red line boundary using GIS software to examine the recorded presence of relevant bird species within the site. The available GIS data was downloaded and reviewed in February 2025. Following this review, no data of ornithological relevance specific to the proposed project site was identified.

A review of the NBDC website for the S09 and N00 10x10 km Irish Grid Squares, in which the proposed wind farm is located, revealed records of 65 bird species, along with their conservation status, i.e. listed in either the Wildlife Acts (WA), Annex I of the Birds Directive, or in the BoCCI (Gilbert et al., 2021). Of these, the Annex I species or species listed as SCIs for nearby SPAs have been included in Table 4-2.

Table 4-2: Previous Records of Annex I species or species listed as special conservation interests for nearby SPAs recorded within the 10km Grid Squares (S09, N00)

Species	Designation	Last Recorded	Grid Square
Black-headed Gull (*Larus ridibundus*)	WA, BoCCI Amber Listed	26/05/2017	N00, S09
Black-tailed Godwit (*Limosa limosa*)	WA, BoCCI Amber Listed	26/02/2024	N00, S09
Common Kingfisher (*Alcedo atthis*)	WA, EU BD Annex I, BoCCI Amber Listed	24/09/2024	N00, S09
Corn Crake (*Crex crex*)	WA, EU BD Annex I, BoCCI Red Listed	31/07/1991	N00, S09
Eurasian Teal (*Anas crecca*)	WA, BoCCI Amber Listed	29/02/2024	N00, S09
Eurasian Wigeon (*Anas penelope*)	WA, BoCCI Amber Listed	26/02/2024	N00
European Golden Plover (*Pluvialis apricaria*)	WA, EU BD Annex I, BoCCI Red Listed	21/08/2021	N00, S09
European Nightjar (*Caprimulgus europaeus*)	WA, EU BD Annex I, BoCCI Red Listed	31/07/1972	N00
Great Cormorant (*Phalacrocorax carbo*)	WA, BoCCI Amber Listed	23/02/2019	N00, S09
Great Egret (*Ardea alba*)	WA, EU BD Annex I	31/12/2011	N00

Species	Designation	Last Recorded	Grid Square
Greater White-fronted Goose (*Anser albifrons*)	WA, EU BD Annex I, BoCCI Amber Listed	27/12/2019	N00
Greenland White-fronted Goose (*Anser albifrons subsp. flavirostris*)	WA, EU BD Annex I, BoCCI Amber Listed	31/12/2011	N00
Hen Harrier (*Circus cyaneus*)	WA, EU BD Annex I, BoCCI Amber Listed	29/11/2017	N00, S09
Little Egret (*Egretta garzetta*)	WA, EU BD Annex I, BoCCI Green Listed	08/06/2024	N00
Merlin (*Falco columbarius*)	WA, EU BD Annex I, BoCCI Amber Listed	31/12/2011	N00, S09
Northern Lapwing (*Vanellus vanellus*)	WA, BoCCI Red Listed	26/02/2024	N00, S09
Northern Pintail (*Anas acuta*)	WA, BoCCI Amber Listed	26/02/2024	N00
Northern Shoveler (*Anas clypeata*)	WA, BoCCI Red Listed	26/02/2024	N00
Peregrine Falcon (*Falco peregrinus*)	WA, EU BD Annex I, BoCCI Green Listed	15/01/2024	N00, S09
Red Kite (*Milvus milvus*)	WA, EU BD Annex I, BoCCI Red Listed	18/03/2024	N00
Ruff (*Philomachus pugnax*)	WA, EU BD Annex I, BoCCI Amber Listed	31/12/2011	N00, S09
Short-eared Owl (*Asio flammeus*)	WA, EU BD Annex I, BoCCI Amber Listed	03/05/2016	N00
Tufted Duck (*Aythya fuligula*)	WA, BoCCI Amber Listed	26/02/2024	N00, S09
Whooper Swan (*Cygnus cygnus*)	WA, EU BD Annex I, BoCCI Amber Listed	20/03/2022	N00, S09

Note: EU BD = European Union Birds Directive, WA = Wildlife Acts, BoCCI = Birds of Conservation Concern Ireland 2020-2026.

4.1.6 Fisheries

Records from IFI database (IFI, 2025) show IFI have undertaken fish stock assessments on the on the Little Brosna_040 RWB in 2021 as part of a catchment-wide survey of the Little Brosna catchment. A total of two Habitats Directive Annex II fish species, Atlantic Salmon and Brook Lamprey, were recorded present. No other Annex II fish species were recorded within the catchment. This distribution data suggests Salmon migrating up the Little Brosna_040 RWB. A

fish ecological status of "Moderate" was assigned to the Little Brosna_040 RWB based on the stock assessment results.

4.1.7 Invasive Flora and Fauna Species

A review of the NBDC (NBDC, 2025a) show a record of nine IAS (flora and fauna) listed on the Part 1 of the Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), as amended, and on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) within the 10km grid squares N00 and S09 within the past 20 years. Table 4-4 lists a table of INNS recorded within the 10km grid squares.

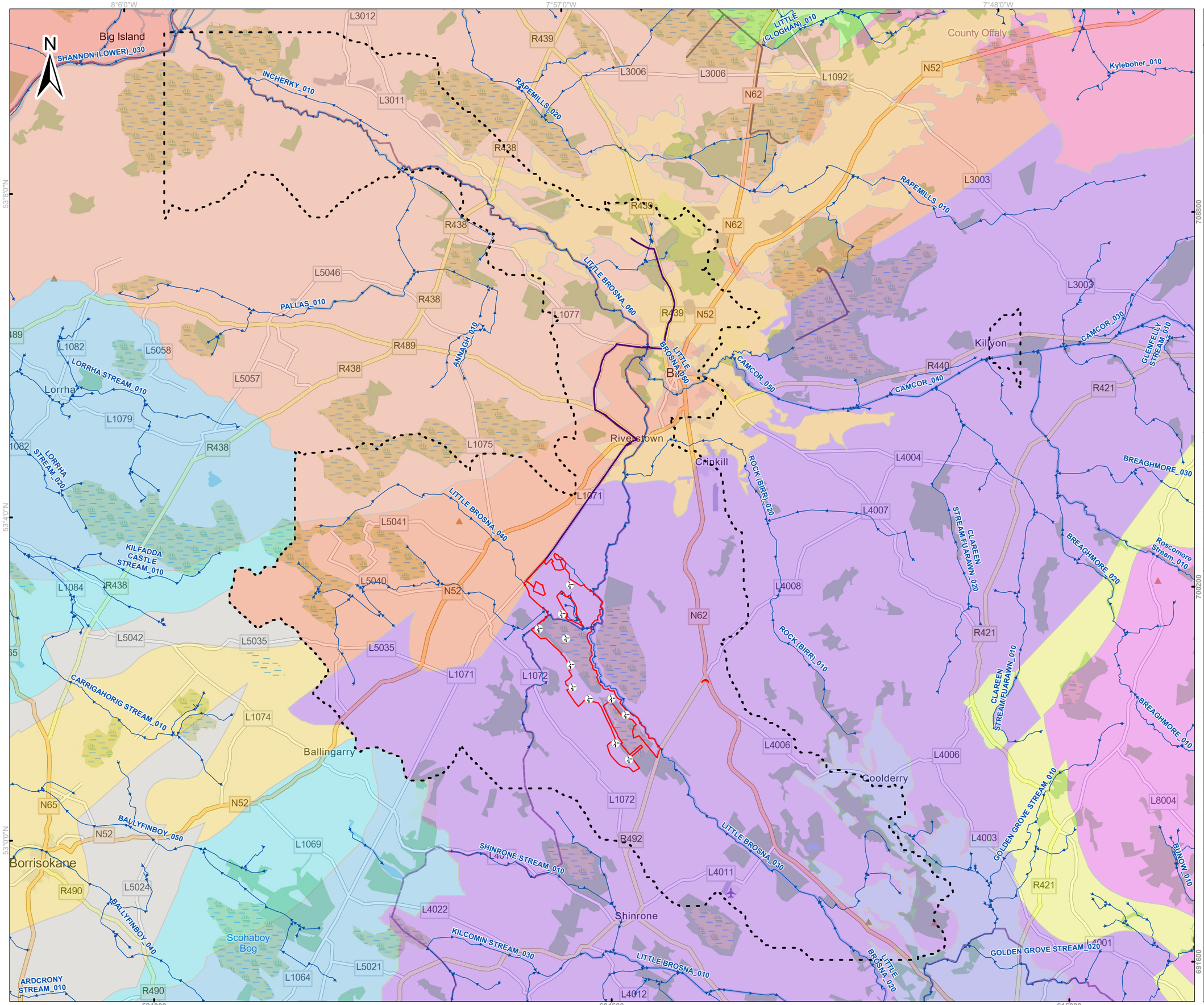
Table 4-3: Records of Protected Fauna Species Recorded within the 10km Hectads Surrounding the Study Areas

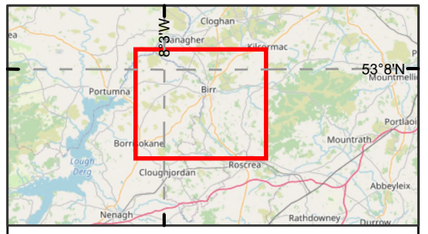
Species Name	Grid Square	Record Count	Date of Last Record	Title of Dataset	Designation
Amphibians/Invertebrates/Fish					
Freshwater White-clawed Crayfish (*Austropotamobius pallipes*)	N00	5	31/12/2021	General Biodiversity Records from Ireland	Protected Species: EU Habitats Directive >> Annex II || Annex V || Wildlife Acts
	S09	2	31/12/2021		
Marsh Fritillary (*Euphydryas aurinia*)	N00	11	22/09/2016	Butterflies of Ireland pre-2022	Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable
	S09	3	16/08/2016		
Desmoulin's Whorl Snail (Vertigo (*Vertigo) moulinsiana*)	N00	5	25/08/2005	All Ireland Non-Marine Molluscan Database	Protected Species: EU Habitats Directive >> Annex II || Wildlife Acts || Threatened Species: Endangered
Geyer's Whorl Snail (*Vertigo (Vertigo)* geyeri)	N00	10	25/08/2005	All Ireland Non-Marine Molluscan Database	Protected Species: EU Habitats Directive >> Annex II || Wildlife Acts || Threatened Species: Vulnerable
Mammals					
European Otter (*Lutra lutra*)	N00	11	11/01/2013	Road Kill Survey	Protected Species: EU Habitats Directive >> Annex II || Annex IV || Wildlife Acts
	S09	1	15/10/2010	Atlas of Mammals in Ireland 2010-2015	

Table 4-4: Records of Invasive Flora and Fauna Species Listed on the Third Schedule Part 1 of the Birds and Habitats Regulations (2011) as amended and listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024), recorded within the 10km Hectads Surrounding the Study Areas

Species Name	Grid Square	Record Count	Date of Last Record	Title of Dataset	Designation
Plants					
Fringed Water-lily (*Nymphoides peltata*)	N00	1	31/12/2010	BSBI tetrad data for Ireland	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
Giant Hogweed (*Heracleum mantegazzianum*)	N00	1	29/05/2003	Species Data from the National Vegetation Database	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
Giant Knotweed (*Fallopia sachalinensis*)	N00	5	26/07/2018	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
Giant-rhubarb (*Gunnera tinctoria*)	N00	4	23/04/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
	S09	1	03/09/2008	River Biologists' Database (EPA)	
Indian Balsam (*Impatiens glandulifera*)	N00	31	27/07/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
Japanese Knotweed (*Fallopia japonica*)	N00	1	06/07/2018	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
	S09	1	20/05/2017		
Parrot's-feather (*Myriophyllum aquaticum*)	N00	1	15/08/2018	National Invasive Species Database	High Impact Invasive Species >> EU Regulation No. 1143/2014 >>

Species Name	Grid Square	Record Count	Date of Last Record	Title of Dataset	Designation
					Regulation S.I. 477 and S.I. 374 (Ireland)
Rhododendron ponticum	N00	2	28/08/2003	Species Data from the National Vegetation Database	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
	S09	1	25/04/2003		
Mammals					
American Mink (*Mustela vison*)	N00	5	08/10/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species >> Regulation S.I. 477 and S.I. 374 (Ireland)
	S09	1	02/06/2017		





Legend

- Wind Farm Site Boundary
- Proposed Turbine locations
- Proposed Grid Connection Route
- Study Area
- WFD - River Water Bodies

WFD - Groundwater Bodies

- Ballinderry
- Banagher
- Birr
- Birr Gravels
- Borrisokane
- Bredagh
- Clara
- Geashill
- Industrial Facility (P0320-02)
- Lismaline
- Nenagh
- Roscrea Gravels
- Shinrone
- Slieve Bloom South
- Tullamore
- Tynagh

0 1.5 3
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Map data © OpenStreetMap contributors, Microsoft, Facebook, Google, Esri Community Maps contributors, Map layer

Rev	Date	Description	By	Chkd.
A	10/12/2025	Draft issue	S.P	J.D

Client: RWE

Project:

Ballincor Wind Farm

Title:

Figure 4-1:
Hydrological and
Hydrogeological Features

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2025

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Map Ref: 11333-004.AA-WFD-P.App.BO-TOB-A

Draft: A

4.2 Ecological Field Survey Results

The findings of the field surveys of the receiving environment are summarised hereunder.

4.2.1 Habitats and Flora

An overview of the habitats recorded within the proposed project site is summarised below and shown in Figure 4-2. In general, the proposed wind farm site comprises agricultural land, including improved agricultural grassland (GA1), horticultural land (BC2), arable crops (BL1), tilled land (BC3), wet grassland (GS4), and farm buildings or roadways categorised as buildings and artificial surfaces (BL3).

Peatland habitats also make up a substantial portion of the site, occurring in the form of raised bog (PB1), cutover bog (PB4), dry siliceous heath (HH1), and pockets of dense bracken (HD1) within areas of degraded peatland.

Several woodland habitat types are also present, including mixed broadleaved woodland (WD1), conifer plantation (WD4), scrub (WS1), immature woodland (WS2), oak–birch–holly woodland (WN1), riparian woodland (WN5), and bog woodland (WN7).

Linear habitats include hedgerows (WL1), treelines (WL2), drainage ditches (FW4), and lowland depositing rivers (FW2).

Annex I habitat type Degraded raised bog [7120] and priority Annex I habitat type *Active raised bog [7110] were recorded within the proposed wind farm site due to the presence of key peat-forming species, Annex I habitat indicators, and structural features consistent with Annex I definitions.

The Little Brosna_040 RWB, Little Brosna_050 RWB and Little Brosna_060 RWB's are lowland depositing rivers (FW2), that flow northwest along the eastern border of the proposed project site and continue north westerly. The Little Brosna_040 RWB main channel is typically a low-medium gradient channel, actively depositing, stable with a large amount of deposition of fine sediment throughout its meandering profile. The smaller Little Brosna_040 RWB tributary channels, bordering the west and north of the project site, have been modified as part of drainage, diverting water off the surrounding bogs and land. These channels have been straightened and deepened and in places, blocked off. The natural physical and ecological features of the Little Brosna_040 RWB corridors have been removed in places due to this modification causing an imbalance in natural hydromorphology of the river in sections, thus affecting the flow regime of these watercourses as they flow into the main channel. The drainage ditches' located within the land parcels of the proposed wind farm site are also hydrologically connected to the Little Brosna_040 RWB. The Little Brosna_050 RWB and Little Brosna_060 RWB's are of similar hydromorphology, with a mostly meandering natural main profile.

4.2.2 Protected Flora Species

No QI plant species listed under the Flora Protection Order 2022 (FPO) were recorded within the proposed project site.

4.2.3 Invasive Non-Native Species

Throughout the study area, two high impact IAS listed on the Part 1 of the Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), as amended, and on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) were recorded within the study area, Parrot's-feather (*Myriophyllum aquaticum*) and Himalayan Balsam (*Impatiens glandulifera*).

Parrots feather was recorded within the channel Little Brosna_090 RWB tributary, located within the northern section of the proposed wind farm site. The dense abundance of this plant was visible within the channel for over 100m.

Himalayan Balsam was recorded 13.5m north of the GCR, located within a broadleaved woodland along the banks of the Little Brosna_040 RWB. There were approximately 15 stands of Himalayan Balsam present with an area of 870m^2.

4.2.4 Fauna

4.2.4.1 Otter

All streams and drainage ditches within the proposed project site were surveyed for Otter. Evidence of Otter activity was recorded at two locations along the Brosna_040 RWB within the proposed wind farm site (See Figure 4-3).

Otter prints were recorded in soft mud near water edge of the main channel Brosna_040 RWB on the northeastern boundary. Scat was recorded at one location along the northwestern boundary on a large boulder located on Brosna_040 RWB bankside and also along the Brosna_040 RWB, located 300m northeast of T2 outside the red line boundary.

There is evidence and high potential that Otter is utilising the Little Brosna_040 RWB and its tributaries within the proposed project site as it provides suitable habitat for resting, foraging and commuting. There is also potential that Otter uses all connected streams and rivers that are hydrologically connected to the proposed project site for foraging and commuting, including the Little Brosna_040 RWB near the GCR.

No evidence of any other Annex II mammal species listed on the EU Habitats Directive (92/43/EEC) were recorded within the survey area during the field surveys.

4.2.4.2 Marsh Fritillary

Suitable habitat containing Devil's-Bit Scabious plants was recorded at two locations within the proposed wind farm site, located along the southeastern border. The first habitat contained several Devil's-Bit Scabious plants, of which contained seven marsh fritillary webs within the plants. The second habitat contained two marsh fritillary webs within the plants, with one web empty and the other containing approximately 15 marsh fritillary caterpillars. The location of these records can be seen in Figure 4-3.

4.2.5 Aquatic Ecology

4.2.5.1 Fish Species

One Annex II fish species, *Lampetra sp*, was recorded during the electrofishing surveys on the Little Brosna_040 RWB. A total of two Lamprey ammocetes (7cm and 14cm in length) were

present within soft sediment with a tributary of the main Little Brosna_040 RWB at survey Site 7. No Atlantic Salmon were recorded during the electrofishing survey.

4.2.5.2 Fisheries habitat

The moderate flowing low gradient nature of the Little Brosna_040 RWB in the survey area provided suitable conditions for Lamprey ammocetes, which require soft substrates into which they can burrow. Suitable silt habitat was recorded present at Sites 1, 6, 7 and 9.

Some sections of the Little Brosna_040 RWB (Sites 1, 2, 7, 10) contained moderate value for salmonids due to the evident pressures on water quality, including siltation, stagnant flow, lack of gravels and cobbles, and absence of any riffle, glide or pools which reduced the value of spawning and nursery habitat. The overall depth of the main river channel provided good holding habitat for migratory adults in the pool and glide areas. The silt deposits along the margins of the river at the sample site provided moderate to good potential habitat for Lamprey ammocoetes.

There is potential for salmonids and Lamprey spawning and nursery habitat at Sites 3 and 4 with the presence of gravels and silt however this is limited due to heavy siltation, poor water quality and heavy shading. Some sites (Sites 5, 8 and 9) did not provide any potential habitat for these salmonids or Lamprey species.

All drainage ditches located within the proposed wind farm site are hydrologically connected to the Little Brosna_040 RWB. A number of these drains contained stagnant water, where as a number of other drains were also dry during the surveys. These drains did not contain suitable habitat for salmonids or Lamprey species.

4.2.5.3 White-clawed Crayfish

A habitat assessment and manual search was carried out at all accessible sites of the Little Brosna_040 RWB for the presence of white-clawed crayfish. No white-clawed crayfish were recorded present at any of the sites, nor were any captured during kick sampling or electrofishing surveys. No evidence of white-clawed crayfish carapace or claw remains were recorded on the riverbanks or bridge ledges in the form of Otter scat or remains from predation. Potential suitable habitat to support crayfish was recorded at Site 1, Site 4 and Site 10 where refuge and detritus was present with moderate water quality. All drainage ditches located within the proposed wind farm site do not provide suitable habitat for this species.

4.2.6 Birds

Bird abundances and assemblages for the proposed wind farm site were determined from the results of the surveys outlined in Section 2.5.2.4. A total of 92 species were recorded during the breeding and wintering bird surveys conducted within the study areas between 2020 and 2024. For this report, a total of 16 species were identified as target species as they are Annex I or SCI species for nearby SPAs. All recorded species, the season in which they were recorded, and their protection and conservation status is provided in Table 4-5. The data and locations of all species observed over the survey period are plotted and presented on tables and figures within Appendix A. Species account of all target species recorded over the survey period are discussed below.

In this assessment, the terms regular, occasional, irregular, and rare are used to describe the frequency of species occurrence within and around the proposed wind farm site. These categories are based on the number and consistency of observations recorded during baseline surveys, informed by professional judgment and established good practice. The following general definitions apply:

- Regular – Species recorded consistently across seasons or years, typically observed in >50% of relevant surveys.
- Occasional – Species recorded less frequently, typically in 10–50% of surveys.
- Irregular – Species with no discernible seasonal or annual pattern, and whose presence is unpredictable.
- Rare – Species recorded only once or twice during the full survey period.

These classifications follow principles of transparent, evidence-based ecological assessment, and the use of professional judgment, as outlined in CIEEM (2018) and SNH (2017a).

Table 4-5: Target species list of birds recorded within the Ballincor study area during the breeding and wintering surveys between 2020 and 2024.

Target Species	Survey Season*		Designation**
	Breeding	Winter	
Black-headed Gull (*Larus ridibundus*)	2020 2021 2023 2024	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Amber List - River Little Brosna Callows SPA - Middle Shannon Callows
Black-Tailed Godwit (*Limosa limosa*)	-	2023/2024	BoCCI Red List - River Little Brosna Callows SPA - Middle Shannon Callows
Cormorant (*Phalacrocorax carbo*)	2020 2021 2023 2024	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Amber List Lough Derg (Shannon) SPA
Golden Plover (*Pluvialis apricaria*)	2021 2023 2024	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Red List Annex I - River Little Brosna Callows SPA - Middle Shannon Callows
Hen Harrier (*Circus cyaneus*)	2023	2020/2021 2022/2023 2023/2024	BoCCI Amber List Annex I Slieve Blooms Mountains SPA

Target Species	Survey Season*		Designation**
	Breeding	Winter	
Kingfisher (*Alcedo atthis*)	-	2020/2021	BoCCI Amber List Annex I
Lapwing (*Vanellus vanellus*)	2023	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Red List - River Little Brosna Callows SPA - Middle Shannon Callows
Little Egret (*Egretta garzetta*)	2023 2024	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Green List Annex I
Merlin *(Falco columbarius)*	2023 2024	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Amber List Annex I
Peregrine Falcon *(Falco peregrinus)*	2021 2023 2024	2020/2021 2021/2022 2022/2023 2023/2024	BoCCI Green List Annex I
Pintail (*Anas acuta*)	-	2023/2024	BoCCI Amber List River Little Brosna Callows SPA
Shoveler (*Spatula clypeat*)	-	2023/2024	BoCCI Red List River Little Brosna Callows SPA
Teal *(Anas crecca)*	-	2021/2022 2023/2024	BoCCI Amber List River Little Brosna Callows SPA
Greenland White-fronted Goose (*Anser albifrons flavirostris*)	-	2022/2023	BoCCI Amber List Annex I - River Little Brosna Callows SPA - Dovegrove Callows SPA - All Saints Bog SPA
Whooper Swan (*Cygnus cygnus*)	-	2020/2021 2021/2022 2022/2023	BoCCI Amber List Annex I - River Little Brosna Callows SPA

Target Species	Survey Season*		Designation**
	Breeding	Winter	
		2023/2024	- Middle Shannon Callows
Wigeon (*Mareca penelope*)	-	2022/2023 2023/2024	BoCCI Amber List - River Little Brosna Callows SPA - Middle Shannon Callows

* [-] = a species was not recorded over the survey season.

** BoCCI = Birds of Conservation Concern Ireland 2020-2026.

4.2.6.1 Black-headed Gull

The Black-headed Gull (*Chroicocephalus ridibundus*) is a common resident small gull species in Ireland, found both along the coast and inland. The winter population of this species is bolstered by winter migration. It is Amber-listed on the BoCCI list (Gilbert et al., 2021), and it is estimated that there are 7,810 breeding pairs in Ireland (Cummins et al., 2019), while the wintering population size is estimated at 48,821 individuals (Lewis et al., 2019a). This species is designated as a SCI of the River Little Brosna Callows SPA and the Middle Shannon Callows SPA located approximately 10km and 12km downstream of the proposed project.

During the survey period, Black-headed Gull was regularly recorded, with a total of 133 observations involving 1,942 individuals. Records were largely concentrated in the northern and northeastern parts of the site, and along the Little Brosna River. The species was typically observed in small flocks ranging from 1 to 11 individuals; however, larger groups of up to 250 birds were occasionally recorded. The majority of sightings occurred during the winter season and typically involved birds commuting or foraging over agricultural fields or wetland habitats.

4.2.6.2 Black-Tailed Godwit

Black-tailed Godwit (*Limosa limosa*) is a wintering species in Ireland and red-listed on the BoCCI. Ireland supports internationally important numbers of wintering Black-tailed Godwit, with birds commonly associated primarily with estuaries, but large numbers can occur in wetlands, and flooded grasslands inland. The estimated wintering population in the Republic of Ireland is approximately 17,862 individuals. The species is currently experiencing a sustained increase over time, with an overall average increase rate of 3.5% per year, resulting in a 78% increase in numbers over a 22-year period. This species is designated as a SCI of the River Little Brosna Callows SPA and the Middle Shannon Callows SPA located approximately 10km and 12km downstream of the proposed project. Both of these SPAs regularly exceeded national and internationally important numbers for this species (Lewis et al., 2019a).

During the baseline surveys, Black-tailed Godwit was rarely recorded and was exclusively observed during the winter period. The species was observed on two occasions, with a total of 460 individuals recorded and a maximum single count of 350 birds. Sightings were concentrated along the eastern section of the site, particularly in wetlands and flooded areas adjacent to the Little Brosna River, primarily recorded foraging within these areas. Black-tailed Godwit was not

observed within the site during the breeding season. Considering the distance to the River Little Brosna SPA and that the northeastern section of the proposed project site might provide foraging resources to the species, it is not likely that it contributes for the integrity of the Black-tailed Godwit SPA population

4.2.6.3 Cormorant

Cormorant (*Phalacrocorax carbo*) is a widespread resident and wintering species in Ireland and is Amber-listed on the BoCCI. The species is commonly associated with coastal waters, rivers, lakes, and wetlands, where it forages for fish, while it is known to form communal roosts, particularly during the non-breeding season. The estimated wintering population in the Republic of Ireland is approximately 7,960 individuals (Lewis et al., 2019a). This species is designated as a SCI of the Lough Derg (Shannon) SPA, located approximately 13km in a straight line or 38km downstream of the proposed project.

Cormorant was regularly recorded within the study area throughout the survey period. A total of 592 observations were made, involving 1,026 individual birds. Sightings were distributed across all seasons, with birds frequently observed foraging along the Little Brosna River and associated wetlands. The species was typically recorded in low numbers or as single individuals however, a communal roost site within the study area was identified, where larger numbers were observed, with the highest count being 40 individuals. These higher numbers of roosting birds predominantly occurred during the winter months (October to March, inclusive). There was no evidence of cormorant breeding within the study area.

The species was typically recorded in flight, foraging in the Little Brosna River, commuting over watercourses, or roosting in groups along the river and surrounding habitats.

4.2.6.4 Golden Plover

Golden Plover (*Pluvialis apricaria*) is a wintering and passage species in Ireland, while a small breeding population is also present, concentrated to the north and west of the country. Golden Plover is red listed on the BoCCI due to significant population declines. Wintering Golden Plover are widely distributed throughout Ireland from coastal regions to the midlands, and large flocks are known to gather on a wide range of habitats, including grassland, cultivated lowlands and coastal mudflats. The estimated wintering population in the Republic of Ireland is approximately 80,700 individuals (Lewis et al., 2019a). This species is designated as a SCI of the River Little Brosna Callows SPA and the Middle Shannon Callows SPA located approximately 10km and 12km downstream of the proposed project. Both of these SPAs regularly exceeded national important numbers for this species.

Golden Plover was regularly recorded within the study area during the baseline surveys. Over the survey period, a total of 83 observations were made, involving 6,607 individual birds. Flock sizes ranged from four to 700 individuals, with the largest counts occurring in flooded fields to the north of the site near the Little Brosna River. The species was also recorded in other wetland habitats throughout the wider study area. The majority of records occurred during the winter season or in the late breeding season (September), which is consistent with the species' known

wintering and migratory behaviour in Ireland. There was no breeding activity recorded over the survey period.

Golden Plover was primarily observed foraging, resting, or flying between feeding areas within and around the site.

4.2.6.5 Greenland White-fronted Goose

Greenland White-fronted Goose (*Anser albifrons flavirostris*) is a wintering species in Ireland and is amber-listed on the BoCCI. The species is of high conservation concern due to its restricted wintering range and reliance on a limited number of key wetland sites. The estimated wintering population in the Republic of Ireland is approximately to be between 8,867 and 10,418 individuals. The species is largely site faithful and can be found across wetland sites to the north, west and midlands, however the highest numbers can be found in county Wexford (Fox *et al.*, 2020). This species is designated as a SCI of three SPAs: Dovegrove Callows SPA, All Saints Bog SPA, and the River Little Brosna Callows SPA.

During baseline surveys, the species was rarely recorded, with two observations involving a single bird, both made on the same day in November 2022, it is unknown if these observations related to separate individuals or if they were the same bird. The observations were recorded commuting along the Little Brosna River, with no direct interaction with the proposed project site.

4.2.6.6 Hen Harrier

Hen Harrier (*Circus cyaneus*) is a scarce breeder during the breeding season in Ireland, but the species is more widely distributed in winter. It is amber listed on the BoCCI and is designated under the Annex I of the EU Birds Directive. Hen Harrier is typically associated with upland bogs, heath, and rough grassland during the breeding season, and commonly forages over lowland farmland, wetlands, coastal areas and bogs during winter. The Slieve Bloom Mountains SPA, which is designated for breeding Hen Harrier, is located approximately 12 km from the proposed project site.

Hen Harrier was irregularly recorded over the survey period, predominantly in the winter season, with the exception of a small number of records in July 2023. A total of 15 observations were made over the survey period, each involving a single bird, typically a female or a ringtail (juvenile), but males were also observed. Observations were typically of birds hunting or commuting over bog habitat and rough grassland within the study area.

No evidence of breeding or winter roost sites was identified within the site or wider study area.

4.2.6.7 Kingfisher

Kingfisher (*Alcedo atthis*) is a widespread but localised resident in Ireland. It is amber listed on the BoCCI and is listed on Annex I of the EU Birds Directive. An estimated 368 to 1,031 pairs of Kingfisher are present in the Republic of Ireland (Cummins *et al.* 2010). This species is typically sedentary but may undergo short migrations to the coast during cold weather. This species is

widely distributed along canals and rivers of Ireland. Their distribution is largely dependent on the availability of soft sediment banks for breeding.

During the baseline surveys, Kingfisher was rarely recorded within the study area. The species was observed on two occasions, both involving a single bird during the winter season in October and November 2020. These sightings were brief and recorded towards the southern part of the site, along drainage features. There was no evidence of breeding activity over the survey period.

4.2.6.8 Lapwing

Lapwing (*Vanellus vanellus*) is a wintering and breeding species in Ireland and is currently red listed on the BoCCI due to widespread population declines. The species typically uses wetlands, grasslands, and agricultural fields for foraging and is known to breed in open habitats with short vegetation. The estimated wintering population in the Republic of Ireland is approximately 69,823 individuals (Lewis et al., 2019a). This species is designated as a SCI of the River Little Brosna Callows SPA and the Middle Shannon Callows SPA located approximately 10km and 12km downstream of the proposed project. Both of these SPAs regularly exceeded national important numbers for this species.

Lapwing was occasionally recorded within the study area, with the majority of observations recorded during the winter season. A total of 67 observations were made, involving 2,203 individual birds. Records typically involved small flocks of around 10 to 60 individuals, although larger groups of up to 200 birds were recorded. The species was primarily concentrated in the northern and southern parts of the site, particularly in areas of flooded fields and bog, as well as commuting along the Little Brosna River to the east.

Only a single observation was made during the breeding season (July 2023), which likely related to failed or non-breeding birds from elsewhere, as no breeding activity was recorded at the site prior to, or after this sighting.

4.2.6.9 Little Egret

Little Egret (*Egretta garzetta*) is a resident species in Ireland and is currently green listed on the BoCCI and is listed on Annex I of the EU Birds Directive. The species is commonly associated with wetlands, estuaries, and river corridors, and has undergone a significant range expansion in Ireland over recent decades. The estimated wintering population in the Republic of Ireland is approximately 1,274 individuals (Lewis et al., 2019a).

Little Egret was regularly recorded within the study area across all winter survey seasons, with additional records during the 2023 and 2024 breeding seasons. However, there was no evidence of breeding activity within the site or the wider study area. A total of 141 observations were made, involving 486 individual birds. The species typically occurred in small numbers, often as single birds or in groups of less than ten.

Notably, on two separate days in March 2024, a flock of 40 Little Egrets was recorded foraging on flooded agricultural fields along the Little Brosna River to the north of the red line boundary. According to Lewis et al. (2019a), flocks exceeding 20 individuals are considered to be of

national importance. These records represent the largest gatherings observed during the survey period.

Sightings were largely concentrated in the northern section of the proposed project site, particularly in association with the Little Brosna River and adjacent flooded fields. Birds were frequently observed commuting along the river corridor.

4.2.6.10 Merlin

Merlin (*Falco columbarius*) is a scarce winter visitor and upland breeder in Ireland. It is amber listed on the BoCCI and is also listed on Annex I of the EU Birds Directive due to its conservation importance at a European level. The species typically favours open moorland, bog, and coastal habitats for hunting. Breeding Merlin typically select open upland habitats, such as blanket bogs and moorland, often in proximity to forest edges or young conifer plantations, which provide suitable hunting and nesting conditions (Lusby et al., 2017).

Merlin was occasionally recorded, with 38 observations over the survey period, each involving a single bird. Records were primarily concentrated in the winter season, with a small number of sporadic sightings during the late breeding season. These latter observations are considered to relate to post-breeding dispersal or migrating individuals rather than local breeding activity.

All records were associated with hunting or resting birds, primarily over bog habitats and other marginal areas within the site. There was no evidence of breeding within the site or the wider study area.

4.2.6.11 Peregrine Falcon

Peregrine Falcon (*Falco peregrinus*) is a green-listed species on the BoCCI and is listed under Annex I of the EU Birds Directive. A widespread but scarce breeder in Ireland, Peregrines typically nest on inaccessible cliff ledges, quarries, and occasionally on tall man-made structures, such as churches or industrial buildings. They require large open landscapes such as estuaries, wetlands, and uplands for foraging. Their distribution and activity are closely linked to the availability of avian prey, particularly waders and waterfowl.

The species was occasionally recorded during the survey period, with a total of 65 observations involving 67 individuals. Records were most frequent in the winter months and the late breeding season (August–September). There was no evidence of breeding or territorial activity within the site or its immediate surroundings. Most records consisted of single birds, although pairs were observed on two occasions — once involving male and female adults, and once an adult and juvenile. Observations were spread across the site, with activity concentrated in open areas that supported high densities of prey species, particularly along the Little Brosna River and adjacent flooded agricultural fields. Additional sightings occurred over central grassland areas and occasionally across bog habitats, suggesting foraging or commuting behaviour.

4.2.6.12 Pintail

Pintail (*Anas acuta*) is a wintering species in Ireland and is amber listed on the BoCCI. It is typically found in small numbers in shallow wetlands, flooded grasslands, and coastal habitats during the non-breeding season. The species is listed as a Special Conservation Interest (SCI) for the River Little Brosna Callows SPA, located approximately 10 km downstream of the proposed project site.

During the surveys, Pintail was rarely recorded, with just three observations, all during the winter of 2023/2024, totalling 209 individuals. Records typically involved small groups of 3 to 6 birds; however, a single flock of 200 birds was recorded in March 2024, foraging in flooded fields to the northeast of the site. This flock largely exceeds the national importance threshold of 20 individuals (Lewis et al., 2019a). No similarly sized flocks were recorded during previous or subsequent visits. All observations involved foraging birds on flooded agricultural grassland to the northeast of the site along the Little Brosna River.

4.2.6.13 Shoveler

Shoveler (*Anas clypeata*) is a wintering dabbling duck in Ireland and is currently red listed on the BoCCI. The species favours shallow wetlands, flooded grasslands, and slow-moving waterbodies with abundant aquatic invertebrates. Shoveler is also a SCI of the River Little Brosna Callows SPA, located approximately 10 km downstream of the proposed project site.

During baseline surveys, Shoveler was rarely recorded, with a single observation involving three individuals foraging in flooded fields to the northeast of the site, adjacent to the Little Brosna River. This record occurred during the winter season February 2024.

4.2.6.14 Teal

Teal (*Anas crecca*) is a widespread wintering species in Ireland and is amber listed on the BoCCI. It is typically associated with wetland habitats, such as flooded grasslands, lakes, and river margins. The species is also a Special Conservation Interest (SCI) for the River Little Brosna Callows SPA.

Teal was irregularly recorded onsite, with a total of 10 observations involving 436 individuals, all during the winter season. Birds were typically seen foraging on flooded fields or commuting along the Little Brosna River, particularly to the northeast of the site. Flocks generally ranged from 4 to 50 individuals, though a notable peak of 300 birds was recorded foraging in December 2023.

4.2.6.15 Whooper Swan

Whooper Swan (*Cygnus cygnus*) is a wintering migrant to Ireland and is amber listed on the BoCCI. Ireland supports internationally important numbers of wintering Whooper Swan, with the species favouring low-lying wetlands, flooded fields, lakes, and river systems for foraging and roosting. The species is protected under Annex I of the EU Birds Directive and is designated as and SCI of the River Little Brosna Callows SPA and the Middle Shannon Callows SPA located

approximately 10km and 12km downstream of the proposed project. Both of these SPAs regularly exceeded national important numbers for this species.

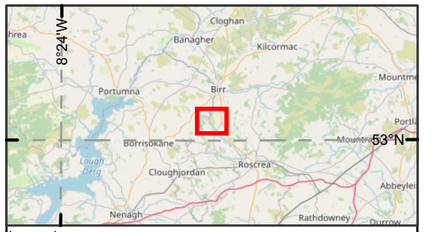
During baseline surveys, the species was occasionally recorded, with a total of 64 observations involving 622 individuals. Flocks ranged in size from 2 to 11 birds, but up to 55 were recorded. Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeast of the site. Observations typically involved commuting or foraging birds, often feeding in shallow flooded fields during the winter months.

4.2.6.16 Wigeon

Wigeon (*Mareca penelope*) is a wintering migrant species in Ireland and is Amber-listed on the BoCCI. The estimated wintering population in the Republic of Ireland is approximately 50,452 individuals. Numbers typically build from early autumn and peak in January. Wigeon are widespread across a variety of coastal and inland wetland complexes but have experienced a long-term population decline since 1994 (Lewis et al., 2019). This species is designated as a SCI of the River Little Brosna Callows SPA and the Middle Shannon Callows SPA located approximately 10km and 12km downstream of the proposed project. Both of these SPAs regularly exceeded national important numbers for this species.

Wigeon were observed irregularly within the study area and recorded only in the winter season. A total of six observations were made over the survey period, with a combined total of 444 individuals and a maximum flock size of 125 birds. Sightings were primarily concentrated in the eastern section of the site along the Little Brosna River, particularly in wetlands and flooded fields adjacent to the river.

Wigeon were mainly observed foraging or undertaking short commuting flights along the river corridor. The species was not recorded during the breeding season.



Legend

- Wind Farm Site Boundary
- Site Layout
- Proposed Grid Connection Route

Habitat

- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- FW2 - Depositing/ lowaland rivers
- BL3 - Buildings and artifical surfaces
- GA1 - Improved agricultural grassland
- GS2 - Dry meadows and grassy verges
- GS4 - Wet grassland
- WD1 - (Mixed) broadleaved woodland
- WD4 - Conifer plantation
- WS1 - Scrub
- BC1 - Arable crops
- FS1 - Reed and large sedge swamp
- HD1 - Dense bracken HH1 - Dry siliceous heath
- HH1 - Dry siliceous heath
- PB1 - Raised bog
- PB4 - Cutover bog
- WN1 - Oak-birch-holly woodland
- WN5 - Riparian woodland
- WN7 - Bog woodland
- WS2 - Immature woodland

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	10/12/2025	First issue	S.P	J.D

Client: RWE

Project:

Ballincor Wind Farm

Title:

Figure 4-2:
Habitats recorded within the Proposed Project site, GCR and TDR

Scale @ A3: 1:18,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2025

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Map Ref: 11333-005.AA-HAB-P.App.BO-TOB-A

Draft: A

Legend

- Wind Farm Site Boundary
- Proposed Grid Connection Route
- Proposed Turbine locations
- Otter Activity
- Marsh Fritilary
- Marsh Fritilary Area

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	10/12/2025	First issue	S.P	J.D

Client: RWE

Project:

Ballincor Wind Farm

Title:

Figure 4-3:
Relevant Protected Species Recorded Over the Survey Period

Scale @ A3: 1:18,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2025

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Map Ref: 11333-006.AA-SPE-P.App.BO-TOB-A

Draft: A

Legend

- Wind Farm Site Boundary
- Proposed Turbine locations
- Proposed Grid Connection Route

Invasive Habitat

- Parrots feather
- Himalayan Balsam

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	10/12/2025	First issue	S.P	J.D

Client: RWE

Project:

Ballincor Wind Farm

Title:

Figure 4-4:
Location of Invasive Non-Native Species

Scale @ A3: 1:40,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-007.AA-Inv.SPE-P.App.BO-TOB-A

Draft: A

5. STAGE 1: SCREENING FOR APPROPRIATE ASSESSEMNT

5.1 OVERVIEW OF POTENTIAL IMPACTS

There are a number of elements associated with the proposed project's construction, operation and decommissioning phases that may result to direct and indirect impacts that have the potential to result in likely significant effects on European sites, either alone or in combination with other plans and projects. The significance of these likely significant effects depends on the scale of the impact as well as the ecological condition and the sensitivities of the Qualifying Interests and Special Conservation Interests. Elements of the proposed project that may give rise to ecological impacts, which have been considered with regards to potential effects to European sites, are:

- Loss of habitat as a result of the proposed infrastructure;
- Potential release of sediment and pollutants, which may be discharged into surface water, particularly during high rainfall events;
- Movement of vehicles and machinery associated with construction works and the potential for spillages of oils, fuels or other pollutants, which could be transported to the surface water system during rainfall events;
- Transportation, pouring of concrete onsite and washing of concrete lorry chute– risk for entry into surface water;
- Increased silt loading which may stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the water quality of watercourses, with the most critical period associated with low flow conditions;
- The introduction or spread of invasive alien species due to construction works;
- Disturbance to fauna (e.g. through noise from construction or operation activities, human presence, and/or barrier effects as a result of operation wind turbines) resulting in the displacement of affected species; and
- Accidental mortality of wildlife from machinery during the construction, operation or decommissioning phases or collision with wind turbines during the Operational Phase.

5.1.1 Construction Phase

5.1.1.1 Habitat loss

The proposed project will result in the permanent or temporary loss of approximately 28.984ha and 2.2km of habitat. Habitat that will be permanently or temporally lost will predominantly comprises of agricultural grassland (GA1) and wet grassland (GS4) used for farming. Other habitats that will be lost include Conifer plantation (WD4), Bog woodland (WN7), Scrub (WS1), Mixed broadleaved woodland (WD1), Arable crops (BC1), Cutover bog (PB4), Immature woodland (WS2), Dry meadows and grassy verges (GS2) and Buildings and artificial surfaces

(BL3). Linear habitats that will be permanently or temporarily lost include 2.3km of Drainage ditches (FW4), Hedgerows (WL1) and Treelines (WL2).

There will be no loss of any Annex I habitat from the proposed project.

5.1.1.2 Habitat Degradation due to Surface Water Quality Impacts

Site clearance, excavation activities, and the stockpiling of material have the potential to generate sediment-laden runoff if not appropriately managed. Such runoff can lead to the sedimentation of nearby watercourses, particularly during rainfall events. Elevated silt loading in watercourses can inhibit aquatic plant growth, reduce dissolved oxygen levels, and lower the overall ecological quality of the water environment, with the most critical impacts likely to occur during periods of low flow.

Accidental spillages of contaminants during construction, arising from concrete pouring for turbine hardstands or from leaks and spills of fuel, oil, or other materials from construction vehicles and machinery, have the potential to significantly affect the water quality of surface water bodies within the project's hydrological catchment. Hydrocarbons, for example, are highly toxic, mutagenic, and carcinogenic substances. Aquatic organisms may experience both lethal and sub-lethal effects following exposure. These contaminants can be readily absorbed or adsorbed by biota, particularly within aquatic environments, where even non-bioavailable hydrocarbons (e.g. hydrophobic compounds) can become bioavailable to benthic organisms as they bind to suspended particles and sediments (Kuppusamy *et al.*, 2020).

5.1.1.3 Habitat Degradation due to Groundwater Quality Impacts

The habitats/species of some protected sites require suitable groundwater quality and hydrological conditions to maintain/restore a favourable conservation status. Potential indirect effects on groundwater dependent habitats and species within the SACs or SPAs arising from the construction phase include deterioration or lowering of the water table during the excavation of turbine foundations, hardstanding areas, borrow pits, substation, internal haul roads and grid connection cabling.

5.1.1.4 Habitat Degradation due to Air Quality Impacts

Excavation activities may result in the temporary generation of dust within the vicinity of the proposed project, potentially leading to dust deposition on nearby vegetation, which can inhibit plant growth. The Institute of Air Quality Management (IAQM) provides guidance on assessing dust impacts (IAQM, 2024), which defines potential dust emission risk classes for ecological receptors.

In accordance with these guidelines, and considering the size of the proposed project, the scale of the earthworks is classified as large (as the total site area is greater than 110,000 m^2 and the total site volume is greater than 75,000m^3). Dust may also arise from track-out associated with vehicle movements. It is anticipated that there will be between 20 and 50 outward HGV movements per day during the construction phase of the proposed project, which can be classified as medium. Based on this, dust impacts may occur up to 250 m of a construction site, however the majority of the dust deposition occurs within the first 50 m (IAQM, 2024).

5.1.1.5 Disturbance/ Displacement

The proposed construction works will result in an increase in noise levels during the construction phase of the proposed project. The construction works will also result in an increase in personnel and traffic movement to and from the site. It should be noted that no rock breaking, or blasting will be required during the construction phase. It is likely that temporary construction lighting will be required during the construction phase. Fugitive lighting could deter movement of species in the area. A temporary increase in noise levels, disturbance and lighting within the proposed project site may result in disturbance to wildlife within the immediate vicinity of the site.

5.1.1.6 Invasive Species

The invasive plant species parrot's-feather (*Myriophyllum aquaticum*) and Himalayan balsam (*Impatiens glandulifera*) were identified within the footprint of the proposed project. Both species are listed on the Part 1 of the Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), as amended and on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024).

Parrot's-feather was recorded within the channel Little Brosna_090 RWB tributary, located in the northern section of the proposed wind farm site. This species was present in dense abundance along approximately 100m of the channel. Himalayan balsam was recorded approximately 15m north of the GCR, within a broadleaved woodland along the banks of the Little Brosna_040 RWB, where approximately 15 stands were observed, covering an area of around 870 m².

The transport of material, ground disturbance (which can create suitable conditions for invasive species establishment), and the movement of machinery or personnel all carry a risk of spreading these species. The spread of invasive plants such as parrot's-feather and Himalayan balsam can outcompete native flora, reduce species diversity and alter habitat conditions or structure (e.g. through soil erosion). This, in turn, may result in likely significant effects on European sites.

5.1.2 Operational Phase

5.1.2.1 Disturbance/ Displacement and Barrier Effect

The presence of turbines in the landscape could potentially cause disturbance impacts to species using the area and its surroundings, resulting in a disturbance displacement effect. This effect can be particularly significant for avian species. Such displacement can occur due to the physical presence and movement of turbine blades, which may deter birds from using otherwise suitable habitat within and around the proposed wind farm site. The likelihood and extent of displacement are influenced by the availability and quality of alternative habitats; where suitable feeding or roosting areas are readily available nearby, birds may relocate with limited energetic cost. However, where alternative resources are scarce, birds may experience increased stress or reduced foraging efficiency, leading to potential ecological consequences (Percival, 2005; Powlesland, 2009).

In addition to local displacement, wind turbines may also cause disruption to established flight paths, resulting in a potential barrier effect. This occurs when turbines partially obstruct or alter bird movement corridors, such as migratory routes or regular commuting paths between roosting and feeding sites. The resulting diversion may lead to additional energy expenditure, particularly for migratory or energetically constrained species, which could contribute to reduced body condition or breeding success if sustained over time (Pennycuick, 1989; cited by Tolvanen *et al.*, 2023). This effect has been consistently mentioned in grey and scientific literature (e.g. Percival, 2003).

5.1.2.2 Collision Risk

The potential for birds to collide with turbines is one of the main impacts to consider in the assessment of possible impacts of an operating wind farm. Bird collision is dependent on a number of factors: species of bird involved the number of flights and individuals per flight, turbine height and blade length, weather (i.e. fog), topography, geography, etc. Collision risk is only associated with operating wind farms. Given the nominal 30-year life span of a wind farm, impacts are considered to be long term.

It is considered that the physical characteristic of the bird plays a crucial role in predicting the probability of a bird suffering a collision while passing through the airspace occupied by an operating turbine. The probability is predicted based on the bird wing length, weight, tail length and total body length (Janss, 2000). Moreover, flight behaviour can be influenced by wing loading (ratio of body weight to wing area) and aspect ratio (ratio of wingspan squared to wing area) which can affect collision risk. High wing loading is associated with species which demonstrate low manoeuvrability (e.g. swans and several species of geese), which can determine the probability of a bird successfully avoiding an imminent collision with a turbine (Drewitt & Langston, 2008) Other species such as farmland passerines are generally more manoeuvrable and as a consequence are less susceptible to collisions (Bright *et al.,* 2008).

Radar-tracking studies at operating wind farms have shown that birds will generally avoid colliding with turbines and do not fly into them blindly.

In practice, most birds do take avoiding action when they encounter operating turbines in the landscape. Birds in flight may detect either the wind farm as a whole or an individual turbine and alter their flight paths accordingly (Band, 2012). Avoidance may also occur as an emergency action performed by birds at close quarters with the rotating blade of an operating turbine. To account for this avoidance rate, an analysis of collision risk must incorporate an 'avoidance factor'. The avoidance factor incorporates the ability of birds to successfully avoid collisions with objects in their environment into the analysis. A high proportion of birds successfully avoid collisions with operating turbines, this is reflected in a recommended default avoidance rate of 98% (NatureScot, 2025).

5.1.3 Decommissioning Phase

The proposed project is expected to be operational for 35 years. Decommissioning phase effects will be similar to the construction phase but the potential for likely significant effects considerably less. Decommissioning of the proposed project would result in the cessation of renewable energy generation, and include the dismantling and removal of turbines, and the potential removal of other infrastructural elements, minor excavation activities. Impacts during

decommissioning are expected to be similar type and magnitude to those anticipated during the construction phase but generally of a shorter duration

5.2 Determining the Likely Zone of Influence

To establish the ZoI of the proposed project, the likely key biophysical changes associated with the proposed project were determined having regard to the project characteristics set out in Section 3 of this report. The ZoI of the proposed project (in the absence of any mitigation measures) is described hereunder.

5.2.1 Construction Phase

5.2.1.1 Habitat Loss

Effects associated with the permanent and temporary loss of habitats will be confined to within the proposed project. Therefore, the ZoI for this type of effects is defined as all lands within the proposed project.

5.2.1.2 Surface Water Impacts

With regards to potential habitat degradation effects associated with the release of sediment and other pollutants to surface water, the ZoI is considered to include water bodies adjacent to or downstream of the proposed project site, until the first depositional waterbody is reached (Section 2.4.1). Hydrological linkages between the proposed project and European sites (and their QIs/SCIs) can occur over significant distances. However, any effect will be site specific depending on the receiving water environment and nature of the potential impact. The distance downstream is associated with the current biological condition of the accepting waterbody and its capacity to accept and assimilate sediment and other pollutants.

The distance downstream is also associated with the sensitivity of the QIs of the European site which may be hydrologically connected to the proposed project site. In this instance, Derg TN (waterbody code: IE_SH_25_191a) lake water body (ca. 27km downstream) is considered the first depositional waterbody, downstream of the Little Brosna_060 RWB. No water quality impacts from the proposed project are anticipated beyond this point.

In the case of the activities associated with the proposed project, there is hydrological connectivity from the drainage ditches and the Little Brosna_040 RWB located throughout the proposed project wind farm site as well as hydrological connection to the Little Brosna_050 RWB and Little Brosna_060 RWB via drainage channels and instream works. Thus, the ZoI in relation to surface water runoff is considered to extend downstream of the proposed project, with hydrological connectivity via the drainage ditches, the Little Brosna_040, Little Brosna_050 and Little Brosna_060 RWBs extending as far as Derg TN Lake (approximately 27 km downstream).Considering the connection to the Little Brosna_040 RWB, Little Brosna_050 RWB and Little Brosna_060 RWB via drainage ditches and or other or surface water pathways, the distance from the proposed project to the RWB's (0m), the significant downstream distance to the Derg TN lake, the depositing nature of the waterbody coupled with the total volume of water, no water quality impacts from the proposed project are likely beyond the Derg TN lake.

5.2.1.3 Groundwater Impacts

The proposed wind farm project and TDR works area are located within the Shinrone GWB and the proposed GCR located within Birr, Birr Gravels and Banagher GWB. Soils and subsoils along the Little Brosna River comprise of Alluvial silts and clays with peat present to the west (proposed wind farm site) and to the east (Sharavogue Bog). Groundwater vulnerability at Sharavogue Bog SAC and the nearest turbines is low based on the GSI mapping (GS1, 2019).

Borehole data obtained near T8 and T9 (turbines nearest to potentially sensitive Sharavogue Bog SAC) confirms the presence of deep low permeability soils to 18 mbgl. As a result, groundwater movement at these locations is likely to be limited and no likely significant groundwater impacts.

The proposed project is located over a bedrock aquifer which is identified as a Locally Important Aquifer (LIA). The GCR is located over a bedrock Aquifer which is a Regionally Important Aquifer.

The GWB indicates that groundwater flow paths in this area are considered to be short due to the bedrock not considered to constitute a major aquifer. Therefore, the ZoI for groundwater effects is expected to be no larger than a 100m radius surrounding the proposed project. Any potential groundwater effects will be confined to within this 100m groundwater ZoI and within the Shinrone, Birr, Birr Gravels and Banagher GWB.

No abstraction wells exist within the proposed wind farm site.

5.2.1.4 Air quality

The ZoI for dust impacts was established with reference to the Air Quality Management provide guidelines (IAQM, 2024). The guidelines indicate that an assessment will be required where there is an ecological receptor within 50m of the boundary of a site; or 50m of the route(s) used by construction vehicles. On this basis, ecological receptors located within 50 m of the proposed development footprint or construction traffic routes were considered within the ZoI for potential dust effects.

5.2.1.5 Noise and Disturbance

Noise from the construction activity has the potential to cause disturbance to resting, foraging and commuting QI and SCI species. Individual species will elicit differing behavioural responses to disturbance at different distances from the source of disturbance. Below is a summary of the documented zones of influence for varying species.

- Transport Infrastructure Ireland (formally the National Roads Authority) has produced a series of best practice planning and construction guidelines (NRA, 2006) for the treatment of certain protected mammal species (e.g. Otter), which indicate that disturbance to terrestrial mammals would not extend beyond 150m. The ZoI, therefore, for terrestrial mammals is the proposed project site plus 150m.
- Disturbance to bird species will be considered individually where required with reference to Goodship and Furness (2022) and Cutts *et al.* (2013). Goodship and Furness (2022) reviewed the likely sensitivity to disturbance of a selection of bird species. Of these species, the largest recommended buffer zone was 1km. Therefore, as a general rule of thumb, a distance of 1km will be used to represent the maximum likely disturbance distance of birds. Notwithstanding, disturbance to bird species will be

considered individually where required. The ZoI for noise/disturbance for birds was, therefore, established as the proposed project site plus a 1km buffer.

In addition, to further establish any pathways to European sites, the foraging/commuting ranges of SCIs and QI species will be considered.

5.2.2 Operational Phase

5.2.2.1 Disturbance effects

Distinguishing between the potential effects of disturbance or displacement caused by the presence of the proposed wind farm during the operational phase and potential barrier effects is challenging. Consequently, while the nature of activities during the operational phase differs from those occurring during the construction phase, a similar assessment rationale has been applied (Section 5.2.1.5). Given that sources of disturbance during construction are typically temporary and intermittent (e.g. noise and visual disturbance from machinery and excavation), whereas disturbance from operational turbines is more continuous and may lead to habituation in some species, adopting the same precautionary approach as that used for the construction phase is considered appropriate. This ensures a robust and conservative assessment of the potential magnitude and significance of disturbance or displacement effects during the operational phase of the proposed wind farm.

5.2.2.2 Collision Risk

Collision with active wind turbines has the potential to cause direct mortality of bird species. The likelihood of such collisions is influenced by a range of factors, including species-specific flight behaviour, typical flight heights, local topography, weather conditions, and the spatial arrangement of turbines within the landscape. Birds that habitually fly within the rotor-swept zone or that regularly commute through or forage within the wind farm area are at a higher relative risk of collision.

Accordingly, the ZoI for potential collision risk must take into account the regular commuting, foraging, or dispersal ranges of each species. These ranges determine the extent to which individuals are likely to interact with the operational turbines on a routine basis. For example, large gulls or raptors may travel several kilometres between nesting, roosting, and feeding areas, while smaller waders or waterfowl may have more localised movements within wetland or coastal habitats.

Therefore, the ZoI for assessing potential collision risk is defined on a species, or species-group basis (e.g. gulls, ducks, waders, raptors), reflecting differences in foraging ecology, mobility, and flight behaviour. This approach ensures that the assessment appropriately captures the spatial extent of potential effects for each receptor and avoids both under- and over-estimation of risk.

In line with best practice guidance, the identified ZoI will also be informed by baseline survey data on local flight activity, as well as by published evidence on species-specific flight altitudes and collision susceptibility. This ensures that the assessment of potential collision mortality is proportionate, evidence-based, and representative of the actual risk to each species group within the operational wind farm context.

5.3 IDENTIFICATION OF RELEVANT EUROPEAN SITES AND ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

As mentioned, the Source-Pathway-Receptor model was used to identify a list of 'relevant' European sites (i.e. those sites and associated QIs and SCIs that could be potentially affected). There are nineteen European sites (fourteen SACs and five SPAs) within the ZoI of the proposed project, potential impacts and their significance, if any, within the SACs and SPAs are considered in Table 5-1 below.

The location of relevant European sites is illustrated in Figure 5-1. . Impacts are considered in light of the QIs/SCIs for which these SACs and SPAs are designated.

Table 5-1: Assessment of Relevant European Sites Within the Zone of Influence and Potential of Likely Significant Effects.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
Sharavogue Bog SAC [000585] This SAC lies directly adjacent to the proposed project site (within 10m at its nearest location).	• Active raised bogs* [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of Rhynchosporion [7150]	**Physical:** The proposed project lies adjacent to the SAC, with the SAC boundary located at its nearest, 10m from the proposed project. The QIs for this SAC are terrestrial habitats only and these habitats will not be disturbed during the construction, operation or decommissioning of the proposed project. However, considering the distance between the SAC and the proposed project site (ca. 10m) there is potential for impacts as the site occurs inside the ZoI for impacts associated with the generation of dust. There is a physical pathway for effects. **Hydrological:** The SAC is hydrologically connected to the proposed project via the Little Brosna_040 River. The proposed project has the potential to result in a degradation of water quality of this river, and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. However, the QIs for this SAC are terrestrial habitats only and these habitats will not be	**Yes -** A viable pathway for effect (via physical and hydrogeological connectivity) was identified between the proposed project site and this SAC. There is potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		impacted via surface water quality impacts during the construction, operation or decommissioning of the proposed project. **Hydrogeological:** Both the SAC and the proposed project occur within the same groundwater body (Shinrone) (refer to Section 4.1.2). The SAC is designated for groundwater-dependent habitats (NPWS, 2015), which are sensitive to changes in groundwater regime. Due to the proximity to the proposed project site, the SAC occurs within the ZoI for potential impacts on groundwater. Accordingly, a hydrogeological connection exists, and a source-pathway-receptor linkage cannot be excluded. **Ecological:** The QIs for this SAC are terrestrial habitats only and there is no physical connectivity between the SAC and the proposed project. **A Source-pathway-receptor link (via physical and hydrogeological) exists between the proposed project site and this SAC.**	
Ballyduff/Clonfinane Bog SAC (site code: 000641)	• Active raised bogs [7110]	**Physical:** The SAC occurs approximately 2.8km northwest of	**No -** Considering that no viable pathways for effect could be

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
The SAC is located 2.8 km northwest of the proposed project	• Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the Rhynchosporion [7150] • Bog woodland [91D0]	the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	identified, there is no potential for likely significant effects on this SAC.
Lisduff Fen SAC (site code: 002147) This SAC is located 3.7km east of the proposed project	• Petrifying springs with tufa formation (Cratoneurion) [7220] • Alkaline fens [7230] • *Vertigo geyeri* (Geyer's Whorl Snail) [1013]	**Physical:** The SAC occurs approximately 3.7km east of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** Both the SAC and the proposed project occur within the same groundwater body (Shinrone). The SAC is designated for three groundwater dependent qualifying interests (NPWS, 2019c), which are sensitive to changes in groundwater regime. However, given the separation distance between the proposed project and the SAC (approximately 3.7 km), the SAC is considered to occur outside the ZoI for potential groundwater impacts (Section 5.2.1.3). **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Arragh More (Derrybreen) Bog SAC (site code: 002207)	• Degraded raised bogs still capable of natural regeneration [7120]	**Physical:** The SAC occurs approximately 5.2km northwest of the proposed project site and thus	**No -** Considering that no viable pathways for effect could be identified, there is no potential for

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
The SAC is located 5.2km northwest of the proposed project		occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	likely significant effects on this SAC.
Liskeenan Fen SAC (site code: 001683) The SAC is located 5.7km west of the proposed project	• Calcareous fens with Cladium mariscus and species of the *Caricion davallianae* [7210]	**Physical:** The SAC occurs approximately 5.7km west of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Kilcarren-Firville Bog SAC (site code 000647) The SAC is located 6.4km northwest of the proposed project	• Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the Rhynchosporion [7150]	**Physical:** The SAC occurs approximately 6.4km northwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC.	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		Hydrological: There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Island Fen SAC (site code: 0022363) The SAC is located 7.7km east of the proposed project	• *Juniperus communis* formations on heaths or calcareous grasslands [5130] • Alkaline fens [7230]	**Physical:** The SAC occurs approximately 7.7km east of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		between the Proposed project site and the SAC. **Hydrogeological:** Both the SAC and the proposed project occur within the same groundwater body (Shinrone). The SAC is designated for one groundwater dependent qualifying interest (NPWS, 2018), which is sensitive to changes in groundwater regime. However, given the separation distance between the proposed project and the SAC (approximately 7.7 km), the SAC is considered to occur outside the ZoI for potential groundwater impacts (Section 5.2.1.3). **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Scohaboy (Sopwell) Bog SAC [002206] This SAC is located approximately 8.1km southwest of the proposed project	• Degraded raised bogs still capable of natural regeneration [7120]	**Physical:** The SAC occurs approximately 8.1km southwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Ridge Road, SW of Rapemills SAC (site code: 000919) The SAC is located 9km north of the proposed project	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]	**Physical:** The SAC occurs approximately 9km northwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC.	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		Hydrological: There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
All Saints Bog and Esker SAC [000566] This SAC is located approximately 9.1 km north of the proposed project.	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] • Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the Rhynchosporion [7150] • Bog woodland [91D0]	**Physical:** The SAC occurs approximately 9.1km northwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Redwood Bog SAC [002353] This SAC is located approximately 12km north of the proposed project	• Active raised bogs* [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of Rhynchosporion [7150]	**Physical:** The SAC occurs approximately 12km northwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC.	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		Hydrogeological: The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Lough Derg, North east Shore SAC [002241] This SAC is located approximately 12.5km west of the proposed project	• *Juniperus communis* formations on heaths or calcareous grasslands [5130] • Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] • Alkaline fens [7230] • Limestone pavements [8240] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] • *Taxus baccata* woods of the British Isles [91J0]	**Physical:** The SAC occurs approximately 12.5km northwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** The SAC is hydrologically connected to the proposed project via the Little Brosna_040, and the Shannon (lower)_030 Rivers over a distance of approximately 37km. The proposed project has the potential to result in a degradation of water	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		quality of these rivers, and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. However, the QIs for this SAC are terrestrial habitats only and these habitats will not be impacted via surface water quality impacts during the construction, operation or decommissioning of the proposed project. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
Slieve Bloom Mountains SAC [000412] This SAC is located approximately 13.2km east of the proposed project	• Northern Atlantic wet heaths with *Erica tetralix* [4010] • Blanket bogs (* if active bog) [7130] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-	**Physical:** The SAC occurs approximately 13.2km east of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no	**No -** Considering that no viable pathways for effect could be identified, there is no potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
	Padion, Alnion incanae, Salicion albae) [91E0]	potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is no surface water hydrological connectivity between the Proposed project site and the SAC. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** There is no direct ecological connectivity between the proposed project and the SAC in terms of shared species or habitats. **No source-pathway-receptor link exists between the proposed project site and this SAC.**	
River Shannon Callows SAC (site code: 000216) This SAC is located 14km north of the proposed project site.	• Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] • Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] • Alkaline fens [7230] • Limestone pavements [8240]	**Physical:** The SAC occurs approximately 14km north of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. **Hydrological:** The SAC is hydrologically connected to the proposed project via the Little Brosna_040 River which flows approximately 22km before	**Yes -** A viable pathway for effect (via hydrological and ecological connectivity) was identified between the proposed project site and the SAC. There is potential for likely significant effects on this SAC.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
	• Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] • Otter (*Lutra lutra*) [1355]	entering into the SAC. The proposed project has the potential to result in a degradation of water quality of this river, and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ecological:** Although the proposed project is located outside the boundary of the SAC, the Little Brosna_040 River forms a potential ecological linkage between the project site and the SAC. The SAC is designated for Otter, a species that is sensitive to anthropogenic disturbance. It is possible that Otters utilise the Little Brosna_040 River for foraging, commuting, and breeding activities. While there is no direct ecological connectivity between the proposed project and the terrestrial habitats that form part of the SAC's Qualifying Interests, the potential for indirect ecological effects on the Otter cannot be excluded at this stage.	

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		A Source-pathway-receptor link (via hydrological and ecological connectivity) exists between the proposed project site and this SAC.	
Dovegrove Callows SPA (004137) This SPA is located approximately 6km north of the proposed project.	• Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	**Physical:** Considering the distance between the SPA and the proposed project site (ca. 6km) there is no potential for direct impacts as the site occurs outside the ZoI for impacts associated with habitat loss and the generation of dust. There is no physical pathway for effects. **Hydrological:** There is a hydrological connectivity between the proposed project sites and this SPA via the Little Brosna_040 and which flows along the boundary of the SPA. The proposed project has the potential to result in a degradation of water quality of this river and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA supports seasonally inundated callows habitats and is designated for Greenland White-fronted Goose. Given the downstream hydrological connection and the floodplain nature of the SPA, a source–	**Yes -** A viable pathway for effect (via hydrological and ornithological connectivity) was identified between the proposed project site and the SPA. There is potential for likely significant effects on this SPA.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		pathway–receptor linkage cannot be excluded. **Hydrogeological:** The SPA and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ornithological:** The core foraging range for Greenland white-front goose is 5 to 8km (SNH, 2016). As the wind farm site of the proposed project lies approximately 6 km from the SPA and areas of works associated with the GCR occur closer (approximately 200m from the Dallow 110 kV substation), the site occurs within the potential foraging range of this SCI species. The proposed project site supports habitats known to be suitable for the species, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025a). During field surveys this SCI species was rarely recorded at the proposed project site, with two observations recorded over a four year survey period (refer to Section 4.2.6.5), both involving a single bird flying along the river Little Brosna, not interacting with the site. However,	

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		on a precautionary basis, and in the absence of evidence to fully exclude occasional foraging use, a source–pathway–receptor linkage cannot be excluded. **A Source-pathway-receptor link (via hydrological and ornithological connectivity) exists between the proposed project site and this SPA.**	
River Little Brosna Callows SPA (004086) This SPA is located 8.5 km north of the proposed project.	• Whooper Swan (*Cygnus cygnus*) [A038] • Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Shoveler (*Anas clypeata*) [A056] • Golden Plover (*Pluvialis apricaria*) [A140] • Lapwing (*Vanellus vanellus*) [A142] • Black-tailed Godwit (*Limosa limosa*) [A156] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	**Physical:** Considering the distance between the SPA and the proposed project site (ca. 7.5km) there is no potential for direct impacts as the site occurs outside the ZoI for impacts associated with habitat loss and the generation of dust. There is no physical connectivity between the SPA and the proposed project site. **Hydrological:** There is hydrological connectivity between the proposed project site and this SPA via the Incherky_010 which flows through the SPA. The proposed project has the potential to result in a degradation of water quality of this river, and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA supports	**Yes -** A viable pathway for effect (via hydrological and ornithological connectivity) was identified between the proposed project site and the SPA. There is potential for likely significant effects on this SPA.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
	• Wetland and Waterbirds [A999]	seasonally inundated callows habitats and is designated for a number of wintering bird species which may be indirectly impacted by a degradation of water quality. Given the downstream hydrological connection and the floodplain nature of the SPA, a source–pathway–receptor linkage cannot be excluded. **Hydrogeological:** The SPA and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ornithological:** This SPA supports a number of wintering bird species that may occur, or have been recorded, within the proposed project site during the bird survey period. The wind farm area of the proposed project lies within the core foraging range of some species, such as Greenland White fronted Goose, which can forage up to 5–8 km from roosting areas (SNH, 2016). For other species, such as Golden Plover, core foraging ranges during the winter period are less well defined. Therefore, taking a precautionary approach, records of these species	

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		within the proposed project site may be associated with the SPA. Additionally, the proposed project site supports habitats considered suitable for some of the SCI wintering waterbird species of this SPA, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025). On this basis, and in the absence of evidence to fully exclude occasional foraging use, a source–pathway–receptor linkage cannot be excluded. **Source-pathway-receptor link (via hydrological connectivity) exists between the proposed project site and this SPA.**	
All Saints Bog SPA (004103) This SPA is located approximately 9.1 km north of the proposed project.	• Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	**Physical:** Considering the distance between the SPA and the proposed project site (ca. 9.1km) there is no potential for direct impacts as the site occurs outside the ZoI for impacts associated with habitat loss and the generation of dust. There is no physical pathway for effects. **Hydrological:** There is no hydrological connectivity between the proposed project and this SPA.	**No -** Considering the lack of any pathway, there is no potential for likely significant effects on this SPA.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		Hydrogeological: The SPA and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ornithological:** The core foraging range of the Greenland White fronted Goose is approximately 5 to 8 km (SNH, 2016). As the wind farm site of the proposed project lies approximately 9.1 km from the SPA, it occurs outside the potential foraging range of this SCI species. Additionally, no regular flight direction, commuting pattern, or consistent use of the site by Greenland White-front goose was observed, and similar suitable habitats are available in the wider landscape. The areas of works associated with the GCR occur closer to the SPA (approximately 3.4 km from the Dallow 110 kV substation). However, there will be little to no habitat loss within these areas, and suitable foraging habitat for this species is also limited or absent. **No source-pathway-receptor link exists between the proposed project site and this SPA.**	

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
Slieve Bloom Mountains SPA (004160) This SPA is located approximately 10km east of the proposed project	• Hen Harrier (*Circus cyaneus*) [A082]	**Physical:** Considering the distance between the SPA and the proposed project site (ca. 10km) there is no potential for direct impacts as the site occurs outside the ZoI for impacts associated with habitat loss and the generation of dust. There is no physical pathway for effects. **Hydrological:** There is no hydrological connectivity between the proposed project and this SPA. **Hydrogeological:** The SPA and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ornithological:** The core foraging range of Hen Harrier is approximately 5 km but can extend to a maximum of 10 km (SNH, 2016). As the wind farm site of the proposed project lies approximately 10 km from the SPA, it occurs outside the core foraging range of this SCI species and at the limit of its maximum foraging range. Considering this, and the availability of suitable alternative foraging habitat within closer proximity to the SPA, no source	**No -** Considering the lack of pathways, there is no potential for likely significant effects on this SPA.

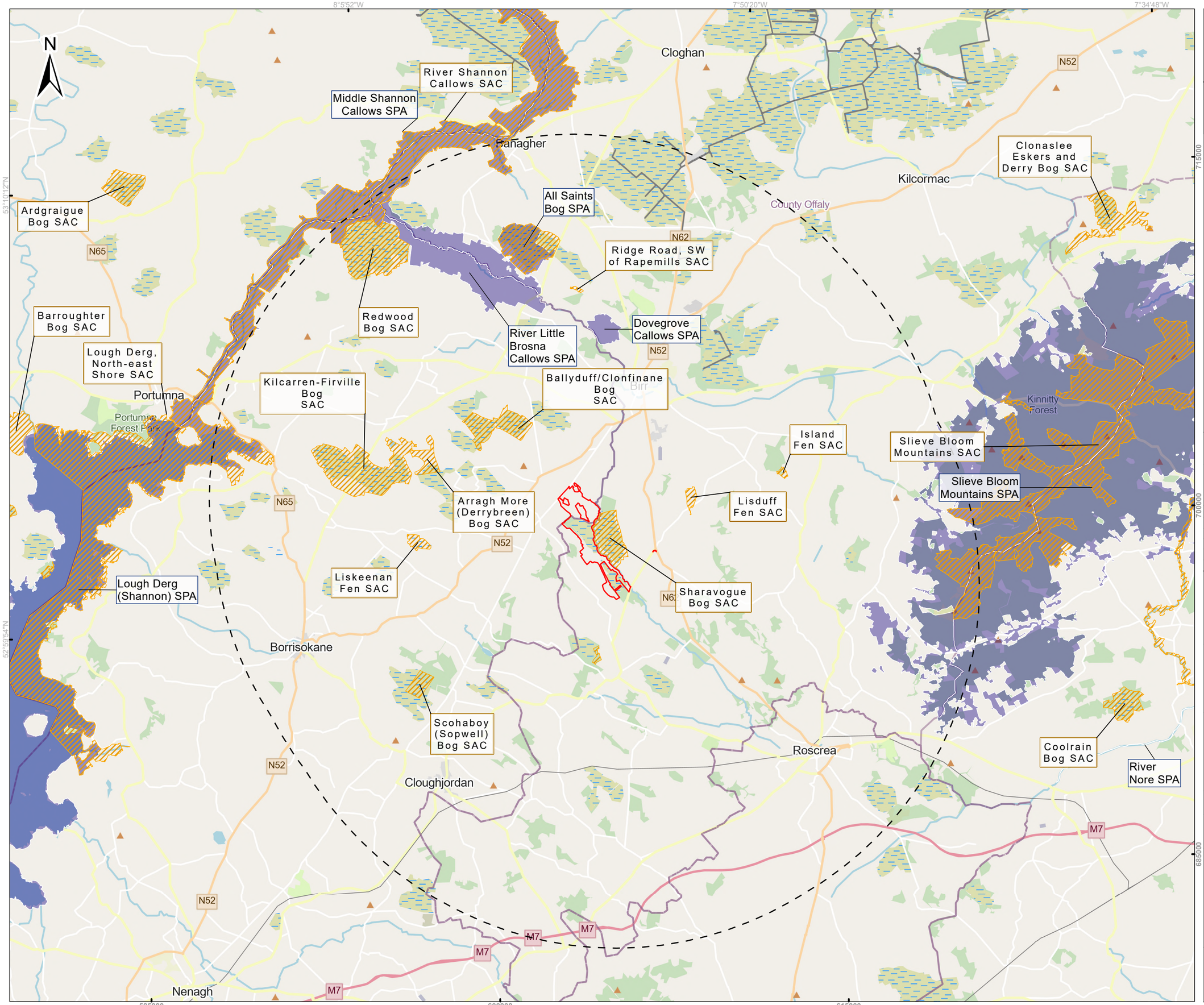
Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		pathway receptor linkage can be established. **No source-pathway-receptor link exists between the proposed project site and this SPA.**	
Lough Derg (Shannon) SPA [004058] This SPA is located 12.9km west of the proposed project site.	• Cormorant (*Phalacrocorax carbo*) [A017] • Tufted Duck (*Aythya fuligula*) [A061] • Goldeneye (*Bucephala clangula*) [A067] • Common Tern (*Sterna hirundo*) [A193] • Wetland and Waterbirds [A999]	**Physical:** The SPA occurs approximately 12.9km northwest of the proposed project site and thus occurs outside the ZoI of habitat loss and dusts impacts. Similarly, due to the distance there is no potential for the introduction of invasive plant species within the SAC. **Hydrological:** There is hydrological connectivity between the proposed project sites and this SPA via Little Brosna_040, and the Shannon (lower)_030 Rivers. The proposed project has the potential to result in a degradation of water quality of this river, and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA is designated for a number of wintering and breeding bird species, and wetland habitats which may be indirectly impacted by a degradation of water quality. Given	**Yes -** A viable pathway for effect (via hydrological and ornithological connectivity) was identified between the proposed project site and the SPA. There is potential for likely significant effects on this SPA.

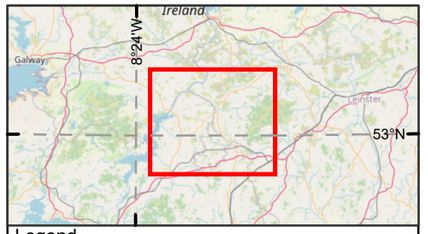
Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		the downstream hydrological connection of the SPA, a source–pathway–receptor linkage cannot be excluded. **Hydrogeological:** The SAC and the proposed project occur in separate groundwater bodies. There is no hydrogeological connectivity. **Ornithological:** This SPA supports a number of breeding and wintering bird species, of which only one, Cormorant, was recorded within the proposed project site during the bird survey period. According to Woodward et al. (2019), the mean foraging range for cormorant is approximately 7 km, although ranges of up to 35 km have been recorded. As the wind farm area of the proposed project lies within the maximum foraging range of this SCI species, there is potential that records of this species within the proposed project site may be associated with the SPA. On this basis, a source pathway receptor linkage cannot be excluded. **Yes source-pathway-receptor link exists between the proposed project site and this SPA.**	

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
Middle Shannon Callows SPA (001096) This SPA is located 14km north of the proposed project site.	• Whooper Swan (*Cygnus cygnus*) [A038] • Wigeon (*Anas penelope*) [A050] • Corncrake (*Crex crex*) [A122] • Golden Plover (*Pluvialis apricaria*) [A140] • Lapwing (*Vanellus vanellus*) [A142] • Black-tailed Godwit (*Limosa limosa*) [A156] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Wetland and Waterbirds [A999]	**Physical:** Considering the distance between the SPA and the proposed project site (ca. 14km) there is no potential for direct impacts as the site occurs outside the ZoI for impacts associated with habitat loss and the generation of dust. There is no physical pathway for effects. **Hydrological:** There is hydrological connectivity between the proposed project sites and this SPA via Little Brosna_040, and the Shannon (lower)_030 Rivers. The proposed project has the potential to result in a degradation of water quality of this river, and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA is designated for a number of wintering and breeding bird species, and wetland habitats which may be indirectly impacted by a degradation of water quality. Given the downstream hydrological connection of the SPA, a source–pathway–receptor linkage cannot be excluded. **Hydrogeological:** The SPA and the proposed project occur in separate	**Yes -** A viable pathway for effect (via hydrological and ornithological connectivity) was identified between the proposed project site and the SPA. There is potential for likely significant effects on this SPA.

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		groundwater bodies. There is no hydrogeological connectivity. **Ornithological:** This SPA supports a number of wintering and one breeding bird species that may occur, or have been recorded, within the proposed project site during the bird survey period. The wind farm area of the proposed project lies outside the core foraging range of some species, such as whooper swan, which can forage up to 5km from roosting areas (SNH, 2016). However, for other species, such as golden plover and lapwing, core foraging ranges during the winter period are less well defined. Therefore, taking a precautionary approach, records of these species within the proposed project site may be associated with the SPA. Additionally, the proposed project site supports habitats considered suitable for some of the SCI wintering waterbird species of this SPA, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2022a). On this basis, and in the absence of evidence to fully exclude	

Designated Site	QIs/ SCIs (* indicates a priority habitat under the EU Habitats Directive)	Source-Pathway-Receptor Link	Potential for Likely Significant Effects
		occasional foraging use of the proposed project site by these SCIs, a source–pathway–receptor linkage cannot be excluded. **Source-pathway-receptor link (via hydrological connectivity) exists between the proposed project site and this SPA.**	





Legend

- Wind Farm Site Boundary
- Initial 15km Buffer
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)

0 2.5 5
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	10/12/2025	First issue	S.P	J.D

Client: RWE

Project:
Ballincor Wind Farm

Title:
Figure 5-1:
European Sites Within the Vicinity of the Proposed Project

Scale @ A3: 1:150,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2025

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Map Ref: 11333-008.AA-EU.S-P.App.BO-TOB-A

Draft: A

5.4 Potential for In-Combination Effects

Article 6(3) of the Habitats Directive requires that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."

It is therefore required that the potential impacts of the proposed project are considered in-combination with any other relevant plans or projects. Projects which have been completed, approved or which are proposed, as well as proposals within county development plans, located within the ZoI of the proposed project, have been considered in the in-combination assessment, and are discussed hereunder.

Pathways for potential in-combination effects have been identified for the following European sites:

- Sharavogue Bog SAC
- River Shannon Callows SAC
- Dovegrove Callows SPA
- River Little Brosna Callows SPA
- Lough Derg (Shannon) SPA
- Middle Shannon Callows SPA

There is the potential for the proposed Project to impact upon the designated features of the European sites identified above. In addition, other plans or projects may also give rise to effects on these same features. Therefore, Likely Significant Effects cannot be excluded for the European sites identified above, both from the Project alone and in combination with other plans or projects.

5.5 Screening Assessment Conclusion

The aim of this AA screening is to appraise the potential likely significant effect of activities associated with proposed project on European sites, in isolation or in-combination with other plans or projects.

Following an examination, analysis and evaluation of the relevant information including, the nature of the proposed project and its potential connectivity with European sites, the conservation objectives, as well as applying the precautionary principle, it is the professional opinion of the authors of this report that that the proposed works, alone or in-combination with other plans or projects and in the absence of mitigation measure could have likely significant effects on the on the following European sites:

- Sharavogue Bog SAC
- River Shannon Callows SAC
- Dovegrove Callows SPA
- River Little Brosna Callows SPA

- Lough Derg (Shannon) SPA
- Middle Shannon Callows SPA

This conclusion is based on the identified pathways between the proposed project and these European sites and likely significant effects on European Sites, their conservation objectives, and QIs/SCIs. Accordingly, in line with Article 6(3) of the Habitats Directive, a Stage 2 Appropriate Assessment (AA) is required for the proposed project to assess whether the proposed project alone or in combination with other plans and projects would adversely affect the integrity of these European sites in view of their conservation objectives.

6. STAGE 2: APPROPRIATE ASSESSMENT/NATURA IMPACT STATEMENT

The Stage 2: Appropriate Assessment (Natura Impact Statement) examines the potential for significant adverse effects on the integrity of European sites as a result of the proposed project, based on the source-pathway-receptor model, appraised in Section 2.4.2.

Sources for potential adverse effects on European sites from the proposed project have been identified in Section 5.3. The significance of any effects on the QI of the European sites brought forward from Stage 1: screening for appropriate assessment will be appraised hereunder.

6.1 DESCRIPTION OF EUROPEAN SITES AND ASSESSMENT OF ADVERSE EFFECTS ON SITE INTEGRITY

6.1.1 Sharavogue Bog SAC

The proposed project lies adjacent to the SAC, with the SAC boundary located at its nearest, ca. 10m from the proposed wind farm site. This SAC comprises two raised bogs: the Sharavogue bog and the Cangort (Kilfrancis) Bog. It also includes surrounding areas of habitat which include cutover bog, wet grassland, semi-natural woodland and an area of wet lagg vegetation. Sharavogue bog is one of the few remaining raised bogs in Ireland situated on a floodplain. Cangort bog is a remnant of a larger area of bog much of which has now been cutover and reclaimed for forestry and agriculture, with only 58 ha of high bog remaining (NPWS, 2017).

6.1.1.1 Identification of Individual Qualifying Features for the Sharavogue Bog SAC with the Potential to be Affected

The SAC is designated for the following Annex I habitats which are listed and discussed in relation to the proposed project below (* indicates priority habitat):

- Active raised bogs [7110*];
- Degraded raised bogs still capable of natural regeneration [7120]; and,
- Depressions on peat substrates of the *Rhynchosporion* [7150].

Table 6-1 lists the qualifying features of this European site and determines, in the light of their Conservation Objectives, extent and proximity to the proposed project, whether there is any pathway or potential for adverse effect on the individual QIs.

Table 6-1 Qualifying Interests, Extent of Habitat and Conservation Objectives for the Sharavogue Bog SAC and Potential for Effect. (NPWS, 2015)

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway for Potential Adverse Effects
Active Raised bogs [7110] *	The Site-Specific Conservation Objectives (SSCO) document indicates that this habitat is located within centre of the SAC, 280m from the proposed project boundary.	To restore the favourable conservation condition.	**Yes -** The proposed project lies adjacent to the SAC, with the SAC boundary located at its nearest, 10m from the proposed project. The QIs for this SAC are terrestrial habitats only and these habitats will not be disturbed during the construction, operation or decommissioning of the proposed project. However, considering the distance between the SAC and the proposed project site (ca. 10m) there is potential for direct impacts as the site occurs inside the ZoI for impacts associated the generation of dust. While the SAC is hydrologically connected to the proposed project via the Little Brosna_040 River, the QIs for this SAC are terrestrial habitats located upstream from the Little Brosna_040 and so there is no potential for adverse effects via surface water degradation. Both the SAC and the proposed project occur within the same groundwater body (Shinrone) (refer to Section 4.1.2). The SAC is designated for groundwater-dependent habitats (NPWS, 2015), which are sensitive to changes in groundwater regime. Due to the proximity to the proposed project site, the SAC occurs within the ZoI for potential impacts on groundwater. A potential for adverse effect was therefore identified.
Degraded raised bogs till capable of natural regeneration [7120]	The SSCO document indicates that this habitat is located around the active bog habitat within the centre of the SAC. This habitat is approximately 50m from the proposed project.	A separate CO has not been set, but it is inherently linked to that of [7110], which aims to restore the habitat to favourable conservation condition.	
Depressions on peat substrates of the *Rhynchosporion* [7150]	This habitat is not mapped within the SSCO document and there is no NPWS data available. However, it is an integral part of active raised bogs [7110], which is located within centre of the SAC, 280m from the proposed project boundary.	A separate CO has not been set, but it is inherently linked to that of [7110], which aims to restore the habitat to favourable conservation condition.	

6.1.1.2 Assessment of Adverse Effects on the Site Integrity of the Sharavogue Bog SAC

Individual QI identified in Table 6-1 as having a potential source–pathway–receptor linkage and potential for adverse effects are assessed in detail below. The specific attributes and targets underpinning the conservation objectives for each QI habitat within the Sharavogue Bog SAC are presented in Table 6-2. The following assessment evaluates the likelihood for the proposed project to adversely affect these conservation objectives, and thereby the overall integrity of the site.

Table 6-2: Assessment of Adverse Effects on the Conservation Objectives of the Sharavogue Bog SAC as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[7110] Active raised bogs *			
Habitat area	Hectares	Restore area of active raised bog to 40.9ha, subject to natural processes.	No – The nearest mapped location of this QI habitat is approximately 400 m (straight-line distance) from the areas where construction activities with the potential to cause groundwater impacts may occur (e.g. turbine foundation excavations). As the ZoI for such impacts associated with the proposed project has been identified as 100m, there is no potential for adverse effects on this attribute. The ZoI for potential dust impacts during the construction phase has been identified as 50 m. The nearest mapped location of this QI habitat is approximately 220 m (straight-line distance) from areas where construction activities with the potential to generate dust may occur (e.g. internal access roads). Therefore, there is no potential for adverse effects on this attribute. On this basis, there is no potential for adverse effects on the attributes of this habitat, and consequently no adverse effects on the integrity of the site.
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC.	
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog.	
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site.	
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes.	
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support / protect the raised bog ecosystem and the services it provides.	
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 20.5ha of central ecotope/active flush/soaks/bog woodland as appropriate.	
Vegetation quality: micro-topographical features	Hectares	Restore adequate cover of high quality micro-topographical features	

Attributes	Measures	Target	Potential for Adverse Effects
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat forming capacity	
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	
Vegetation composition: nonnative invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	No – Although non-native invasive species were recorded within the site, as no works will be located within the boundary of the SAC and there is no hydrological connection to the SAC, there is no potential for the spread of non-native invasive species
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	No - Change in air quality can result from fertiliser drift; quarry activities; or other atmospheric inputs. In the case of the proposed project, excavation activities and vehicle movement may increase dust generation. However, nitrogen will not be contained in such dust and so not cause

Attributes	Measures	Target	Potential for Adverse Effects
			adverse effects on this attribute. Additionally, the active raised bog has been mapped for this SAC, which at its nearest to site infrastructure occurs over 220m, which occurs outside the ZoI for dust impacts.
Water quality	Hydrochemical measures	Water quality on the high bog and transitional areas close to natural reference conditions	No – As outlines in NPWS (2015), water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas and lagg zone surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands). No pathway to impact on these parameters was identified from the proposed project and so there is no potential for adverse effects on this attribute.
[7120] Degraded raised bogs still capable of natural regeneration			
The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110).			As degraded raised bogs still capable of natural regeneration (7120) habitat is inherently linked to that of active raised bogs (7110) and no potential for adverse effects was identified for active raised bogs habitat following an examination of the relevant attributes. On this basis, there is no potential for adverse effects of degraded raised bogs still capable of natural regeneration habitat, and consequently no adverse effects on the integrity of the site.
[7150] Depressions on peat substrates of the *Rhynchosporion*			

Attributes	Measures	Target	Potential for Adverse Effects
Depressions on peat substrates of the *Rhynchosporion* is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Sharavogue Bog SAC			As Depressions on peat substrates of the *Rhynchosporion* (7150) habitat is inherently linked to Active Raised Bog (7110), and no potential for adverse effects was identified for active raised bogs habitat following an examination of the relevant attributes, there is no potential for adverse effects on the attributes of this habitat, and consequently no adverse effects on the integrity of the site.

6.1.2 River Shannon Callows SAC

The proposed project site is located 13.7km southeast of the River Shannon Callows SAC, the Dallow 110 kV substation is located 7.2km southeast of the SAC. The River Shannon Callows SAC is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. The River Shannon Callows SAC is mainly composed of lowland wet grassland. There is an area of limestone pavement representing the only known example in Co. Offaly, colonised by mature hazel (*Corylus avellana*) woodland, with areas of open limestone and calcareous grassland interspersed (NPWS, 2020). Other habitats of smaller area but also of importance within the site are lowland dry grassland, drainage ditches, freshwater marshes and reedbeds. The site is of international importance for wintering waterfowl such as whooper swan and is of national importance to species such as mute swan (*Cygnus olor)*, wigeon, golden plover, lapwing, and black-tailed godwit. Species which occur in numbers of regional or local importance include Bewick's swan (*Cygnus columbianus*), tufted duck, dunlin (*Calidris alpina)*, curlew (*Numenius Arquata)* and redshank (*Tringa tetanus)*. Greenland white-fronted goose use the River Shannon Callows SAC; these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows (NPWS, 2020).

6.1.2.1 Identification of Individual Qualifying Features for the River Shannon Callows SAC with the Potential to be Affected

The SAC is designated for the following Annex I habitats and Annex II species which are listed and discussed in relation to the proposed project below (* indicates priority habitat):

- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]
- Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]
- Alkaline fens [7230]
- Limestone pavements [8240]*
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion*, Alnion incanae, Salicion albae*) [91E0]*
- Otter (*Lutra lutra)* [1355]

Table 6-3 lists the qualifying features of this European site and determines, in the light of their Conservation Objectives, extent and proximity to the proposed project, whether there is any pathway and potential for adverse effect on the individual qualifying interest.

Table 6-3 Qualifying Interests, Extent of Habitat and Conservation Objectives for the River Shannon Callows SAC and Potential for Effect (NPWS,2022)

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	The SSCO document indicates that this habitat is mainly located within the upper reaches of the SAC approximately 9km from the proposed substation, and 15.5km from the wind farm area of the proposed project.	To restore the favourable conservation condition.	No - Due to the terrestrial nature of this QI habitat, and the intervening distance between the SAC and the proposed project site, there is no source-pathway-receptor chain for adverse effect on the QI habitat. This QI is therefore outside the ZoI and there is no potential for likely impacts.
Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]	The SSCO document indicates that this habitat is located within the upper reaches of the SAC approximately 9.4km from the proposed substation, and 15.4km from the proposed project.	To restore the favourable conservation condition.	
Alkaline fens [7230]	The SSCO document indicates that this habitat is located within the lower reaches of the SAC approximately 16.8km west of the proposed project.	To maintain the favourable conservation condition.	
Limestone pavements [8240] *	The SSCO document indicates that this habitat is located within the upper reaches of the SAC approximately 20km from the proposed substation, and 27km from the proposed project.	To maintain the favourable conservation condition.	
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]*	The SSCO document indicates that this habitat is located in the centre of the SAC approximately 16.2km from the proposed project.	To maintain the favourable conservation condition.	
Otter (*Lutra lutra)* [1355]	This species is not mapped within SSCO. According to the available NPWS article 17 data the proposed project site is located within the current distribution and current range grid squares. The watercourses within	To maintain the favourable conservation condition.	**Yes** - The River Shannon Callows SAC is hydrologically connected to the proposed project, occurring approximately 22km downstream of the proposed project wind farm site and 15km from works along the GCR. Taking a precautionary approach, there is potential for indirect impacts on otter via water quality

Qualifying Interests (*indicates a priority habitat)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
	the site are considered to be suitable for Otters.		deterioration during construction activities for the proposed project. A potential for adverse effect was therefore identified. Additionally, there is potential for disturbance effects on otters that may commute along rivers outside the SAC but remain functionally connected to the SAC population. On this basis, a potential for adverse effect cannot be excluded.

6.1.2.2 Assessment of Adverse Effects on the Site Integrity of the River Shannon Callows SAC

Individual Qualifying Interests identified in Table 6-3 as having a potential source–pathway–receptor linkage and potential for adverse effects are assessed in detail below. The specific attributes and targets underpinning the conservation objectives for each Qualifying Interest habitat within the River Shannon Callows SAC are presented in Table 6-4. The following assessment evaluates the potential for the proposed project to adversely affect these conservation objectives, and thereby the overall integrity of the site

Table 6-4: Assessment of Adverse Effects on the Conservation Objectives of the River Shannon Callows SAC as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[1355] Otter (*Lutra lutra*)			
Distribution	Percentage positive survey sites	No significant decline.	**Yes** – The proposed construction works have the potential to result in the disturbance of Otter and degradation of their feeding resources inside and outside the SAC. Disturbance and changes to the species feeding resources could affect the distribution of Otter within the SAC. **A significant decline in the habitat/distribution available for otter would constitute an adverse effect on the integrity of the site.**
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 282.1ha.	No -The proposed project occurs outside the SAC boundary. There is no potential for the loss of habitat for Otter within the SAC. There is no potential for adverse effects.
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 146.7km.	
Couching sites and holts	Number	No significant decline.	
Fish biomass available	Kilograms	No significant decline.	**Yes** - The potential degradation of water quality within the Little Brosna_040 River which is connected to the SAC could affect the availability of fish biomass to Otter. The runoff or discharge of sediment laden water to this waterbody could result in a decline in available feeding resources for Otter.

Attributes	Measures	Target	Potential for Adverse Effects
			A significant decline in fish biomass available for Otter would constitute an adverse effect on the integrity of the site.
Barriers to connectivity	Number	No significant increase	No - The proposed construction works will not result in any barrier to connectivity in any waterbody within the SAC. There is no potential for adverse effects.

6.1.3 Dovegrove Callows SPA

Dovegrove Callows SPA is located 6km north of the proposed project site. Dovegrove Callows is beside the Little Brosna River 2 km downstream from Birr, Co. Offaly and 5 km upstream from the start of the main area of River Little Brosna callows. The main habitat within the SPA is wet grassland which floods. Dovegrove Callows SPA is of major conservation significance as a feeding site for an internationally important flock of Greenland White-fronted Goose (NPWS, 2011).

6.1.3.1 Identification of Individual Qualifying Features for the Dovegrove Callows SPA with the Potential to be Affected

The SPA is designated for the following Annex I species which are listed and discussed in relation to the proposed project below:

- Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]

Table 6-5 lists the qualifying features of this European site and determines, in the light of their Conservation Objectives, extent and proximity to the proposed project, whether there are any pathway and potential for adverse effect on the individual qualifying interest.

Table 6-5 Qualifying Interests, Extent of Habitat and Conservation Objectives for the Dovegrove Callows SPA and Potential for Effect. (NPWS,2025b)

Qualifying Interests	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	The site is an important feeding area for the internationally important Little Brosna Greenland White-fronted Goose flock (527 individuals - 5 year mean peak for the period 1994/95 to 1998/99) and is used on an occasional basis when other feeding sites along the middle Shannon and Little Brosna callows are flooded.	To restore the favourable conservation condition.	**Yes** –The proposed project site supports habitats known to be suitable for the species, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025a). When considering the core foraging range for Greenland white-front goose, which is 5 to 8km (SNH, 2016) and that the wind farm site of the proposed project lies approximately 6 km from the SPA and areas of works associated with the GCR occur closer (approximately 200m from the Dallow 110 kV substation), the site occurs within the potential foraging range of this SCI species. During field surveys this SCI species was rarely recorded at the proposed project site, with two observations recorded over a four year survey period (refer to Section 4.2.6.5), both involving a single bird flying along the river Little Brosna, not interacting with the site. As such, and based on a precautionary principle there is potential connectivity between the proposed project and the SCI population of of the SPA, and further assessment is required. A potential for direct adverse effect via collision risk and indirect adverse effects via ex-situ disturbance, displacement was identified, and further assessment is required. Additionally there is hydrological connectivity between the proposed project sites and this SPA via the Little Brosna_040 and which flows along the boundary of the

Qualifying Interests	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			SPA. The proposed project has the potential to result in a degradation of water quality of this river and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA supports seasonally inundated callows habitats and is designated for Greenland White-fronted Goose. Given the downstream hydrological connection and the floodplain nature of the SPA, further assessment is required.

6.1.3.2 Assessment of Adverse Effects on the Site Integrity of the Dovegrove Callows SPA

Individual Qualifying Interests identified in Table 6-5 as having a potential source–pathway–receptor linkage and potential for adverse effects are assessed in detail below. The specific attributes and targets underpinning the conservation objectives for each Qualifying Interest within the Dovegrove Callows SPA are presented in Table 6-6. The following assessment evaluates the potential for the proposed project to adversely affect these conservation objectives, and thereby the overall integrity of the site.

Table 6-6: Assessment of Adverse Effects on the Conservation Objectives of the Dovegrove Callows SPA as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[A395] Greenland White-fronted Goose (*Anser albifrons flavirostris*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, Greenland white-fronted goose was rarely recorded at the proposed project site, with only two observations over a four winter survey periods (refer to Section 4.2.6.5). Both observations involved a single bird flying along the River Little Brosna without interacting with the site. The proposed project site supports habitats that are potentially suitable for the species, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025a). However, no regular flight direction, commuting pattern, or consistent use of the site was observed, and similar suitable habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Dovegrove Callows SPA via the Little Brosna_040, which flows along the boundary of the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for Greenland white-fronted goose, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA.**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - The wind farm site of the proposed project lies approximately 6 km from Dovegrove Callows SPA, and some works associated with the GCR occur closer (approximately 200 m from the Dallow 110 kV substation), therefore the site is considered to be within the potential foraging range of the Greenland white-fronted goose (typically 5–8 km; SNH, 2016). However, the species was not regularly recorded at the proposed project site during surveys, with no evidence of regular flight paths, commuting behaviour, or consistent site use. In addition, similar suitable foraging habitats are available in the surrounding landscape. Consequently, the potential for significant effects on this SCI species arising from barrier effects is considered unlikely and there is no potential for adverse effects on the integrity of Dovegrove Callows SPA.

Attributes	Measures	Target	Potential for Adverse Effects
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population targe	No - Overnight roosting habitat for the Greenland white-fronted goose typically consists of permanent waterbodies such as lakes, estuaries, bays, and other open water features. When roosting in such areas, the species may also use above-water features such as sandbanks (NPWS, 2025a). No suitable roosting habitats of this nature occur within or in close proximity to the proposed project site. As a result, the site is unlikely to be used by Greenland white-fronted goose for roosting purposes. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of Dovegrove Callows SPA
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	No - The wind farm site of the proposed project lies approximately 6 km from Dovegrove Callows SPA, and some works associated with the GCR occur closer (approximately 200 m from the Dallow 110 kV substation), therefore the site is considered to be within the potential foraging range of the Greenland white-fronted goose (typically 5–8 km; SNH, 2016). However, the species was not regularly recorded at the proposed project site during surveys, with no evidence of regular flight paths, commuting behaviour, or consistent

Attributes	Measures	Target	Potential for Adverse Effects
			site use. In addition, similar suitable foraging habitats are available in the surrounding landscape. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of Dovegrove Callows SPA.

6.1.4 River Little Brosna Callows SPA

The River Little Brosna Callows SPA is located 3km west of the proposed substation and 8.5km from the proposed project site. The SPA extends along both sides of the river within counties Offaly and Tipperary. The main habitat present is the extensive area of low-lying callow grassland along the floodplain of the river (NPWS, 2014a). The River Little Brosna Callows is an internationally important site for wintering waterfowl such as Greenland white-fronted goose, golden plover, and black-tailed godwit. The SPA is also an important spring passage site for species such as the black-tailed godwit flock, which is the largest in the country. The SPA is of national importance for whooper swan, wigeon, teal, pintail, shoveler, lapwing, and black-headed gull. The populations of wigeon, teal and golden plover are consistently among the largest in the country (NPWS, 2014a).

6.1.4.1 Identification of Individual Qualifying Features of the River Little Brosna Callows SPA with the Potential to be Affected

The SPA is designated for the following Annex I species which are listed and discussed in relation to the proposed project below (* indicates priority species):

- Whooper Swan (*Cygnus cygnus*) [A038]
- Teal (*Anas crecca*) [A052]
- Pintail (*Anas acuta*) [A054]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]
- Wigeon (*Mareca penelope*) [A855]
- Shoveler (*Spatula clypeata*) [A857]
- Wetland and Waterbirds [A999]

Table 6-7 lists the qualifying features of this European site and determines, in the light of their Conservation Objectives, extent and proximity to the proposed project, whether there are any pathway and potential for adverse effect on the individual qualifying interest.

Table 6-7 Qualifying Interests, Extent of Habitat and Conservation Objectives for the River Little Brosna Callows SPA and Potential for Effect (NPWS, 2025c)

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Whooper Swan (*Cygnus cygnus*) [A038]	The site is of national importance for this species (122: 4 years mean peaks between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	**Yes** –The proposed project site supports habitats known to be suitable for these species, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025). During field surveys theses SCI species were recorded in various numbers at the proposed project site (refer to Section 4.2.6), some of which occurring regularly within the proposed project site, while others were just commuting over the area with the site. Additionally, there is hydrological connectivity between the proposed project sites and this SPA via the Little the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project has the potential to result in a degradation of water quality of this river and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA supports seasonally inundated callows habitats and is designated for the QI species and habitat. Given the downstream hydrological connection and the floodplain nature of the SPA, further assessment is required.
Wigeon (*Mareca penelope*) [A855]	The site is of national importance for this species (8,116: 4 years mean peaks between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	
Teal (*Anas crecca*) [A052]	The site is of national importance for this species (2,683: 4 years mean peaks between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Pintail (*Anas acuta*) [A054]	The site is of national importance for this species (130: 4 years mean peaks between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Shoveler (*Spatula clypeata*) [A857]	The site is of national importance for this species (164: 4 years mean peaks between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Golden Plover (*Pluvialis apricaria*) [A140]	The site is of international importance for this species (10,577: 3 years mean population peak from aerial surveys between 1995/1996 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Lapwing (*Vanellus vanellus*) [A142]	The site is of national importance for this species (6,552: 3 years mean peak from aerial surveys between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Black-tailed Godwit *(Limosa limosa)* [A156]	The site is of international importance for this species (2,900: 4 years mean peak between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	The site is of national importance for this species (1,939: 4 years mean peaks between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	The site is of international importance for this species (527: mean peak count for the five winters 1994/95 to 1998/99). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Wetland and Waterbirds [A999]	The callows are of importance for breeding waders with species as redshank (65 pairs in 1987 and 22 pairs in 2002), snipe (35 pairs in 1987 and 23 pairs in 2002) and lapwing (41 pairs in 1987) have been recorded breeding here. Corncrake formerly bred on the Brosna callows (2 calling birds recorded in 1993) and may still breed occasionally. The extent of the wetland habitat is not mapped within the SSCO document.	To maintain the favourable conservation condition.	

6.1.4.2 Assessment of Adverse Effects on the Site Integrity of the River Little Brosna Callows SPA

Individual Qualifying Interests identified in Table 6-7 as having a potential source–pathway–receptor linkage and potential for adverse effects are assessed in detail below. The specific attributes and targets underpinning the conservation objectives for each Qualifying Interest within the River Little Brosna Callows SPA are presented in Table 6-8. The following assessment evaluates the potential for the proposed project to adversely affect these conservation objectives, and thereby the overall integrity of the site.

Table 6-8: Assessment of Adverse Effects on the Conservation Objectives of the River Little Brosna Callows SPA as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
Whooper Swan (*Cygnus cygnus*) [A038]			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, whooper swan was occasionally recorded at the proposed project site, with flocks ranging in size from 2 to 11 birds, but up to 55 were recorded. Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeast of the site. The proposed project site supports habitats that are suitable for the species, including, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025). However, as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 5km; SNH, 2016). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 5km; SNH, 2016). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No - Overnight roosting habitat for this species typically consists of permanent waterbodies, such as rivers, lakes, turloughs, lagoons and other open waterbodies (NPWS, 2025). No suitable roosting habitats of this nature occur within or in close proximity to the proposed project site. As a result, the site is unlikely to be used by species for roosting purposes. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss,

Attributes	Measures	Target	Potential for Adverse Effects
			or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	No - as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 5km; SNH, 2016). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely and there will be no potential for adverse effects on this attribute or on the integrity of the SPA. .
[A855] Wigeon (*Mareca penelope*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, wigeon was irregularly recorded at the proposed project site, only observed six times over the four winter seasons, with one observation containing a flock of 125 birds. Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeast of the site. The proposed project site supports habitats that are suitable for the species, including, rivers and

Attributes	Measures	Target	Potential for Adverse Effects
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	river floodplains, and other wetland habitats, as well as pastures (NPWS, 2025). However, as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 2-3km; Johnson *et al.,* 2014). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and ncherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 2-3km; Johnson et al., 2014). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely and there will be no potential for adverse effects on this attribute or on the integrity of the SPA..
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No - Wigeon rely primarily on wetlands or waterbodies for roosting. When roosting overnight, this species typically utilises a similar range of habitats as noted for foraging (i.e. marshes, lagoons, estuaries, coastal bays, lakes, rivers and river floodplains, turloughs and other wetland habitats, as well as pastures) (NPWS, 2025). The proposed project site contains habitat types that Wigeon may find suitable for roosting. However, the site lies outside the core foraging range of this species, which is typically 2–3 km (Johnson et al., 2014). Therefore, the potential for significant effects on this species arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA. .

Attributes	Measures	Target	Potential for Adverse Effects
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	No - as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 2-3km; Johnson et al., 2014). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A052] Teal (*Anas crecca*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, teal was irregularly recorded at the proposed project site, only observed 10 times over the four winter seasons, with flocks ranging from 4 to 50 individuals, though a notable peak of 300 birds was recorded on one occasion. Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeastern portion of the site. The proposed project site supports habitats that are suitable for the species, including floodplains, and agricultural areas (NPWS, 2025). However, as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (ranging from 800m to 8.4km; Johnson *et al.,* 2014). Additionally, no regular flight direction, commuting pattern, or consistent use of the site was observed, and similar suitable
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and ncherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	The wind farm site of the proposed project lies approximately 8.5 km from this SPA, placing it outside the potential foraging range for the species (ranging from 800 m to 8.4 km; Johnson et al., 2014). No regular flight direction, commuting pattern, or consistent use of the site was observed during surveys, and no functional connectivity between the SPA and the

Attributes	Measures	Target	Potential for Adverse Effects
			proposed project site has been identified. Similar suitable habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	When roosting overnight, teal primarily utilise permanent waterbodies, marshes, wide ditches, wet grasslands, and wetlands (NPWS, 2025). The proposed project site contains habitat types that teal may find suitable for roosting. However, as the wind farm site of the proposed project lies approximately 8.5 km from the SPA, it is considered to be outside the potential foraging range for this species (ranging from 800 m to 8.4 km; Johnson et al., 2014). No regular flight direction, commuting pattern, or consistent use of the site was observed during surveys, and similar suitable habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	The wind farm site of the proposed project lies approximately 8.5 km from this SPA, placing it outside the potential foraging range for the species (ranging from 800 m to 8.4 km; Johnson et al., 2014). No regular

Attributes	Measures	Target	Potential for Adverse Effects
			flight direction, commuting pattern, or consistent use of the site was observed during surveys, and no functional connectivity between the SPA and the proposed project site has been identified. Similar suitable habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A054] Pintail (*Anas acuta*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, pintail was rarely recorded at the proposed project site, only observed six times over the four winter seasons, with one observation containing a flock of 209 birds (which exceeds the threshold for a nationally important flock). Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeast of the site. The proposed project site supports habitats that are suitable for the species, including, floodplains, and agricultural areas (including stubble fields). (NPWS, 2025). However, no regular flight direction, commuting pattern, or consistent use of the site was observed, and similar suitable habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance,
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			displacement, habitat loss, or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and ncherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	The wind farm site lies approximately 8.5 km from the SPA, placing it within the potential foraging range of the species, which can extend from 1.3 km to 18.5 km (Johnson et al., 2014). However, pintail were not regularly recorded at the proposed project site during surveys, and there was no evidence of regular flight paths, commuting behaviour, or consistent site use. Moreover, similar suitable foraging habitats are available throughout the surrounding landscape. Consequently, the potential for

Attributes	Measures	Target	Potential for Adverse Effects
			significant effects on this SCI species arising from barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	During winter, pintail typically roost in undisturbed wetlands (NPWS, 2025). The proposed project site contains such habitat types that may be suitable for roosting. Additionally, the wind farm site lies approximately 8.5 km from the SPA, placing it within the potential foraging range of the species, which can extend from 1.3 km to 18.5 km (Johnson et al., 2014). However, pintail were not regularly recorded at the proposed project site during surveys, and there was no evidence of regular flight paths, commuting behaviour, or consistent site use. Moreover, similar suitable foraging habitats are available throughout the surrounding landscape. Consequently, the potential for significant effects on this SCI species arising from barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A857] Shoveler (*Spatula clypeata*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, shoveler was rarely recorded at the proposed project site, only observed once over the four winter seasons, involving three birds foraging adjacent to the river Little Brosna on flooded
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable	

Attributes	Measures	Target	Potential for Adverse Effects
		habitat to support the population target	agricultural fields to the northeast of the site. The proposed project site supports habitats that are suitable for the species, including, rivers and flood-waters, as well as grasslands (NPWS, 2025). However, as the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 2-3km; Johnson *et al.,* 2014) and that no regular flight direction, commuting pattern, or consistent use of the site was observed, and similar suitable habitats are available in the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and ncherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support.
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - As the wind farm site of the proposed project lies approximately 8.5 km from this SPA, the site is considered to be outside the potential foraging range of the species (typically 2–3 km; Johnson et al., 2014). Shoveler were not regularly recorded at the proposed project site during surveys, and there was no evidence of regular flight paths, commuting behaviour, or consistent site use. Furthermore, similar suitable foraging habitats are available throughout the surrounding landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	Shoveler rely primarily on wetlands and waterbodies for roosting. When roosting overnight, this species typically utilises a similar range of habitats to those used for foraging, including marshes, rivers, floodwaters, lakes, reservoirs, lagoons, estuaries, and grasslands (NPWS, 2025). The proposed project site contains habitat types that shoveler may find suitable for roosting. However, the site lies outside the core foraging range of this species, which is typically 2–3 km (Johnson et al., 2014).

Attributes	Measures	Target	Potential for Adverse Effects
			Shoveler were not regularly recorded at the proposed project site during surveys, and there was no evidence of regular flight paths, commuting behaviour, or consistent site use. Moreover, similar suitable foraging habitats are available throughout the surrounding landscape. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss, collision, or barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A140] Golden Plover (*Pluvialis apricaria*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, golden plover were regularly recorded at the proposed project site, with a total of 83 observations involving 6,607 individual birds. Flock sizes ranged from four to 700 individuals and were typically located adjacent to the River Little Brosna on flooded agricultural fields to the northeast of the site, flying over the site or recorded in other wetland habitats throughout the wider study area. The proposed project site supports habitats suitable for the species, including river floodplains and other wetlands, as well as grasslands (wet grassland, semi-improved, and improved grasslands), stubble fields, and ploughed farmland (NPWS, 2025).
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			There are no recognised foraging ranges for wintering golden plover; however, if following the ranges set by breeding birds, and taking into account a maximum range of 11 km (SNH, 2016), the wind farm site of the proposed project lies within the potential range for the SPA. However, there was limited evidence to suggest that birds recorded onsite were commuting from this SPA. No regular flight direction, commuting pattern, or consistent site use was observed, and similar suitable habitats are available throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support.

Attributes	Measures	Target	Potential for Adverse Effects
			A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - There are no recognised foraging ranges for wintering golden plover; however, if following the ranges set by breeding birds, and taking into account a maximum range of 11 km (SNH, 2016), the wind farm site of the proposed project lies within the potential range for the SPA. However, there was limited evidence to suggest that birds recorded onsite were commuting from this SPA. No regular flight direction, commuting pattern, or consistent site use was observed, and similar suitable habitats are available throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No - Golden plover rely primarily on wetlands and waterbodies for roosting. When roosting, this species typically utilises a similar range of habitats to those used for foraging, including river floodplains and other wetlands, as well as grasslands (wet grassland, semi-improved, and improved grasslands), stubble fields, and ploughed farmland (NPWS, 2025). There are no recognised foraging ranges for wintering golden plover; however, if following the ranges set by breeding birds,

Attributes	Measures	Target	Potential for Adverse Effects
			and taking into account a maximum range of 11 km (SNH, 2016), the wind farm site of the proposed project lies within the potential range for the SPA. However, there was limited evidence to suggest that birds recorded onsite were commuting from this SPA. No regular flight direction, commuting pattern, or consistent site use was observed, and similar suitable habitats are available throughout the wider landscape. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss, collision, or barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	There are no recognised foraging ranges for wintering golden plover; however, if following the ranges set by breeding birds, and taking into account a maximum range of 11 km (SNH, 2016), the wind farm site of the proposed project lies within the potential range for the SPA. However, there was limited evidence to suggest that birds recorded onsite were commuting from this SPA. No regular flight direction, commuting pattern, or consistent site use was observed, and similar suitable habitats are available throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is

Attributes	Measures	Target	Potential for Adverse Effects
			considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A142] Lapwing (*Vanellus vanellus*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, lapwing were regularly recorded at the proposed project site, with a total of 67 observations involving 2,203 individual birds. Records typically involved small flocks of 10–60 individuals, although larger groups of up to 200 birds were occasionally recorded, primarily adjacent to the River Little Brosna on flooded agricultural fields in the northeastern portion of the site. The proposed project site supports a range of habitats suitable for lapwing, including river floodplains and other wetlands, as well as grasslands (wet grassland, semi-improved, and improved), stubble fields, and ploughed farmland (NPWS, 2025). There are no well-defined foraging ranges for wintering lapwing, and flocks can be extremely mobile during winter. Typical patterns involve flocks using one or two areas of suitable habitat for several weeks, then moving to another area, which may be several kilometres away (Gillings and Fuller, 1999). Therefore, proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - There are no well-defined foraging ranges for wintering lapwing, and flocks can be extremely mobile during winter. Typical patterns involve flocks using one or two areas of suitable habitat for several weeks, then moving to another area, which may be several kilometres away (Gillings and Fuller, 1999). Therefore, the wind farm site of the

Attributes	Measures	Target	Potential for Adverse Effects
			proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No - Lapwing rely primarily on wetlands and waterbodies for roosting. When roosting, this species typically utilises a similar range of habitats to those used for foraging, including river floodplains and other wetlands, as well as grasslands (wet grassland, semi-improved, and improved grasslands), stubble fields, and ploughed farmland (NPWS, 2025). There are no well-defined foraging ranges for wintering lapwing, and flocks can be extremely mobile during winter. Typical patterns involve flocks using one or two areas of suitable habitat for several weeks, then moving to another area, which may be several kilometres away (Gillings and Fuller, 1999). Therefore, the proposed project has the potential to be within range of the SPA.

Attributes	Measures	Target	Potential for Adverse Effects
			However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	No - There are no well-defined foraging ranges for wintering lapwing, and flocks can be extremely mobile during winter. Typical patterns involve flocks using one or two areas of suitable habitat for several weeks, then moving to another area, which may be several kilometres away (Gillings and Fuller, 1999). Therefore, the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.

Attributes	Measures	Target	Potential for Adverse Effects
*[A156]*Black-tailed Godwit *(Limosa limosa)*			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, this species was recorded rarely, with two observations totalling 460 individuals (maximum single count of 350). Sightings were concentrated within wetland and seasonally flooded areas along the eastern red line boundary, adjacent to the River Little Brosna, where birds were observed actively foraging. The proposed project site supports habitats known to be suitable for non-breeding Black-tailed Godwits, including seasonally inundated pastures, shallow flooded areas, and floodplain wetlands (NPWS, 2025). There are no well-defined foraging ranges for wintering black-tailed godwit, however limited studies indicate that black-tailed godwits commonly exhibit fine-scale foraging site fidelity during the non-breeding season, typically using a limited network of feeding patches. Lourenço et al. (2010) showed that individuals in Portuguese rice fields repeatedly exploited nearby sites and shifted as resources declined, while Jourdan et al. (2022) found similarly restricted feeding ranges shaped by tidal and habitat conditions. Together, these studies indicate a range-resident foraging strategy involving short, local movements that maintain functional connectivity within wetland networks while some individuals, undertake more irregular long-distance movements
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			that maintain functional connectivity across wider wetland networks. Therefore, the wind farm site of the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**

Attributes	Measures	Target	Potential for Adverse Effects
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - There are no well-defined foraging ranges for wintering lapwing, however limited studies indicate that black-tailed godwits commonly exhibit fine-scale foraging site fidelity during the non-breeding season, typically utilising a limited network of feeding patches within local wetland complexes. However, populations also display range-resident behaviour, involving short periodic movements (e.g. 24–72 hours) and, in some individuals, more irregular long-distance movements that maintain functional connectivity across wider wetland networks. Therefore, the wind farm site of the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No – Black-tailed godwit rely primarily on wetlands and waterbodies for roosting. When roosting, this species typically utilises a similar range of habitats to those used for foraging, including seasonally inundated

Attributes	Measures	Target	Potential for Adverse Effects
			pastures, shallow flooded areas, and floodplain wetlands (NPWS, 2025). There are no well-defined foraging ranges for wintering black-tailed godwit, however limited studies indicate that black-tailed godwits commonly exhibit fine-scale foraging site fidelity during the non-breeding season, typically utilising a limited network of feeding patches within local wetland complexes. However, populations also display range-resident behaviour, involving short periodic movements (e.g. 24–72 hours) and, in some individuals, more irregular long-distance movements that maintain functional connectivity across wider wetland networks. Therefore, the wind farm site of the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	No - There are no well-defined foraging ranges for wintering lapwing, however limited studies indicate that black-tailed godwits commonly exhibit fine-scale

Attributes	Measures	Target	Potential for Adverse Effects
			foraging site fidelity during the non-breeding season, typically utilising a limited network of feeding patches within local wetland complexes. However, populations also display range-resident behaviour, involving short periodic movements (e.g. 24–72 hours) and, in some individuals, more irregular long-distance movements that maintain functional connectivity across wider wetland networks. Therefore, the wind farm site of the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - This species was recorded regularly during field surveys, with 133 observations totalling 1,942 individuals (typically in flocks of 1–11, with a maximum single count of 250). Sightings were concentrated within wetland and seasonally flooded areas along the eastern red line boundary, adjacent to
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	the River Little Brosna, where birds were observed actively foraging. The proposed project site supports habitats known to be suitable for non-breeding Black-headed Gulls, including wetlands and surrounding agricultural areas (NPWS, 2025). Black-headed gull is a highly mobile, opportunistic species that forages across a broad range of habitats, including wetlands, flooded grasslands, agricultural fields, and occasionally terrestrial areas such as refuse sites. Individuals and flocks frequently exploit locally available feeding resources, with movements influenced by water levels, food availability, and weather conditions rather than fixed foraging territories. As such, the species can operate across wide, overlapping foraging areas and is capable of regular movement between wetlands within a regional network. Although the species was regularly recorded at the proposed project site, there was no evidence of regular commuting behaviour or directional flight activity indicative of a functional connection with the SPA. Given the abundance of suitable alternative foraging habitat within the wider landscape, the mobility of the species, and the absence of colony-based dependence during the non-breeding season, the potential for significant effects arising from disturbance, displacement, or barrier effects is considered unlikely.
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	Black-headed gull is a highly mobile, opportunistic species that forages across a broad range of habitats, including wetlands, flooded grasslands, agricultural fields, and occasionally terrestrial areas such as refuse sites. Individuals and flocks frequently exploit locally available feeding resources, with movements influenced by water levels, food availability, and weather conditions rather than fixed foraging territories. As such, the species can operate across wide, overlapping foraging areas and is capable of regular movement between wetlands within a regional network.

Attributes	Measures	Target	Potential for Adverse Effects
			Although the species was regularly recorded at the proposed project site, there was no evidence of regular commuting behaviour or directional flight activity indicative of a functional connection with the SPA. Given the abundance of suitable alternative foraging habitat within the wider landscape, the mobility of the species, and the absence of colony-based dependence during the non-breeding season, the potential for significant effects arising from disturbance, displacement, or barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No – Black-headed Gull rely primarily on open wetlands and waterbodies for roosting. (NPWS, 2025). The proposed project site supports habitats known to be suitable for roosting non-breeding Black-headed gulls. Black-headed gull is a highly mobile, opportunistic species that forages across a broad range of habitats, including wetlands, flooded grasslands, agricultural fields, and occasionally terrestrial areas such as refuse sites. Individuals and flocks frequently exploit locally available feeding resources, with movements influenced by water levels, food availability, and weather conditions rather than fixed foraging territories. As such, the species can operate across wide, overlapping foraging areas and is capable of

Attributes	Measures	Target	Potential for Adverse Effects
			regular movement between wetlands within a regional network. Although the species was regularly recorded at the proposed project site, there was no evidence of regular commuting behaviour or directional flight activity indicative of a functional connection with the SPA. Given the abundance of suitable alternative foraging habitat within the wider landscape, the mobility of the species, and the absence of colony-based dependence during the non-breeding season, the potential for significant effects arising from disturbance, displacement, or barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	Black-headed gull is a highly mobile, opportunistic species that forages across a broad range of habitats, including wetlands, flooded grasslands, agricultural fields, and occasionally terrestrial areas such as refuse sites. Individuals and flocks frequently exploit locally available feeding resources, with movements influenced by water levels, food availability, and weather conditions rather than fixed foraging territories. As such, the species can operate across wide, overlapping foraging areas and is capable of regular movement between wetlands within a regional network. Although the species was regularly recorded at the proposed project site, there was no

Attributes	Measures	Target	Potential for Adverse Effects
			evidence of regular commuting behaviour or directional flight activity indicative of a functional connection with the SPA. Given the abundance of suitable alternative foraging habitat within the wider landscape, the mobility of the species, and the absence of colony-based dependence during the non-breeding season, the potential for significant effects arising from disturbance, displacement, or barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A395] Greenland White-fronted Goose (*Anser albifrons flavirostris)*			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, Greenland white-fronted goose was rarely recorded at the proposed project site, with only two observations over a four winter survey periods (refer to Section 4.2.6.5). Both observations involved a single bird flying along the River Little Brosna without interacting with the site. The proposed project site supports habitats that are potentially suitable for the species, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025). However, no regular flight direction, commuting pattern, or consistent use of the site was observed, and similar suitable habitats are available in the wider landscape. Consequently, the potential for significant
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
			effects arising from disturbance, displacement, habitat loss, or collision is considered unlikely. There is, however, a clear hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and Incherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	No - The wind farm site of the proposed project lies approximately 8.5 km from this SPA, therefore the site is considered to be outside the potential foraging range of the Greenland white-fronted goose (typically 5–8 km; SNH, 2016). Additionally, the species was not regularly recorded at the proposed project site during surveys, with no evidence of regular flight paths, commuting behaviour, or consistent site use.

Attributes	Measures	Target	Potential for Adverse Effects
			Consequently, the potential for significant effects on this SCI species arising from barrier effects is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	No - Overnight roosting habitat for the Greenland white-fronted goose typically consists of permanent waterbodies such as lakes, estuaries, bays, and other open water features. When roosting in such areas, the species may also use above-water features such as sandbanks (NPWS, 2025). No suitable roosting habitats of this nature occur within or in close proximity to the proposed project site. As a result, the site is unlikely to be used by Greenland white-fronted goose for roosting purposes. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	No - The wind farm site of the proposed project lies approximately 8.5 km from this SPA; therefore the site is considered to be outside the potential foraging range of the Greenland white-fronted goose (typically 5–8 km; SNH, 2016). Additionally, the species was not regularly recorded at the proposed project site during surveys, with no evidence

Attributes	Measures	Target	Potential for Adverse Effects
			of regular flight paths, commuting behaviour, or consistent site use. Consequently, the potential for significant effects on this SCI species arising from disturbance, displacement, habitat loss, or collision is considered unlikely, and there will be no potential for adverse effects on this attribute or on the integrity of the SPA.
[A999] Wetlands			
Wetland habitat area	Hectares	No significant loss to wetland habitat within the SPA, other than that occurring from natural patterns of variation	There is a hydrological connection between the proposed project site and Little Brosna Callows SPA via the Little Brosna_040 and ncherky_010 which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats/wetlands that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Wetland habitat quality and functioning	Quality and function of the wetland habitat	No significant impact on the quality or functioning of the wetland habitat within the SPA, other than that occurring from natural patterns of variation	

6.1.5 Lough Derg (Shannon) SPA

Lough Derg (Shannon) SPA is located 12.8km west of the proposed project site. Lough Derg lies within counties Tipperary, Galway and Clare and is the largest of the River Shannon Lakes. Lough Derg is of importance for both breeding and wintering birds. The SPA supports a nationally important breeding colony of Common Tern (*Sterna hirundo*). Large numbers of Black-Headed Gull have traditionally bred on the many islands (2,176 pairs in 1985) but the recent status of this species is not known. The islands in the lake also support a nationally important Cormorant colony (NPWS, 2014b). Lough Derg is also a noted breeding site for Great Crested Grebe (*Podiceps cristatus*) (47 pairs in 1995) and tufted duck. In winter, the lake is important for a range of waterfowl species, including nationally important populations of tufted duck, goldeneye and many other species. Hen harriers are also known to roost in the reedbeds on the margins of the site during the winter (NPWS, 2014b).

6.1.5.1 Identification of Individual Qualifying Features of the Lough Derg (Shannon) SPA with the Potential to be Affected

The SPA is designated for the following Annex I species which are listed and discussed in relation to the proposed project below (* indicates priority species):

- Cormorant (*Phalacrocorax carbo*) [A017]
- Tufted Duck (*Aythya fuligula*) [A061]
- Goldeneye (*Bucephala clangula*) [A067]
- Common Tern (*Sterna hirundo*) [A193]
- Wetland and Waterbirds [A999]

Table 6-9 lists the QIs of this European site and determines, in the light of their Conservation Objectives, extent and proximity to the proposed project, whether there are any pathway and potential for adverse effect on the individual qualifying interest.

Table 6-9 Qualifying Interests, Extent of Habitat and Conservation Objectives for the Lough Derg (Shannon) SPA and Potential for Effect. (NPWS, 2024)

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Cormorant (*Phalacrocorax carbo*) [A017]	The site is of national importance for the breeding populations of this species (167 pairs were recorded in 1995; a partial survey of the lake in 2010 recorded 113 pairs). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	**Yes** - The proposed project site supports limited habitats suitable for SCI species for which SPA is designated. During field surveys, only cormorant was recorded within the proposed wind farm site; the remaining SCI species were not recorded, and therefore significant effects on these species are not anticipated. Cormorant was recorded regularly and given the potential foraging range of the species (up to 35 km; Woodward et al., 2019), individuals recorded within the proposed project site could be associated with the SPA. Additionally, there is hydrological connectivity between the proposed project site and the SPA via the Little Brosna_040 and Shannon (Lower)_030 rivers. The proposed project has the potential to result in temporary degradation of water quality within these watercourses and their downstream receptors during the construction and decommissioning phases. The SPA is designated for a number of wintering and breeding bird species, as well as wetland habitats, which may be indirectly affected by changes in water quality. Given the presence of a downstream hydrological connection and the extent of wetland and open water habitats within the SPA, further
Tufted Duck (*Aythya fuligula*) [A061]	The site is of national importance for the breeding and wintering populations of this species (169 breeding pairs in May 1995) (776 winter mean peaks for 4 of the 5 seasons between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Goldeneye (*Bucephala clangula*) [A067]	The site is of national importance for winter populations of this species (157: mean peaks for 4 of the 5 seasons between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Common Tern (*Sterna hirundo*) [A193]	The site is of national importance for the breeding populations of this species (55 pairs recorded in 1995). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Wetland and Waterbirds [A999]	The lake and wetlands are important for other wintering species such as mute swan (164), whooper swan (18), wigeon (249), teal (301), mallard (376), little grebe (14), cormorant (90), coot (173), lapwing (922), curlew (66) and black-headed Gull (732).	To maintain the favourable conservation condition.	assessment is required to determine the potential for adverse effects on site integrity.

6.1.5.2 Assessment of Adverse Effects on the Site Integrity of the Lough Derg (Shannon) SPA

Individual SCIs identified in Table 6-9 as having a potential source–pathway–receptor linkage and potential for adverse effects are assessed in detail below. The specific attributes and targets underpinning the conservation objectives for each SCI within the Lough Derg (Shannon) SPA are presented in Table 6-10. The following assessment evaluates the potential for the proposed project to adversely affect these conservation objectives, and thereby the overall integrity of the site.

Table 6-10: Assessment of Adverse Effects on the Conservation Objectives of the Lough Derg (Shannon) SPA as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[A017] Cormorant (*Phalacrocorax carbo*)			
Breeding population size	Number of Apparently Occupied Nests (AON)	Long term SPA population trend is stable or increasing	**Yes** - Cormorant was regularly recorded within the proposed project site during field surveys, with observations primarily associated with wetland and riverine habitats. The species was typically recorded in low numbers or as single individuals however, a communal roost site within the study area was identified, where larger numbers were observed, with the highest count being 40 individuals. These higher numbers of roosting birds predominantly occurred during the winter months (October to March, inclusive). Given the maximum recorded foraging range of up to 35 km (Woodward et al., 2019), individuals observed within the proposed project site could potentially be associated with the SPA. However, the majority of records within the site relate to wintering birds, and no evidence of breeding or nesting activity was recorded. Accordingly, there is no potential for adverse effects on the breeding population of cormorant within the SPA arising from habitat loss, disturbance, or collision risk associated with the proposed project. There is, however, potential for indirect effects on cormorant through degradation of water quality in the hydrologically connected rivers, which could adversely affect prey availability and, consequently, impact the SPA breeding population. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Productivity rate	Number of fledged young per AON	Sufficient to maintain a stable or increasing population	
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population	
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Disturbance at the breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on birds at the breeding site	No - Given the maximum recorded foraging range of up to 35 km (Woodward et al., 2019), individuals observed within the proposed project site could potentially be associated

Attributes	Measures	Target	Potential for Adverse Effects
Disturbance at areas ecologically connected to the colony	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population	with the SPA. However, the majority of records within the site relate to wintering birds, and no evidence of breeding or nesting activity was recorded. In addition, the proposed project site lies approximately 12.9 km from the SPA, a distance considered to be outside the range of potential disturbance effects. Accordingly, there is no potential for adverse effects on the breeding population of cormorant within the SPA arising from habitat loss, disturbance, or collision risk associated with the proposed project.
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	
[A061] Tufted Duck (*Aythya fuligula*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - Tufted duck is a wintering SCI species for the SPA. No individuals were recorded within the proposed project site during field surveys. Consequently, there is no potential for adverse effects on the species arising from habitat loss, disturbance, or collision risk associated with the proposed project. However, as with other waterbird species, there remains potential for indirect effects through degradation of water quality in the hydrologically connected rivers, which could affect prey availability. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore on the integrity of the SPA.**
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	No - The proposed project site lies approximately 12.9 km from the SPA, and no records of this species were made during field surveys at the site. Given this distance, the low potential for disturbance or barrier effects, and the unlikelihood of the attribute being affected by any potential degradation of water quality, there is no potential for adverse effects on this attribute, and consequently no impact on the integrity of the SPA.
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	

Attributes	Measures	Target	Potential for Adverse Effects
[A067] Goldeneye (*Bucephala clangula*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - Goldeneye is a wintering SCI species for the SPA. No individuals were recorded within the proposed project site during field surveys. Consequently, there is no potential for adverse effects on the species arising from habitat loss, disturbance, or collision risk associated with the proposed project. However, as with other waterbird species, there remains potential for indirect effects through degradation of water quality in the hydrologically connected rivers, which could affect prey availability. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore on the integrity of the SPA.**
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	No - The proposed project site lies approximately 12.9 km from the SPA, and no records of this species were made during field surveys at the site. Given this distance, the low potential for disturbance or barrier effects, and the unlikelihood of the attribute being affected by any potential degradation of water quality, there is no potential for adverse effects on this attribute, and consequently no impact on the integrity of the SPA.
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
[A193] Common Tern (*Sterna hirundo*)			
Breeding population size	Number of Apparently Occupied Nests (AON)	Long term SPA population trend is stable or increasing	**Yes** – Common Tern is a breeding SCI species for the SPA. No individuals were recorded within the proposed project site during field surveys. Consequently, there is no potential for adverse effects on the species arising from habitat loss,
Productivity rate	Number of fledged young per AON	Sufficient to maintain a stable or increasing population	

Attributes	Measures	Target	Potential for Adverse Effects
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population	disturbance, or collision risk associated with the proposed project. However, as with other waterbird species, there remains potential for indirect effects through degradation of water quality in the hydrologically connected rivers, which could affect prey availability and so the breeding attributes or habitat usage of this species. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore on the integrity of the SPA.**
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Disturbance at the breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on birds at the breeding site	No - The proposed project site lies approximately 12.9 km from the SPA, and no records of this species were made during field surveys at the site. Given this distance, the lack of potential for disturbance or barrier effects, and the unlikelihood of the attribute being affected by any potential degradation of water quality, there is no potential for adverse effects on this attribute, and consequently no impact on the integrity of the SPA.
Disturbance at areas ecologically connected to the colony	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population	
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	
[A999] Wetland and Waterbirds			
Wetland habitat area	Hectares	No significant loss to wetland habitat within the SPA, other than that occurring from natural patterns of variation	There is a hydrological connection between the proposed project site and Lough Derg (Shannon) SPA via the Little Brosna_040 and Shannon (Lower)_030 rivers. which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats/wetlands that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support.
Wetland habitat quality and functioning	Quality and function of the wetland habitat	No significant impact on the quality or functioning of the wetland habitat within the SPA, other than that occurring from natural patterns of variation	

Attributes	Measures	Target	Potential for Adverse Effects
			A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA

6.1.6 Middle Shannon Callows SPA

The Middle Shannon Callows SPA is located 14km north of the proposed project site. The Middle Shannon Callows SPA is a long and diverse site which extends for approximately 50 km from the town of Athlone to the town of Portumna, it lies within Counties Galway, Roscommon, Westmeath, Offaly and Tipperary. The Middle Shannon Callows qualifies as a site of international importance as it regularly supports in excess of 20,000 wintering waterbirds (23,656 – four years mean peak for four of the winters between 1995/96 and 1999/2000). (NPWS, 2012). The site also supports internationally important populations of whooper swan and black-tailed godwit. The SPA is also of national importance for wigeon, golden plover, lapwing and black-headed gull. The Shannon Callows is the largest site monitored as part of I-WeBS as well as being an important site for breeding waders (NPWS, 2012).

6.1.6.1 Identification of Individual Qualifying Features of the Middle Shannon Callows SPA with the Potential to be Affected

The SPA is designated for the following Annex I species which are listed and discussed in relation to the proposed project below (* indicates priority species):

- Whooper Swan (*Cygnus cygnus*) [A038]
- Wigeon (*Mareca penelope*) [A855]
- Corncrake (*Crex crex*) [A122]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Wetland and Waterbirds [A999]

Table 6-11 lists the qualifying features of this European site and determines, in the light of their Conservation Objectives, extent and proximity to the proposed project, whether there are any pathway and potential for adverse effect on the individual qualifying interest

Table 6-11 Qualifying Interests, Extent of Habitat and Conservation Objectives for the Middle Shannon Callows SPA and Potential for Effect. (NPWS,2022a)

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Whooper Swan (*Cygnus cygnus*) [A038]	The site is of international importance for the population of this species (305 – five years mean peak for the period 1995/96 to 1999/2000). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	**Yes** –The proposed project site supports habitats known to be suitable for these species, including raised bogs, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2025). During field surveys theses SCI species were recorded in various numbers at the proposed project site (refer to Section 4.2.6), some of which occurring regularly within the proposed project site, while others were just commuting over the area with the site. Additionally, there is hydrological connectivity between the proposed project sites and this SPA via the Little the Little Brosna_040 and the Shannon (lower)_030 Rivers which flows through the SPA. The proposed project has the potential to result in a degradation of water quality of this river and all hydrologically connected rivers downstream during the construction and decommissioning phases of the proposed project. The SPA supports seasonally inundated callows habitats and is designated for the QI species and habitat. Given the downstream hydrological connection and the floodplain nature of the SPA, further assessment is required.
Wigeon (*Mareca penelope*) [A855]	The site is of national importance for the population of this species (3,059: four years mean peaks for four of the winters between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	
Golden Plover (*Pluvialis apricaria*) [A140]	The site is of national importance for the population of this species (4,133: four years mean peaks for four of the winters between 1995/96 and 1999/2000) recorded in 1995). The extent of the population is not mapped within the SSCO document.	To maintain the favourable conservation condition.	
Lapwing (*Vanellus vanellus*) [A142]	The site is of national importance for the wintering population of this species (13,240: four years mean peak for four of the winters between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
Black-tailed Godwit (*Limosa limosa*) [A156]	The site is of international importance for the population of this species (485: four years mean peak for four of the winters between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	The site is of national importance for the wintering population (1,209: four years mean peak for four of the winters between 1995/96 and 1999/2000). The extent of the population is not mapped within the SSCO document.	To restore the favourable conservation condition.	
Wetland and Waterbirds [A999]	The lake and wetlands are important for other wintering species and breeding waders with the total population on the Shannon and Little Brosna Callows being one of three major concentrations in Ireland and Britain in 1987. Numbers of some species have declined since then but a survey of the Shannon Callows in 2002 recorded the following breeding waders - Lapwing (63 pairs), Redshank (116 pairs), Snipe (139 drumming birds) and Curlew (8 pairs).	To maintain the favourable conservation condition.	
Corncrake (*Crex crex*) [A122]	The site is of importance for breeding population of this species (19 pairs: five years mean peak between 2003 and 2007, based on records of calling males). The extent of the population is not mapped within the SSCO document.	The status of corncrake as a Species of the SPA is currently under review.	No – There were no records of this species during the bird survey periods from 2020 to 2024. Therefore, there is no potential for adverse effects arising from disturbance, displacement, or collision risk.

Qualifying Interests (*indicates a priority species)	Extent of Habitat & Closest Proximity	Conservation Objective	Pathway & Potential for Effects
			Additionally, corncrake are summer visitors to Ireland and are known to feed on insects, slugs, snails, earthworms, and plant material, including the seeds of grasses and sedges. They typically breed in hay fields and are not significantly dependent on waterbodies. Therefore, no potential for adverse effects via hydrological pathways has been identified.

6.1.6.2 Assessment of Adverse Effects on the Site Integrity of the Middle Shannon Callows SPA

Individual SCIs identified in Table 6-11 as having a potential source–pathway–receptor linkage and potential for adverse effects are assessed in detail below. The specific attributes and targets underpinning the conservation objectives for each within the Middle Shannon Callows SPA are presented in Table 6-12. The following assessment evaluates the potential for the proposed project to adversely affect these conservation objectives, and thereby the overall integrity of the site.

Table 6-12: Assessment of Adverse Effects on the Conservation Objectives of the Middle Shannon Callows SPA as a Result of the Proposed Project

Attributes	Measures	Target	Potential for Adverse Effects
[A038] Whooper Swan (*Cygnus cygnus*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, whooper swan was occasionally recorded at the proposed project site, with flocks ranging in size from 2 to 11 birds, but up to 55 were recorded. Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeast of the site. The proposed project site supports habitats that are suitable for the species, including, wet grassland, callows, semi-improved and improved grassland, arable stubble, and winter cereals (NPWS, 2022). However, as the wind farm site of the proposed project lies approximately 14km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 5km; SNH, 2016). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, barrier effects or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Forage spatial distribution, extent and abundance	Location and area, and available forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Barriers to connectivity and site use	Number, location, shape and hectares	The number, location, shape and area of barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	

Attributes	Measures	Target	Potential for Adverse Effects
			construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
[A855] Wigeon (*Mareca penelope*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, wigeon was irregularly recorded at the proposed project site, only observed six times over the four winter seasons, with one observation containing a flock of 125 birds. Records were almost entirely confined to the Little Brosna River and adjacent flooded agricultural fields to the northeast of the site. The proposed project site supports habitats that are suitable for the species, including, rivers and river floodplains, and other wetland habitats, as well as pastures (NPWS, 2022). However, as the wind farm site of the proposed project lies approximately 14 km from this SPA, the site is considered to be outside the potential foraging range for the species (typically 2-3km; Johnson *et al.,* 2014). Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered low.
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Barriers to connectivity and site use	Number, location, shape and hectares	The number, location, shape and area of barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
Forage spatial distribution,	Location and area, and available forage biomass	Sufficient number of locations, area of suitable habitat and available	

Attributes	Measures	Target	Potential for Adverse Effects
extent and abundance		forage biomass to support the population target	There is, however, a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	
[A140] Golden Plover (*Pluvialis apricaria*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, golden plover were regularly recorded at the proposed project site, with a total of 83 observations involving 6,607 individual birds. Flock sizes ranged from four to 700 individuals and were typically located adjacent to the River Little Brosna on flooded agricultural fields to the northeast of the site, flying over the site or recorded in other wetland habitats throughout the wider study area. The proposed project site supports habitats
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets	

Attributes	Measures	Target	Potential for Adverse Effects
		for population trend and spatial distribution	suitable for the species, including river floodplains and other wetlands, as well as grasslands (wet grassland, semi-improved, and improved grasslands), stubble fields, and ploughed farmland (NPWS, 2022). There are no recognised foraging ranges for wintering golden plover; however, if following the ranges set by breeding birds, and taking into account a maximum range of 11 km (SNH, 2016), the wind farm site of the proposed project lies outside the potential range for the SPA. Additionally, there was limited evidence to suggest that birds recorded onsite were commuting from this SPA. No regular flight direction or commuting pattern was observed and similar suitable habitats are available throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, barrier effect or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated
Barriers to connectivity and site use	Number, location, shape and hectares	The number, location, shape and area of barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
Forage spatial distribution, extent and abundance	Location and area, and available forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	

Attributes	Measures	Target	Potential for Adverse Effects
			callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
[A142] Lapwing (*Vanellus vanellus*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, lapwing were regularly recorded at the proposed project site, with a total of 67 observations involving 2,203 individual birds. Records typically involved small flocks of 10–60 individuals, although larger groups of up to 200 birds were occasionally recorded, primarily adjacent to the River Little Brosna on flooded agricultural fields to the northeast of the site. The proposed project site supports a range of habitats suitable for lapwing, including river floodplains and other wetlands, as well as grasslands (wet grassland, semi-improved, and improved), stubble fields, and ploughed farmland (NPWS, 2022). There are no well-defined foraging ranges for wintering lapwing, and flocks can be extremely mobile during winter. Typical patterns involve flocks using one or two areas of suitable habitat for several weeks, then moving to another area, which may be
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Barriers to connectivity and site use	Number, location, shape and hectares	The number, location, shape and area of barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
Forage spatial distribution,	Location and area, and available forage biomass	Sufficient number of locations, area of suitable habitat and available	

Attributes	Measures	Target	Potential for Adverse Effects
extent and abundance		forage biomass to support the population target	several kilometres away (Gillings and Fuller, 1999). Therefore, the wind farm site of the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	

Attributes	Measures	Target	Potential for Adverse Effects
[A156] Black-tailed Godwit (*Limosa limosa*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	**Yes** - During field surveys, this species was recorded rarely, with two observations totalling 460 individuals (maximum single count of 350). Sightings were concentrated within wetland and seasonally flooded areas along the eastern red line boundary, adjacent to the River Little Brosna, where birds were observed actively foraging. The proposed project site supports habitats known to be suitable for non-breeding Black-tailed Godwits, including seasonally inundated pastures, shallow flooded areas, and floodplain wetlands (NPWS, 2022). There are no well-defined foraging ranges for wintering black-tailed godwit, however limited studies indicate that black-tailed godwits commonly exhibit fine-scale foraging site fidelity during the non-breeding season, typically utilising a limited network of feeding patches within local wetland or agricultural complexes. However, populations also display range-resident behaviour, involving short periodic movements (e.g. 24–72 hours) and, in some individuals, more irregular long-distance movements that maintain functional
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Barriers to connectivity and site use	Number, location, shape and hectares	The number, location, shape and area of barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
Forage spatial distribution, extent and abundance	Location and area, and available forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	connectivity across wider wetland networks. Therefore, the wind farm site of the proposed project has the potential to be within range of the SPA. However, limited evidence suggests that birds recorded onsite were commuting from this SPA. No regular flight directions, commuting patterns, or consistent site use were observed, and similar suitable habitats exist throughout the wider landscape. Consequently, the potential for significant effects arising from disturbance, displacement, habitat loss, or collision is considered low. There is, however, a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**

Attributes	Measures	Target	Potential for Adverse Effects
[A179] Black-headed Gull (*Chroicocephalus ridibundus*)			
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	There is, however, a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	
Disturbance at wintering site	Intensity, frequency, timing and duration	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	
Barriers to connectivity and site use	Number, location, shape and hectares	The number, location, shape and area of barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	
Forage spatial distribution, extent and abundance	Location and area, and available forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	

Attributes	Measures	Target	Potential for Adverse Effects
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	
[A999] Wetlands			
Wetland habitat area	Hectares	No significant loss to wetland habitat within the SPA, other than that occurring from natural patterns of variation	**Yes** - There is a clear hydrological connection between the proposed project site and this SPA via the Little Brosna_040 and the Shannon (lower)_030 rivers which flows through the SPA. The proposed project could result in temporary deterioration of water quality within this river, and consequently within hydrologically connected downstream systems, during the construction and decommissioning phases. As the SPA supports seasonally inundated callow habitats that provide key foraging areas for this species, any reduction in water quality could adversely affect these habitats and the species they support. **A significant decline in water quality would constitute an adverse effect on this attribute and therefore the integrity of the SPA**
Wetland habitat quality and functioning	Quality and function of the wetland habitat	No significant impact on the quality or functioning of the wetland habitat within the SPA, other than that occurring from natural patterns of variation	

6.2 Mitigation Measures

The assessment concluded that the proposed project, in the absence of appropriate mitigation measures, could result in an indirect adverse effect on the following European sites due to a degradation in water quality:

- Sharavogue Bog SAC
- River Shannon Callows SAC
- Dovegrove Callows SPA
- River Little Brosna Callows SPA
- Lough Derg (Shannon) SPA
- Middle Shannon Callows SPA

For the purpose of Article 6(3) of the Habitats Directive, the mitigation measures prescribed hereunder will avoid and/or reduce the significance of the potential impacts from the proposed project and prevent the occurrence of significant adverse effects on European sites.

The mitigation measures are prescribed with regards to the EC Guidance (EC 2021a) which requires mitigation by avoidance as a first approach, the guidelines states that:

'The hierarchy of mitigation measures suggests first avoidance (i.e. preventing significant impacts from happening in the first place) and then reduction of impact (i.e. reducing the magnitude and/or likelihood of an impact)'.

In addition, the guidelines further states that:

'Each mitigation measure must be described in detail, specifying how it will eliminate or reduce the adverse impacts identified, and how, when and by whom it will be implemented. The following aspects must be indicated:

- *The impacts concerned that the mitigation measures aim to address, including information on relevant parameters (e.g. the area of the habitats of Community interest subject to deterioration and their conservation degree in the site, the species population subject to disturbance).*
- *The expected results from implementing the proposed mitigation measures, with reference to each parameter (e.g. habitat area, species population numbers or structure and functions).*
- *Technical-scientific feasibility and degree of effectiveness expected of the proposed measures.*
- *The person or body in charge of implementation.*
- *The management of the area where the mitigation measures will be implemented (methods, duration).*
- *The location and timing of the measures with relation to the plan or project.*
- *The methods for checking implementation of the measures.*
- *The financing of the measures.*
- *The monitoring programme to verify the effectiveness of the measures and adapt them if necessary.'*

The above guideline recommendations have been considered within the proposed mitigation measures, which are outlined hereunder.

6.2.1 Construction Phase Mitigation Measures

6.2.1.1 Mitigation by Design

The proposed project design has followed the basic principles outlined below to minimise the potential for significant effects on ecological features and European sites

The proposed project has been deliberately designed to avoid the most ecologically sensitive areas within the study area following results from the continued survey effort starting in April 2020 and desktop research using available data sources, maps and reports. These sensitive areas include intact raised bog habitat, or areas where concentrations of winter birds have been recorded along the Little Brosna River to the northeast of the proposed project. The proposed project will largely be confined to already modified cutover bog habitat or agricultural lands and where appropriate located within the vicinity of existing roadways to minimise further habitat loss.

Hard standing areas, roads and turning bays have been designed to the minimum size necessary to accommodate the turbine dimensions and number of vehicles and machinery required.

The proposed wind farm will be connected to the national electricity grid through the existing ESB Dallow 110 kV substation, located approximately 12 km north of the proposed project site. The works associated with the grid connection route and 110 kV substation will require excavation, although almost entirely being confined to existing roads and will require minimal habitat loss.

6.2.1.2 General

The proposed project has been designed to incorporate current industry best practice for the construction and operation of wind farms.

Best practice measures incorporated into the design aim to avoid significant effects on the surrounding biodiversity. A CEMP has been developed to provide a framework for how significant effects on the environment will be avoided during the construction phase and includes all mitigation measures described herein.

A suitably qualified Ecological Clerk of Works (ECoW) with extensive experience, will be appointed and will be required full time on site during the construction phase. The ECoW will ensure that all mitigation measures outlined within this report and the CEMP are implemented correctly during the construction phase.

6.2.1.3 Management of Habitat Degradation Due to Surface Water Quality Impacts

The proposed project has been designed to avoid significant effects on watercourses. The turbines have been located in excess of 50m from all rivers, and no in-stream works are proposed within natural watercourse as part of the proposed wind farm.

The construction of internal roadways within the proposed wind farm site, will involve water crossing at 15 locations. One of these crossings will span the natural watercourse of the Little Brosna_040/Holy Well Clohaskin River (EPA code: 25H28, Segment code: 25_3276) using a clear-span bridge. The bridge will comprise a reinforced concrete bed set back 2.5 m from each

bank, avoiding any works within the channel itself. Installation will take place during dry periods to minimise sediment risk.

The remaining 14 crossings are over minor artificial drains or peatland channels. These crossings will require installation of culverts, which will constitute limited in-stream works confined to these man-made drains. Culverting will be undertaken during dry weather, and appropriate silt control measures (e.g. temporary silt fences/dams) will be used to prevent sediment movement downstream.

6.2.1.3.1 Pollution control measures

Pollution control measures which will be implemented during the construction phase are summarised hereunder:

- All construction works will be undertaken regarding alignment with the guidance contained within the CIRIA Document C811 'Environment Good Practice on Site' (CIRIA, 2023) and the IFI guidance 'Guidelines on the Protection Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (2016) to ensure the protection of watercourses located within the Proposed Development site.
- No instream works within natural watercourse will be permitted during the construction works. Where stream crossing occurs on site, a clear-span design bridge will be used.
- Culverting will only be used for existing artificial peatland, agricultural or forestry drainage ditches and will be carried out in dry weather periods.
- Fuels and chemicals will be stored within bunded areas within the construction compound to guard against potential accidental spills or leakages. The bund area will have a volume of at least 110 % of the volume of such materials stored.
- All on-site refuelling will be carried out at construction compounds by a trained competent operative.
- All vehicles and machinery operating and the proposed project site will be provided with mobile measures, such as drip trays and fuel absorbent mats, which will be readily available for use during all refuelling operations.
- No refuelling will take place within 50m of any watercourse;
- All equipment and machinery will have regular checking for leakages and quality of performance and will carry spill kits.
- Any servicing of vehicles will be confined to designated and suitably protected areas within the construction compounds.
- Additional drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site.
- Soil/peat exposure will be minimized by controlling, in so far as is practical, where and when peat is stripped.
- Concrete is required for the construction of the turbine bases and foundations. No batching of wet-cement products will occur on site. Ready-mixed supply of small amounts of wet concrete products and emplacement of pre-cast elements will take place. Pre-cast elements for bridge, culverts and concrete works will be used.
- After concrete is poured, the chutes of ready-mixed concrete trucks must be washed out to remove the remaining concrete before it hardens at the construction compound. Wash out of the main concrete bottle will not be permitted on site; wash out will be restricted only to chute wash out. Wash down and wash out of the concrete transporting vehicles will take place at an appropriate facility, offsite.
- The best practice management objectives for concrete chute washout are to collect and retain all the concrete washout water and solids in leak proof containers, or impermeable lined wash out pits, so that the washed material does not reach the soil

surface and then migrate to surface waters, or into the groundwater. The collected concrete washout water and solids will be emptied on a regular basis and disposed of offsite.
- During the construction phase, four temporary site compounds will be required. Temporary on-site toilet facilities will be used. These will be sealed with no discharge to the surface water or groundwater environment adjacent to the site. They will be emptied on a regular basis by a suitable contractor and disposed of offsite.

6.2.1.3.2 Sediment and Erosion Control Measures

Sediment control measures which will be implemented during the construction phase are summarised hereunder:

- The stripping of soils will be kept to a minimum and confined to construction areas only.
- Silt fencing will be erected immediately downslope of construction works at watercourse crossings and along sections of the grid connection route that are adjacent to or within 50 m of a watercourse. Fencing will be positioned between the works area and the watercourse to intercept surface runoff and prevent silt entering aquatic habitats.
- Silt curtains and floating booms will be available for use were deemed to be appropriate, as per the surface water management plan (SWMP). An assessment for its use will be undertaken by the ECoW separately at each individual location.
- Excavated material will not be stockpiled or side-cast within 50m of any watercourse.
- During the side casting of peat, silt fences, straw bales and/or biodegradable geogrids will be used to retain surface water runoff from the storage areas and prevent silt-laden runoff to flow into rivers and water features.
- All surface water run-off from the development will pass through settlement ponds. It is proposed to locate settlement lagoons immediately downstream of the proposed infrastructure including each hardstand and along all site access tracks.
- Settlement ponds will be located appropriately as per the SWMP and will be installed concurrently with the formation of the access track. They will be located as close to the source of sediment as possible.
- The settlement ponds will be regularly cleaned/maintained to provide effective and successful operation throughout the works, the sediment of which will either be disposed of offsite or deposited into borrow pits. Outfalls and ditches will be cleaned, when required, starting upstream, with the outfalls blocked temporarily prior to cleaning.
- Traffic on site will be kept to a minimum. Only the proposed onsite access track will be used for project-related traffic. Where onsite access tracks pass close to watercourses, silt fencing will be used to protect the streams.

6.2.1.4 Management of Disturbance/Displacement - Otter

6.2.1.4.1 Timing of Works, Lighting and Noise

Otters are predominantly crepuscular in nature and are most active during dawn and dusk. To minimise potential disturbance or displacement, all construction works within 150m of any watercourse, including water crossing locations and HDD points along the GCR, will be confined strictly to daytime hours between 08:00 and 18:00. Works will not commence or conclude during civil twilight periods.

To reduce behavioural disturbance to otters, all site lighting will be directional, downward facing, and shielded. Lighting will be used only where required for safety and will not be directed

towards riparian habitats. High noise activities such as piling or rock breaking within 150 metres of a watercourse will be restricted to daytime hours and kept to the shortest practicable duration. Where operational requirements necessitate deviation from these hours, the works will be subject to review and approval by the ECoW.

6.2.1.4.2 Pre Commencement Otter Surveys

A pre commencement otter survey will be undertaken no more than twelve months prior to the start of construction works and updated if works are delayed by more than six months. Surveys will be undertaken in accordance with the methodologies set out in section 2.5.2.2.2. Surveys will be completed by a suitably qualified ecologist. The survey will record all evidence of otter activity, including spraints, footprints, slides, feeding remains, couches, and holts. Camera traps may be used to confirm activity levels where required. All results will be mapped and retained within the project's ecological records.

6.2.1.4.3 Response to Discovery of Otter Holts

In the event that a new holt (established within the interim period) is identified within the footprint of the works during the pre-construction confirmatory survey and the following mitigation measures will be applied in accordance with the NRA *Guidelines for the Treatment of Otters during the Construction of National Road Schemes* (NRA, 2008) as follows:

- No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts (NRA, 2008). Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence.
- No works will be undertaken within 150m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to such breeding holts may take place provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site (NRA, 2008). Breeding may take place in any season, so activity at a holt will be determined on a case-by-case basis by the ECoW.
- A prohibited working area associated with otter holts will be fenced and appropriate signage erected under guidance of the ECoW;
- If holts are found to be inactive prior to construction, exclusion of holts and their subsequent destruction may be carried out during any season under licence with the NPWS. To prevent the reoccupation of holts the entrances will be soft blocked (using vegetation and a light application of soil) for a period of five days (NRA, 2008).
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6.2.1.4.4 Pollution Prevention and Water Quality Protection

To prevent indirect impacts on otter through deterioration of water quality or prey availability, the following pollution control measures will be implemented through the CEMP:

- Vegetated buffer strips will be retained adjacent to all watercourses where practicable.
- Silt traps, settlement ponds, and sediment fencing will be installed to prevent sediment laden runoff from entering watercourses.
- Refuelling and fuel storage will take place only within bunded areas located at least ten metres from any watercourse.
- Spill kits will be available at all refuelling locations and a site specific spill response procedure will be implemented.

- Staff will receive toolbox talks on pollution prevention and emergency procedures.
- Turbidity and suspended solids will be monitored upstream and downstream of active works in accordance with best practice.

6.2.2 Operational Phase Mitigation Measures

No significant adverse effects on European sites are predicted during the operational phase. As such, no dedicated mitigation measures are considered necessary for the operational phase.

6.2.3 Decommissioning Phase Mitigation Measures

The expected operational lifespan of the proposed project is 35 years. Following this period, the wind turbines may be replaced with a new set of machines, subject to planning permission, or the site will be fully decommissioned.

Activities associated with the decommissioning phase are not predicted to exceed those assessed for the construction phase and are expected to be of a similar type and magnitude, but generally of a shorter duration and smaller scale. In the case of complete decommissioning, where turbines are removed and not replaced, no additional habitat loss would occur beyond that already assessed during the construction phase. Concrete bases will remain in place .

The mitigation measures implemented during the construction phase will also be applied during decommissioning works. In the case of turbine removal and complete decommissioning, the footprint of the infrastructure sites will be reinstated with habitat similar to the surrounding environment to ensure that the site is returned to its pre-existing condition prior to the proposed project.

6.3 Assessment of In-combination effects

A study area was identified for other developments for the purpose of the cumulative assessment. This was set at a 20 km radius from the proposed wind farm site, within which 'other development' is either in situ or has planning permission. These other developments included searches for any renewable energy developments, electricity infrastructure, quarries, wastewater treatment plants, piggeries, power plants, biomass developments and any other large developments.

To conduct the cumulative impact assessment, the online planning registers for Offaly and Tipperary County Councils as well as ACP were used. Relevant NIS and EIAR (or historical EIS) documents, planning application details and planning drawings within the study area of the proposed wind farm site and all associated works were reviewed to identify past and future projects, their activities and their environmental impacts.

6.3.1 Projects

There were a number of projects identified within the vicinity of the proposed project. Most of the projects involved the construction of single properties or the extension of existing

residential properties. Due to the small nature of these developments and lack of connectivity, these projects have been deemed to have no effects on any European sites and therefore there is no possibility for in-combination effects with the proposed surveys.

Larger scale existing and proposed wind farms within proximity to the proposed project have been included and are discussed hereunder. Six wind farms have been located within the study area for the cumulative assessment; these can be seen in Table 6-13.

Table 6-13: List of Select Granted/Undecided Applications within 20 km from the proposed wind farm site.

Wind Farm	Consenting Authority	Planning Reference	Decision	No. Turbines	Distance from site approx. Km
Carrig Wind Farm	ACP	318689	Granted – 30/06/2025	7	c.1.5km
Carrig Wind Farm (Lacka)	Tipperary	5123496	Granted (Conditional) - 24/05/2001	3	c. 1.7km
Skehanagh Wind Farm	Tipperary	5123495	Granted (Conditional) – 25/03/2001	5	c.2.8km
Cush Wind Farm	ACP	318816-24	Granted – 04/11/2024	8	c.10km
Derrinlough Wind Farm	ACP	306706	Granted (Conditional) – 26/08/2021	21	c.13km
Monaincha Bog Wind Farm and Solar Farm	Tipperary	03510957, 09510084, 11510203, 12510174	Initially Granted (Conditional) – 02/03/2004	10	c.15km
Cloghan Wind Farm	ACP	244053, PL19.24405	Grant permission with revised conditions – 27/10/2016	9	c.16km

6.3.1.1 Carrig Wind Farm

A NIS prepared by MKO on behalf of Carrig Renewable Energy Limited concluded that the Carrig Wind Farm has been assessed as having no significant residual effects on European sites. The proposed project incorporates similar robust avoidance and mitigation measures designed to prevent any adverse effects, and any residual effects from the proposed project alone are negligible. When considered in combination with the Carrig Wind Farm, the proposed project is not likely to result in significant adverse effects on the integrity of any European site in view of its conservation objectives.

This conclusion is supported by several factors. Spatially, the two projects are sufficiently separated, so there is no overlap in the areas of potential disturbance, displacement, or barrier

effects. Temporally, although the projected operational periods of the two projects coincide, in-combination effects are not anticipated because the nature and scale of the effects are highly localized and minimal, and the mitigation measures for each project are independently effective. Ecologically, the European sites have sufficient resilience, and the habitats and species are not sensitive to simultaneous, low-level operational disturbances from both projects. Furthermore, the nature of the effects is similar for both projects, and since the Carrig Wind Farm has no residual effects, its presence does not increase baseline pressures. Consequently, even with temporal overlap, the combination of the two projects does not result in additive or synergistic effects that would adversely affect etc

Applying a precautionary approach, the assessment confirms that cumulative or in-combination effects will not adversely affect the conservation objectives or integrity of the relevant European sites.

6.3.1.2 Carrig (Lacka) Wind Farm

The Carrig (Lacka) Wind Farm has been operational since 2006 and comprises three turbines of a smaller scale and height than those proposed as part of the proposed project. A review of the Carrig (Lacka) Wind Farm planning file on the Tipperary County Council Planning Register found no available information relating to potential effects on European sites. Nonetheless, the potential for the proposed project to give rise to cumulative or in-combination effects when considered alongside the Carrig (Lacka) Wind Farm was examined.

As the Carrig (Lacka) Wind Farm is a long-established, operational development, it is considered to form part of the existing environmental baseline. The operational turbines are not subject to ongoing construction or new consent processes that could introduce additional pressures on European sites. While some ecological or hydrological connections to similar European sites may exist in a regional context, the Carrig (Lacka) Wind Farm does not represent a new or intensifying source of potential impact. With the implementation of the avoidance and mitigation measures outlined in Section 6.2, which will prevent significant adverse effects on the integrity of European sites, it is concluded that the proposed project, in combination with the existing Carrig (Lacka) Wind Farm, will not adversely affect the integrity of any European site in view of its conservation objectives.

6.3.1.3 Skehanagh and Wind Farms

The Skehanagh Wind Farm has been operational since 2006 and comprises five turbines of a smaller scale and height than those proposed as part of the proposed development. A review of the Skehanagh Wind Farm planning file on the Tipperary County Council Planning Register found no available information relating to potential effects on European sites. Nonetheless, the potential for the proposed project to give rise to cumulative or in-combination effects when considered alongside the Skehanagh Wind Farm was examined.

As the Skehanagh Wind Farm is a long-established, operational development, it is considered to form part of the existing environmental baseline. The operational turbines are not subject to ongoing construction or new consent processes that could introduce additional pressures on European sites.

While some ecological or hydrological connections to similar European sites may exist in a regional context, the Skehanagh Wind Farm does not represent a new or intensifying source of potential impact. With the implementation of the avoidance and mitigation measures outlined in section 6.2 of this NIS, which will prevent significant adverse effects on the integrity of European sites, it is concluded that the proposed project, in combination with the existing Skehanagh Wind Farm, will not adversely affect the integrity of any European site in view of its conservation objectives.

6.3.1.4 Cush Wind Farm

A NIS for the Cush Wind Farm Project was prepared by SLR/Galetech Energy Services on behalf of Cush Wind Farm Limited. It concluded that the Cush Wind Farm has been assessed as having no significant residual effects on European sites. The proposed project incorporates similar robust avoidance and mitigation measures designed to prevent any adverse effects, and any residual effects from the proposed project alone are negligible. When considered in combination with the Cush Wind Farm, the proposed project is not likely to result in significant adverse effects on the integrity of any European site in view of its conservation objectives.

This conclusion is supported by several factors. Spatially, the two projects are sufficiently separated, so there is no overlap in the areas of potential disturbance, displacement, or barrier effects. Temporally, although the operational periods of the two projects coincide, in-combination effects are not anticipated because the nature and scale of the effects are highly localized and minimal, and the mitigation measures for each project are independently effective. Ecologically, the European sites have sufficient resilience, and the habitats and species are not sensitive to simultaneous, low-level operational disturbances from both projects. Furthermore, the nature of the effects is similar for both projects, and since the Cush Wind Farm has no residual effects, its presence does not increase baseline pressures. Consequently, even with temporal overlap, the combination of the two projects does not result in additive or synergistic effects that would compromise site integrity.

Applying a precautionary approach, the assessment confirms that cumulative or in-combination effects will not adversely affect the conservation objectives or integrity of the relevant European sites

6.3.1.5 Derrinlough Wind Farm

A NIS and EIAR for the Derrinlough Wind Farm Project were prepared by MKO on behalf of Bord Na Móna Powergen Limited. It concluded that the Derrinlough Wind Farm has been assessed as having no significant residual effects on European sites. The proposed project incorporates similar robust avoidance and mitigation measures designed to prevent any adverse effects, and any residual effects from the proposed project alone are negligible. When considered in combination with the Derrinlough Wind Farm, the proposed project is not likely to result in significant adverse effects on the integrity of any European site in view of its conservation objectives.

This conclusion is supported by several factors. Spatially, the two projects are sufficiently separated, so there is no overlap in the areas of potential disturbance, displacement, or barrier

effects. Temporally, although the operational periods of the two projects coincide, in-combination effects are not anticipated because the nature and scale of the effects are highly localized and minimal, and the mitigation measures for each project are independently effective. Ecologically, the European sites have sufficient resilience, and the habitats and species are not sensitive to simultaneous, low-level operational disturbances from both projects. Furthermore, the nature of the effects is similar for both projects, and since the Derrinlough Wind Farm has no residual effects, its presence does not increase baseline pressures. Consequently, even with temporal overlap, the combination of the two projects does not result in additive or synergistic effects that would compromise site integrity.

Applying a precautionary approach, the assessment confirms that cumulative or in-combination effects will not adversely affect the conservation objectives or integrity of the relevant European sites

6.3.1.6 Monaincha Bog wind Farm

A review of the Monaincha Bog Wind Farm planning file on the Tipperary County Council Planning Register and the Architectural Conservation Plan found no available information relating to potential effects on European sites.

Nonetheless, the potential for the proposed project to give rise to cumulative or in-combination effects when considered alongside Monaincha Bog Wind Farm was assessed. Based on the wind farm's location, site characteristics, and the absence of shared ecological or hydrological pathways to European sites, the proposed project, in combination with Monaincha Bog Wind Farm, will not adversely affect the integrity of any European site in view of its conservation objectives.

6.3.1.7 Cloghan Wind Farm

A NIS and EIAR for the Cloghan Wind Farm Project were prepared by EcoFact on behalf of Galetech Energy Developments Cloghan Limited. These reports identified potential effects on designated sites but concluded that avoidance, appropriate design, and mitigation measures eliminated any pathways for adverse effects on European sites.

Given that the Cloghan Wind Farm was assessed as having no significant residual effects on European sites, and that the proposed project is similarly designed and mitigated to avoid effects on designated sites, the proposed project, in combination with the Cloghan Wind Farm, will not adversely affect the integrity of any European site in view of its conservation objectives.

6.3.1.8 Other projects

6.3.1.8.1 Clondallow BESS- Planning Ref 2560367

Clondallow BESS (Planning Ref 2560367) is a proposed 100 MW Battery Energy Storage Station submitted by Birr Renewable Ltd. A review of the appropriate assessment screening report and winter bird summary concluded that the BESS and associated cable route are not likely to have significant effects on nearby European sites.

Given that the Clondallow BESS was assessed as having no significant residual effects on European sites, and that the proposed project similarly incorporates avoidance and mitigation measures, it is concluded that the proposed project, in combination with the Clondallow BESS, will not adversely affect the integrity of any European site in view of its conservation objectives.

6.3.2 Plans

The proposed project site is located within the Offaly and Tipperary County administrative areas.

County Offaly Development Plan 2021-2027

The County Offaly Development Plan 2021-2027[16] sets out a range of proposed policy objectives with supporting narrative for development up to 2027. In accordance with national policy, the plan is seeking to develop and improve in a sustainable and environmentally sensitive manner, the social, economic, environmental and cultural assets of the County.

It promotes the climate action and energy, change agenda, wind energy, sustainability, and it sets out the settlement and housing strategy, tourism and recreational development, water services and environment, transport and infrastructure, urban regeneration, environment, natural heritage, healthy placemaking and economic opportunities for the relevant period.

The County Development Plan also indicates policies and objectives associated with the protection and enhancement of biodiversity and European sites. This aims to protect and enhance Offaly's natural assets of clean water, biodiversity, landscape, green infrastructure, heritage and agricultural land.

All new plans and projects proposed within the local administrative area must adhere to legislation and policy. Adherence to the Council's policies and objectives will therefore ensure that all plans and projects proposed within the area are subjected to the tests of Appropriate Assessment which will assess the potential for likely significant effects to European sites, and where deemed necessary, the potential for an adverse effect on European site integrity, either alone or in-combination with other plans and projects.

County Offaly Biodiversity Plan

The Biodiversity Action Plan for Offaly is incorporated into the Offaly Heritage Plan 2023 – 2027. Offaly Heritage Plan considers the current biodiversity loss and climate change crisis and considers this with every plan or action. It proposes active management on Council lands for biodiversity enhancement as well as the adoption of the All-Ireland Pollinator Plan, submitting records of species into the NBDC and the controlling and management of invasives species.

County Tipperary Development Plan 2022 - 2028

The Tipperary County Development Plan 2022 to 2028[17] sets out the strategic framework, policies and objectives for the sustainable development of County Tipperary over the plan

[16] https://www.offaly.ie/c/county-development-plan/

[17] https://www.tipperarycoco.ie/planning-and-building/development-plan-consultation/tipperary-county-development-plan-2022-2028

period. In line with national and regional policy, including the National Planning Framework and the Southern Regional Spatial and Economic Strategy, the Plan seeks to support compact growth, climate resilience, balanced economic development and the protection of environmental and cultural assets across the county.

The Plan promotes a transition to a low carbon and climate resilient society through policies on renewable energy, including wind, solar and bioenergy, energy efficiency, sustainable transport and resource management. It also sets out a clear settlement hierarchy and housing strategy, alongside objectives for urban and rural regeneration, tourism, recreation, water services, transport infrastructure and the enhancement of natural and built heritage.

The County Development Plan contains policies and objectives to protect and enhance biodiversity, landscape and designated European sites, ensuring that development takes place in an environmentally sensitive and sustainable manner. All new plans and projects within the county must comply with relevant legislation and policy, and will be subject to Appropriate Assessment, as required under the Habitats Directive, to ensure no adverse effects on the integrity of European sites, either alone or in combination with other plans or projects.

6.3.3 Conclusion of In-Combination Effects

A review of other existing, permitted, and proposed developments within the wider study area was undertaken to identify any potential for cumulative or in-combination effects on European sites in combination with the proposed project. This review considered all large-scale renewable energy projects, relevant infrastructure developments, and other plans or projects that could potentially act in combination with the proposed project to affect the same European sites or qualifying interests.

Where available, the findings of these assessments indicate that potential adverse effects on European sites have been effectively avoided through appropriate design and the implementation of mitigation measures. For older operational developments where such documentation was not available, it was concluded that these form part of the existing environmental baseline and do not represent ongoing or intensifying sources of impact.

While some developments within the region may share limited hydrological or ecological connections with the same European sites, the proposed project has been designed to avoid significant effects through adherence to best-practice construction methodologies and the mitigation measures outlined in Section 6.2 of this NIS.

On the basis of the information available and the detailed assessment undertaken, it is concluded that the proposed project, either alone or in combination with other plans or projects, will not adversely affect the integrity of any European site in view of its conservation objectives.

7. CONCLUSION

This AA Screening and NIS has been prepared in accordance with the requirements of all applicable European and Irish legislation including Article 6(3) of the EU Habitats Directive (92/43/EEC), the Planning and Development Acts 2000 as amended, the Planning and Development Regulations 2001 as amended and the European Communities (Birds and Natural Habitats) Regulations as amended , which transpose EU directives into Irish law. Additional guidance has been drawn from relevant national and EU-level documents, including the NPWS guidelines on Appropriate Assessment and the European Commission's Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitats Directive.

This assessment has considered whether the proposed project, alone or in combination with other plans or projects, would adversely affect the integrity of any European site within the ZoI of the proposed project. The NIS also identifies and evaluates the mitigation measures necessary to avoid or reduce potential adverse effects.

In the absence of appropriate mitigation, the proposed project could result in indirect effects on the following European sites, primarily due to the potential for a temporary disturbance/displacement and degradation in water quality from the release of suspended solids or pollutants:

- Sharavogue Bog SAC
- River Shannon Callows SAC
- Dovegrove Callows SPA
- River Little Brosna Callows SPA
- Lough Derg (Shannon) SPA
- Middle Shannon Callows SPA

Through the careful design of the proposed project, in combination with the detailed avoidance and mitigation measures outlined in Section 6.2, the potential for significant adverse effects on any European sites in view of their conservation objectives will be fully avoided. The project design has been developed to minimise habitat disturbance, prevent displacement of species, and reduce potential barrier effects. As a result, any residual effects from the proposed project alone are negligible, and when considered in combination with other existing or approved plans and projects , no significant adverse effects are anticipated or likely that would compromise the integrity or conservation objectives of the European sites. Consequently, it is concluded in the light of best scientific knowledge that the proposed project alone and in combination with any other plan or project will not result in any significant adverse effects on the integrity of any European site in view of its conservation objectives.

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Appendix A ORNITHOLOGY DATA AND FIGURES

Appendix 7-1: Species Data and Figures – Key Ornithological Receptors

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Appendix 7-1 - I BARN OWL

Incidental					
Map Ref.	Season	Date	Time	Abundance	Note
N/A	Breeding	10/06/2022	11:49	1	Adult barn owl flushed from old barn, in farmyard 20m from redline boundary to west of proposed project. No whitewash or pelts but some down feathers. Recorded during multidisciplinary survey.
N/A	Breeding	09/07/2025	12:46	N/A	Old farm building approximately 50m from the redline boundary to the west of the proposed project, with number of positive BO signs including fresh whitewash feathers and pelts. Very suitable for breeding. Inside ceiling is missing in sections where nest could be located. Recorded during multidisciplinary survey.
N/A	Winter	10/03/2026	10:00:00	N/A	Evidence of Barn Owl potentially breeding in the close proximity to the proposed project site was recorded in March 2026.. This location is situated approximately 50 metres from the boundary of the proposed project site, within an abandoned barn, where evidence including feathers, pellets, and audio recording from a bird voice recording device. Calls were also heard from nearby dusk VP survey. Additionally, Barn Owl carcass was found at this location in October 2025
N/A	Winter	10/03/2026	11:30:00	2	The second potential breeding location is located approximately 450 meters from the boundary of the most southerly section of the proposed project site, where a species-specific nest box has been installed in derelict round tower. According to anecdotal evidence from the landowner, Barn Owl pair has been breeding in this location in previous years

Appendix 7-1 - II BLACK-HEADED GULL

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT72-20	Breeding	VP4	04/06/2020	14:13:00	1	65	15m	0	65
WT60-20	Breeding	VP5	04/06/2020	12:10:00	1	10	15m	0	10
WT57-20	Breeding	VP4	04/06/2020	12:05:00	2	35	27.5m	35	0
WT56-20	Breeding	VP2	04/06/2020	11:59:00	1	12	20m	12	0
WT67-20/21	Wintering	VP, 3	05/11/2020	14:58:00	9	116	70m	0	116
WT47-20/21	Wintering	VP, 3	05/11/2020	12:18:00	14	136	50m	0	136
WT94-20/21	Wintering	VP, 5	14/01/2021	10:17:00	2	35	110m	15	20
WT153-20/21	Wintering	VP3	14/01/2021	14:59:00	4	30	90m	30	0
WT124-20/21	Wintering	VP, 4	09/02/2021	13:39:00	57	150	47.5m	0	150
WT122-20/21	Wintering	VP, 4	09/02/2021	12:39:00	17	330	45m	60	270
WT121-20/21	Wintering	VP, 4	09/02/2021	12:39:00	13	330	45m	60	270
WT119-20/21	Wintering	VP, 4	09/02/2021	12:16:00	63	360	57.5	0	360
WT40-21	Breeding	VP5	11/06/2021	11:55:00	1	20	17.5m	0	20
WT37-21	Breeding	VP3	11/06/2021	13:18:00	2	10	35m	10	0
WT45-21	Breeding	VP1, VP2	14/06/2021	11:48:00	1	180	40m	180	0
WT151-21/22	Wintering	VP3, VP4	10/02/2022	10:40:00	11	352	25m	52	300
WT8-22/23	Wintering	VP2	28/11/2022	11:18:00	1	10	25m	0	10
WT4-22/23	Wintering	VP2	28/11/2022	10:25:00	9	180	62.5m	50	130
WT70-22/23	Wintering	VP1	30/11/2022	14:20:00	24	5	20m	0	5
WT69-22/23	Wintering	VPB, VP3	30/11/2022	14:18:00	250	480	10m	0	480
WT66-22/23	Wintering	VP1	30/11/2022	14:00:00	27	10	30m	0	10
WT60-22/23	Wintering	VP3	30/11/2022	13:12:00	50	142	15m	14	128
WT54-22/23	Wintering	VPB	30/11/2022	12:46:00	10	80	65m	0	80
WT53-22/23	Wintering	VPB	30/11/2022	12:44:00	1	280	220m	0	280
WT51-22/23	Wintering	VP1	30/11/2022	12:41:00	50	600	35m	300	300

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT49-22/23	Wintering	VPA	30/11/2022	11:52:00	1	81	15m	10	71
WT48-22/23	Wintering	VPB	30/11/2022	11:47:00	11	77	50m	10	67
WT45-22/23	Wintering	VPB	30/11/2022	11:28:00	26	26	10m	0	26
WT44-22/23	Wintering	VP1	30/11/2022	11:27:00	50	0	7.5m	-	-
WT43-22/23	Wintering	VP4	30/11/2022	11:23:00	11	60	62.5m	2	58
WT42-22/23	Wintering	VPB	30/11/2022	11:19:00	10	64	15m	0	64
WT41-22/23	Wintering	VPA, VP3	30/11/2022	11:19:00	3	329	15m	41	288
WT40-22/23	Wintering	VP1	30/11/2022	11:10:00	10	16	25m	0	16
WT39-22/23	Wintering	VP3, VPA, VP4	30/11/2022	11:05:00	21	480	62.5m	54	426
WT38-22/23	Wintering	VPB	30/11/2022	11:02:00	48	450	50m	150	300
WT37-22/23	Wintering	VPB	30/11/2022	11:02:00	120	145	10m	0	145
WT35-22/23	Wintering	VPA	30/11/2022	10:43:00	4	128	15m	110	18
WT34-22/23	Wintering	VP3, VP1	30/11/2022	10:40:00	36	158	25m	0	158
WT30-22/23	Wintering	VPB	30/11/2022	10:27:00	37	35	65m	0	35
WT28-22/23	Wintering	VP4, VPB	30/11/2022	10:24:00	100	90	15m	20	70
WT24-22/23	Wintering	VPA	30/11/2022	10:06:00	30	169	62.5m	130	39
WT22-22/23	Wintering	VPB, VP4	30/11/2022	09:59:00	7	65	65m	35	30
WT14-22/23	Wintering	VPB, VP4	30/11/2022	09:10:00	10	25	25m	25	0
WT99-22/23	Wintering	VP4	20/12/2022	11:35:00	1	18	15m	6	12
WT98-22/23	Wintering	VP3, VPB	20/12/2022	11:35:00	6	300	2.5m	50	250
WT97-22/23	Wintering	VP3	20/12/2022	11:29:00	3	30	2.5m	0	30
WT96-22/23	Wintering	VPB	20/12/2022	11:28:00	6	180	2.5m	0	180
WT94-22/23	Wintering	VPB	20/12/2022	11:19:00	13	120	2.5m	0	120
WT93-22/23	Wintering	VP4	20/12/2022	11:11:00	4	22	15m	17	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT90-22/23	Wintering	VP4	20/12/2022	10:59:00	1	11	15m	7	4
WT87-22/23	Wintering	VPA	20/12/2022	10:25:00	5	30	12.5m	25	5
WT86-22/23	Wintering	VP4	20/12/2022	10:24:00	2	39	15m	30	9
WT83-22/23	Wintering	VP4	20/12/2022	10:20:00	4	40	15m	5	35
WT82-22/23	Wintering	VPB	20/12/2022	10:19:00	1	55	2.5m	8	47
WT81-22/23	Wintering	VP4	20/12/2022	10:16:00	1	33	15m	0	33
WT80-22/23	Wintering	VP4	20/12/2022	10:11:00	4	195	15m	95	100
WT79-22/23	Wintering	VPB	20/12/2022	10:09:00	5	5	15m	4	1
WT77-22/23	Wintering	VP3, VP4	20/12/2022	09:15:00	8	72	15m	20	52
WT76-22/23	Wintering	VPB	20/12/2022	09:09:00	11	180	2.5m	0	180
WT74-22/23	Wintering	VPB	20/12/2022	09:00:00	1	180	2.5m	0	180
WT117-22/23	Wintering	VP3	20/12/2022	14:30:00	1	40	15m	0	40
WT114-22/23	Wintering	VPB	20/12/2022	14:16:00	6	62	2.5m	42	20
WT113-22/23	Wintering	VP4	20/12/2022	14:06:00	1	21	15m	10	11
WT111-22/23	Wintering	VPA	20/12/2022	13:30:00	2	50	10m	35	15
WT110-22/23	Wintering	VP4	20/12/2022	13:11:00	15	189	15m	95	94
WT107-22/23	Wintering	VP4	20/12/2022	13:07:00	1	55	15m	0	55
WT104-22/23	Wintering	VP4	20/12/2022	12:51:00	1	8	15m	0	8
WT103-22/23	Wintering	VP4	20/12/2022	12:48:00	1	5	15m	1	4
WT102-22/23	Wintering	VPB	20/12/2022	12:30:00	4	45	15m	7	38
WT101-22/23	Wintering	VP4	20/12/2022	12:25:00	1	42	15m	0	42
WT146-22/23	Wintering	VP1	21/12/2022	13:28:00	1	140	60m	60	80
WT137-22/23	Wintering	VP1	21/12/2022	12:20:00	1	35	90m	17	18
WT135-22/23	Wintering	VP1, VP2	21/12/2022	12:06:00	1	243	120m	160	83
WT134-22/23	Wintering	VP2	21/12/2022	11:08:00	1	92	15m	75	17

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT129-22/23	Wintering	VP5	21/12/2022	09:53:00	12	28	40m	0	28
WT127-22/23	Wintering	VP5	21/12/2022	09:46:00	2	15	30m	0	15
WT298-22/23	Wintering	VP5	25/01/2023	14:51:00	6	90	-	45	45
WT224-22/23	Wintering	VPA	27/03/2023	12:14:00	2	360	15m	250	110
WT195-22/23	Wintering	VPB	27/03/2023	09:50:00	2	30	2.5m	30	0
WT183-22/23	Wintering	VPA	27/03/2023	08:43:00	2	21600	2.5m	21600	0
WT16-23	Breeding	VP2, VP1	30/05/2023	12:16:00	1	57	15m	57	0
WT35-23	Breeding	VPA	20/07/2023	08:54:00	1	3600	2.5m	1800	1800
WT184-23/24	Wintering	VPB	20/12/2023	11:59:00	80	300	15m	0	300
WT181-23/24	Wintering	VPB	20/12/2023	09:26:00	6	182	2.5m	91	91
WT178-23/24	Wintering	VPA, VPB	20/12/2023	14:06:00	4	50	62.5m	10	40
WT171-23/24	Wintering	VPA, VPB	20/12/2023	11:30:00	65	480	62.5m	350	130
WT168-23/24	Wintering	VPA	20/12/2023	08:55:00	8	5400	15m	4000	1400
WT151-23/24	Wintering	VP2	20/12/2023	11:36:00	30	22	75m	20	2
WT188-23/24	Wintering	VP4	11/01/2024	09:35:00	60	70	62.5m	40	35
WT231-23/24	Wintering	VP4	25/01/2024	10:17:00	9	5	35m	1	4
WT223-23/24	Wintering	VP3	25/01/2024	12:50:00	80	150	62.5m	120	30
WT220-23/24	Wintering	VP3	25/01/2024	11:28:00	30	155	62.5m	125	30
WT218-23/24	Wintering	VP3	25/01/2024	10:29:00	1	56	62.5m	50	6
WT209-23/24	Wintering	VP2	25/01/2024	13:02:00	50	60	120m	20	60
WT206-23/24	Wintering	VP2	25/01/2024	12:05:00	20	30	15m	0	30
WT191-23/24	Wintering	VP1, VP2	25/01/2024	09:07:00	6	38	15m	0	38
WT269-23/24	Wintering	VPA	02/02/2024	12:10:00	10	20	15m	15	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT354-23/24	Wintering	VP3	21/03/2024	09:52:00	100	120	15m	120	0
WT345-23/24	Wintering	VP3	21/03/2024	08:52:00	7	86	62.5m	66	20
WT333-23/24	Wintering	VP1	21/03/2024	12:57:00	2	212	62.5m	200	12
WT405-23/24	Wintering	VPB	27/03/2024	11:09:00	3	54	62.5m	14	40
WT400-23/24	Wintering	VPB	27/03/2024	08:55:00	8	205	62.5m	0	205
WT392-23/24	Wintering	VPA	27/03/2024	11:40:00	1	40	62.5m	0	40
WT379-23/24	Wintering	VP5	27/03/2024	12:26:00	2	6	9m	0	6
WT377-23/24	Wintering	VP5	27/03/2024	10:09:00	3	4	12.5m	4	0
WT65-24	Breeding	VP5	24/06/2024	13:12:00	1	20	15m	0	20
WT63-24	Breeding	VPB	24/06/2024	12:58:00	2	7200	15m	7200	0
WT62-24	Breeding	VPB	24/06/2024	12:47:00	2	8	10m	6	2
WT59-24	Breeding	VPB	24/06/2024	11:27:00	1	300	30m	300	0
WT53-24	Breeding	VPB	24/06/2024	09:51:00	1	210	40m	200	10
WT148-24	Breeding	VPB	28/08/2024	13:38:00	1	200	25m	120	80

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00013	Winter	VP1	28/10/2025	13:57:00	48	55	0	0	0	0	55
F00016	Winter	VP1	28/10/2025	14:44:00	10	18	0	0	0	0	18
F00021	Winter	VP1	28/10/2025	16:11:00	4	21	0	0	0	0	21

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00067	Winter	VP5	19/11/2025	10:43:00	33	65	15	0	0	0	80
F00069	Winter	VP5	19/11/2025	11:00:00	2	45	0	0	0	0	45
F00070	Winter	VP5	19/11/2025	11:44:00	1	48	0	0	0	0	48
F00072	Winter	VP5	19/11/2025	12:27:00	1	35	0	0	0	0	35
F00084	Winter	VP1	27/11/2025	08:59:00	1	0	0	24	0	0	24
F00108	Winter	VP2	25/11/2025	11:51:00	7	0	0	49	0	0	49
F00144	Winter	VP3	28/11/2025	12:12:00	2	16	0	0	0	0	16
F00161	Winter	VP5	08/12/2025	10:13:00	35	0	25	0	0	0	25
F00183	Winter	VP1	02/12/2025	11:03:00	32	0	40	0	0	0	40
F00184	Winter	VP1	02/12/2025	11:32:00	26	0	34	0	0	0	34
F00185	Winter	VP1	02/12/2025	11:32:00	92	9	44	0	0	0	53
F00186	Winter	VP1	02/12/2025	11:34:00	29	23	81	0	0	0	104
F00188	Winter	VP1	02/12/2025	11:39:00	102	0	112	0	0	0	112
F00189	Winter	VP1	02/12/2025	11:44:00	108	24	47	60	0	0	131
F00193	Winter	VP1	02/12/2025	12:05:00	51	0	73	0	0	0	73
F00194	Winter	VP1	02/12/2025	12:07:00	79	0	15	39	0	0	54
F00195	Winter	VP1	02/12/2025	12:09:00	52	0	61	0	0	0	61
F00196	Winter	VP1	02/12/2025	12:13:00	51	0	82	0	0	0	82
F00198	Winter	VP1	02/12/2025	12:31:00	64	0	51	0	0	0	51
F00199	Winter	VP1	02/12/2025	12:35:00	63	0	3	36	0	0	39
F00201	Winter	VP1	02/12/2025	12:37:00	96	0	39	0	0	0	39
F00202	Winter	VP1	02/12/2025	12:48:00	202	0	0	191	0	0	191
F00203	Winter	VP1	02/12/2025	12:56:00	15	0	38	0	0	0	38
F00205	Winter	VP1	02/12/2025	13:01:00	13	0	29	0	0	0	29
F00256	Winter	VP2	03/12/2025	13:22:00	11	0	0	89	24	0	113

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00313	Winter	VP1	27/01/2026	09:12:00	49	0	0	0	137	0	137
F00317	Winter	VP1	27/01/2026	11:23:00	10	0	0	39	0	0	39
F00318	Winter	VP1	27/01/2026	11:24:00	17	3	7	29	0	0	39
F00325	Winter	VP1	27/01/2026	12:37:00	23	0	29	0	0	0	29
F00328	Winter	VP1	27/01/2026	13:06:00	137	0	0	56	149	0	205
F00331	Winter	VP1	27/01/2026	13:19:00	55	0	0	59	0	0	59
F00400	Winter	VP1	10/02/2026	17:19:00	1	0	0	41	0	0	41

Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2022/2023	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	8	-	-
2020/2021	-	5	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	2	-	-	1	-	-	-	-	-	-	-	-	2	-	4	-	2	-	-	-	-	-	-
2023/2024	-	1	-	-	-	-	1	3	1	-	-	3	-	-	-	2	-	3	-	-	-	2	-	-
2024	-		-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00266	Winter	Transect	T2,5,6	24/11/2025	13:10:00	32	GA1	in flight
P00267	Winter	Transect	T2,5,6	24/11/2025	13:34:00	4	GA1	on ground

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00268	Winter	Transect	T2,5,6	24/11/2025	13:44:00	146	GA1	on ground
P00426	Winter	Transect	T2, T5, T6	05/12/2025	10:18:00	5	GA1	in flight
P00431	Winter	Transect	T2, T5, T6	05/12/2025	10:36:00	13	GA1	in flight
P00796	Winter	Transect	T6	13/03/2026	15:02:00	39	FW2	Flying

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	01/12/2025	N/A	55	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	01/12/2025	N/A	42	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	53	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	09/02/2026	N/A	32	N/A	N/A

8°0'0"W
7°56'0"W
7°52'0"W
53°5'25"N
53°1'30"N
700800
699600
600000
606000
N52
R491
Crinkill
Roscrea Road
Grove Street
Ballingarry
Birr Road
Figure 2
Figure 3
Figure 4

Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025 - 2026

- Black-headed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Black-headed Gull

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	S.P	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 1:
Black-headed Gull observations over the survey period (May 2020 – March 2026) Overview

Scale @ A3: 1:35,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Sherry	April 2026

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Map Ref: 11333-001.ApX-VP-BH-SUM-A_Overview

Draft: A

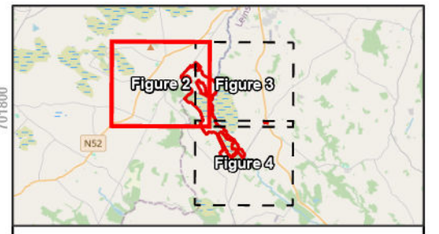
8°0'0"W

53°3'45"N

600000

701800

N52



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Black-headed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Black-headed Gull

0 250 500
Meters

Spatial Reference
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 2:
Black-headed Gull observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
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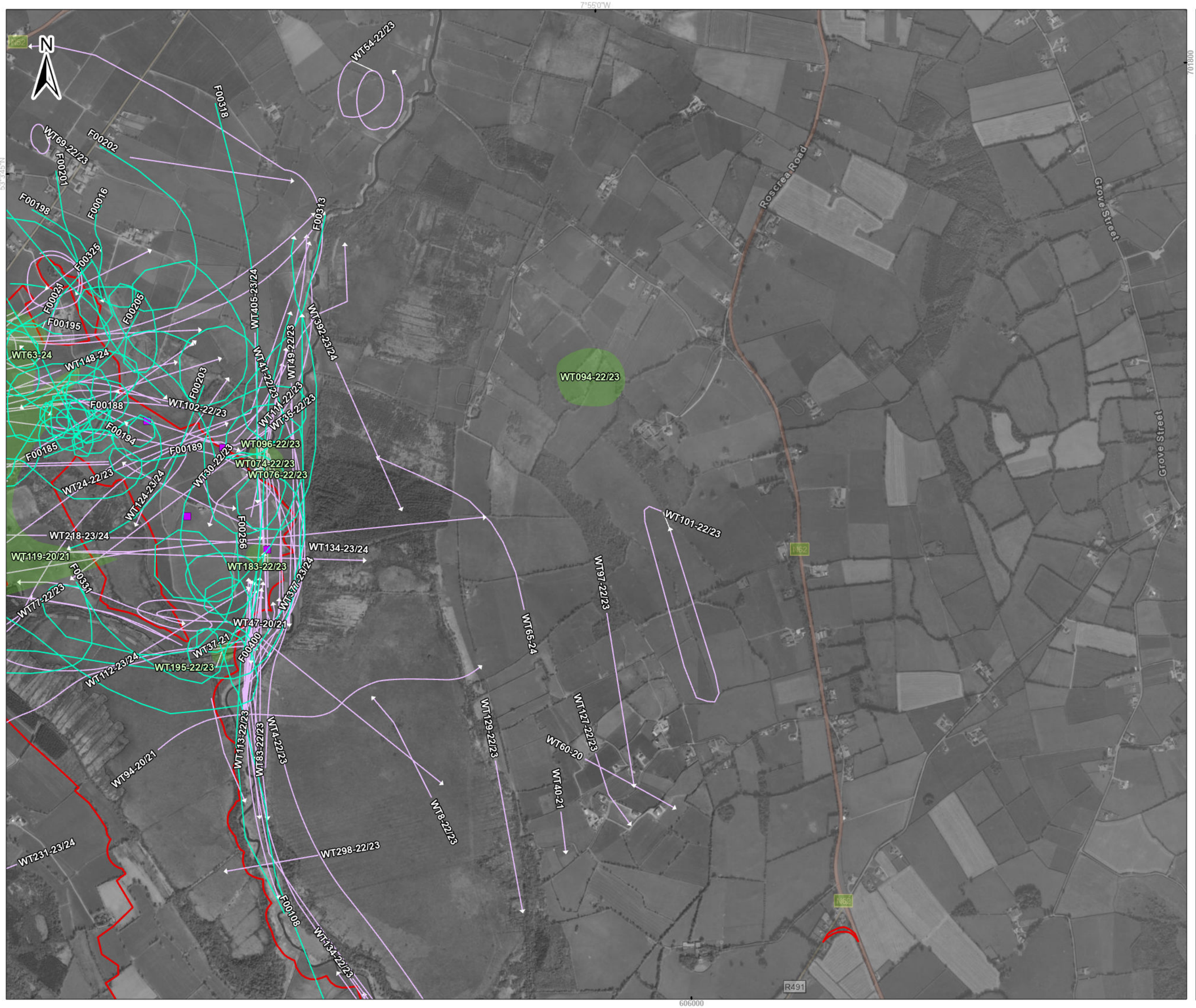
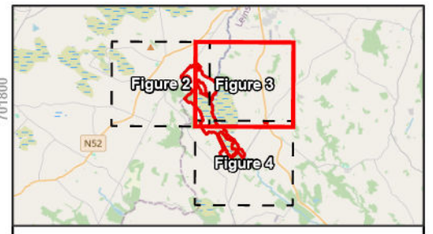
Map Ref: 11333-001.ApX-VP-BH-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Black-headed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Black-headed Gull

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	S.P	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 3:
Black-headed Gull observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-001.ApX-VP-BH-SUM-A

Draft: A

7°55'0"W

53°1'30"N

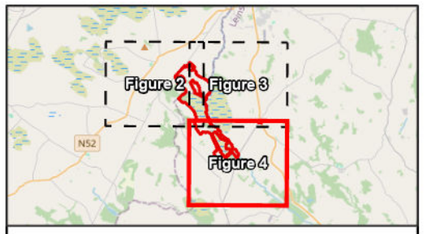
606000

639000

N

WT134-22/23
WT151-23/24
WT56-20
WT16-23
WT137-22/23
WT66-22/23
WT206-23/24
F00067
F00161
F00070
WT45-21
WT51-22/23
WT40-22/23
WT209-23/24
WT44-22/23

R491
N62



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Black-headed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Black-headed Gull

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	S.P	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 4:
Black-headed Gull observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-001.ApX-VP-BH-SUM-A

Draft: A

Appendix 7-1 - III BLACK-TAILED GODWIT

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD53-23/24	Wintering	VP1, VP2, VP3	21/03/2024	09:32:00	350	80	15m	40	40
WD55-23/24	Wintering	VPA	27/03/2024	10:20:00	110	14000	2.5m	14000	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00534	Winter	VP2	17/02/2026	11:01:00	82	0	0	82	17	0	99
F00535	Winter	VP2	17/02/2026	11:04:00	44	0	0	63	16	0	79
F00536	Winter	VP2	17/02/2026	11:10:00	1750	0	0	104	32	0	136

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	1700	N/A	N/A

7°55'0"W

53°3'45"N

53°1'30"N

701800

695600

606000

N

N52

N62

Roscrea Road

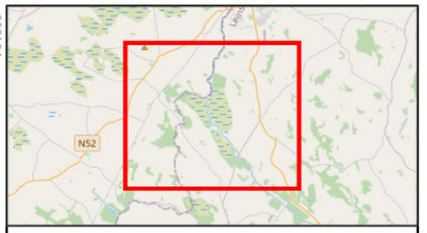
Grove Street

R491

F00534

F00535

WD53-23/24



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

- Black-tailed Godwit

Flightlines - TOBIN 2025/26

- Black-tailed Godwit

0 500 1,000

Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	07/04/2026	First issue	S.P	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 5: Black-tailed Godwit observations over the survey period (May 2020 – Sept 2026)

Scale @ A3: 1:25,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-002.ApX-VP-BW-SUM-A

Draft: A

Appendix 7-1 - IV BUZZARD

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP1-20	Breeding	VP3, VP5	28/04/2020	09:51:00	1	600	137.5m	500	100
RP11-20	Breeding	VP4	28/04/2020	11:45:00	2	300	87.5m	100	200
RP12-20	Breeding	VP1	28/04/2020	12:26:00	1	80	25m	60	20
RP13-20	Breeding	VP1	28/04/2020	12:35:00	1	30	10m	30	0
RP14-20	Breeding	VP4	28/04/2020	13:30:00	2	400	87.5m	0	400
RP2-20	Breeding	VP3, VP5	28/04/2020	09:51:00	1	540	137.5m	500	100
RP3-20	Breeding	VP3, VP4	28/04/2020	09:51:00	1	540	87.5m	500	40
RP4-20	Breeding	VP4	28/04/2020	10:05:00	1	30	100m	30	0
RP5-20	Breeding	VP4	28/04/2020	10:09:00	1	120	62.5m	0	120
RP6-20	Breeding	VP4	28/04/2020	10:30:00	2	120	87.5m	120	0
RP7-20	Breeding	VP3	28/04/2020	10:59:00	1	0	40m	-	-
RP9-20	Breeding	VP5	28/04/2020	11:23:00	2	360	100m	120	240
RP17-20	Breeding	VP4	14/05/2020	10:32:00	1	240	125m	40	200
RP18-20	Breeding	VP1	14/05/2020	10:38:00	2	30	62.5m	15	15
RP20-20	Breeding	VP3	14/05/2020	11:17:00	3	408	75m	0	408
RP22-20	Breeding	VP3	14/05/2020	11:44:00	2	54	27.5m	0	54
RP23-20	Breeding	VP3	14/05/2020	11:49:00	2	169	40m	80	89
RP24-20	Breeding	VP3	14/05/2020	12:04:00	1	98	20m	0	98
RP27-20	Breeding	VP3	14/05/2020	12:24:00	1	95	20m	0	95
RP29-20	Breeding	VP2	14/05/2020	12:43:00	1	300	87.5m	300	0
RP30-20	Breeding	VP3	14/05/2020	12:44:00	1	60	25m	0	60
RP31-20	Breeding	VP2	14/05/2020	12:44:00	1	240	175m	200	40
RP32-20	Breeding	VP1	14/05/2020	12:45:00	1	30	15m	30	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP34-20	Breeding	VP4	14/05/2020	13:39:00	1	40	37.5m	0	40
RP36-20	Breeding	VP1	14/05/2020	13:58:00	1	5	15m	2	3
RP37-20	Breeding	VP5	14/05/2020	14:15:00	1	40	70m	0	40
RP38-20	Breeding	VP3	14/05/2020	14:20:00	1	45	17.5m	0	45
RP40-20	Breeding	VP2	14/05/2020	14:25:00	2	60	150m	40	20
RP42-20	Breeding	VP4	14/05/2020	14:44:00	2	90	75m	0	90
RP43-20	Breeding	VP4	14/05/2020	14:45:00	1	60	75m	0	60
RP45-20	Breeding	VP4	04/06/2020	08:41:00	1	105	30m	0	105
RP48-20	Breeding	VP4	04/06/2020	09:12:00	1	25	25m	0	25
RP49-20	Breeding	VP4	04/06/2020	09:40:00	1	210	20m	0	210
RP50-20	Breeding	VP4	04/06/2020	09:41:00	1	130	22.5m	0	130
RP52-20	Breeding	VP3	04/06/2020	10:27:00	2	100	25m	100	0
RP58-20	Breeding	VP4	04/06/2020	12:18:00	1	20	20m	20	0
RP61-20	Breeding	VP4	04/06/2020	12:38:00	1	30	17.5m	30	0
RP63-20	Breeding	VP4	04/06/2020	12:54:00	1	180	20m	0	180
RP66-20	Breeding	VP4	04/06/2020	13:13:00	1	135	22.5m	0	135
RP67-20	Breeding	VP4	04/06/2020	13:13:00	1	95	17.5m	0	95
RP68-20	Breeding	VP4	04/06/2020	13:44:00	1	24	20m	24	0
RP72-20	Breeding	VP3	04/06/2020	14:11:00	1	50	30m	50	0
RP73-20	Breeding	VP4	04/06/2020	14:19:00	1	395	20m	95	300
RP74-20	Breeding	VP2	04/06/2020	14:23:00	1	12	80m	0	12
N/A	Breeding	VP3	10/07/2020	13:58:00	2	60	125m	0	60
RP100-20	Breeding	VP3	10/07/2020	11:11:00	2	30	20m	30	0
RP101-20	Breeding	VP5, V2	10/07/2020	11:14:00	1	390	112.5m	200	190
RP104-20	Breeding	VP3	10/07/2020	11:37:00	1	8	10m	8	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP105-20	Breeding	VP4	10/07/2020	11:39:00	1	12	35m	12	0
RP110-20	Breeding	VP4	10/07/2020	11:53:00	1	8	27.5m	8	0
RP112-20	Breeding	VP2	10/07/2020	11:55:00	1	170	30m	0	170
RP114-20	Breeding	VP4	10/07/2020	11:59:00	1	20	25m	10	10
RP115-20	Breeding	VP3	10/07/2020	12:00:00	1	120	30m	120	0
RP116-20	Breeding	VP4	10/07/2020	12:12:00	1	600	57.5m	600	0
RP118-20	Breeding	VP5	10/07/2020	12:17:00	2	180	100m	0	180
RP120-20	Breeding	VP2	10/07/2020	12:33:00	1	20	Unknown	20	0
RP122-20	Breeding	VP2	10/07/2020	12:40:00	1	375	145m	0	375
RP126-20	Breeding	VP4	10/07/2020	13:07:00	1	120	35m	100	20
RP127-20	Breeding	VP4	10/07/2020	13:09:00	1	20	45m	20	0
RP129-20	Breeding	VP4	10/07/2020	13:17:00	1	120	45m	100	20
RP133-20	Breeding	VP2	10/07/2020	14:09:00	1	80	35m	10	70
RP134-20	Breeding	VP2	10/07/2020	14:27:00	1	145	102.5m	45	100
RP135-20	Breeding	VP2	10/07/2020	14:31:00	1	21	12.5m	21	0
RP136-20	Breeding	VP5	10/07/2020	14:40:00	1	77	35m	0	77
RP83-20	Breeding	VP3	10/07/2020	09:56:00	2	280	57.5m	0	280
RP86-20	Breeding	VP4	10/07/2020	10:05:00	2	135	25m	0	135
RP87-20	Breeding	VP3	10/07/2020	10:06:00	1	60	22.5m	60	0
RP88-20	Breeding	VP3	10/07/2020	10:06:00	1	60	22.5m	55	5
RP89-20	Breeding	VP2	10/07/2020	10:26:00	1	7	27.5m	7	0
RP90-20	Breeding	VP4	10/07/2020	10:28:00	1	360	100m	360	0
RP91-20	Breeding	VP3	10/07/2020	10:48:00	2	60	80m	0	60
RP93-20	Breeding	VP5	10/07/2020	10:51:00	3	382	85m	0	382
RP95-20	Breeding	VP4	10/07/2020	11:00:00	1	180	60m	0	180

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP96-20	Breeding	VP5	10/07/2020	11:07:00	1	29	20m	4	25
RP99-20	Breeding	VP4	10/07/2020	11:11:00	1	600	45m	50	550
RP142-20	Breeding	VP3	14/08/2020	10:54:00	1	50	20m	20	30
RP143-20	Breeding	VP5	14/08/2020	10:59:00	1	48	7.5m	0	48
RP156-20	Breeding	VP1	14/08/2020	12:08:00	1	1080	60m	900	180
RP158-20	Breeding	VP4	14/08/2020	12:15:00	1	10	0m	0	10
RP160-20	Breeding	VP4	14/08/2020	13:07:00	1	30	-	0	30
RP163-20	Breeding	VP5	14/08/2020	13:42:00	1	165	150m	80	85
RP164-20	Breeding	VP2	14/08/2020	13:45:00	1	88	80m	0	88
RP165-20	Breeding	VP1	14/08/2020	13:46:00	1	25	75m	0	25
RP10-20/21	Wintering	VP, 4	08/10/2020	10:55:00	1	20	15m	20	0
RP15-20/21	Wintering	VP, 4	08/10/2020	11:26:00	1	60	15m	60	0
RP18-20/21	Wintering	VP, 4	08/10/2020	11:49:00	2	60	62.5m	60	0
RP28-20/21	Wintering	VP, 4	08/10/2020	12:37:00	2	180	15m	150	30
RP29-20/21	Wintering	VP, 3	08/10/2020	12:40:00	2	175	20m	90	85
RP31-20/21	Wintering	VP, 2	08/10/2020	12:54:00	1	6	40m	6	0
RP32-20/21	Wintering	VP, 3	08/10/2020	12:54:00	1	30	30m	30	0
RP34-20/21	Wintering	VP, 5	08/10/2020	13:18:00	2	540	80m	0	540
RP40-20/21	Wintering	VP, 4	08/10/2020	14:16:00	3	30	15m	0	30
RP41-20/21	Wintering	VP, 4	08/10/2020	14:16:00	2	20	62.5m	5	15
RP5-20/21	Wintering	VP, 4	08/10/2020	10:09:00	1	60	15m	60	0
RP6-20/21	Wintering	VP, 4	08/10/2020	10:30:00	1	60	15m	60	0
RP49-20/21	Wintering	VP, 4	05/11/2020	11:11:00	1	20	25m	0	20
RP51-20/21	Wintering	VP, 5	05/11/2020	12:11:00	1	120	22.5m	0	120
RP57-20/21	Wintering	VP, 4	05/11/2020	13:08:00	1	10	15m	0	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP58-20/21	Wintering	VP, 4	05/11/2020	13:19:00	1	55	35m	0	55
RP62-20/21	Wintering	VP, 4	05/11/2020	13:55:00	3	60	35m	0	60
RP66-20/21	Wintering	VP, 5	05/11/2020	14:51:00	1	15	12.5m	0	15
RP69-20/21	Wintering	VP, 4	05/11/2020	15:14:00	1	45	35m	0	45
RP71-20/21	Wintering	VP, 4	04/12/2020	09:11:00	1	40	15m	0	40
RP73-20/21	Wintering	VP, 1	04/12/2020	09:48:00	1	63	35m	0	63
RP76-20/21	Wintering	VP, 4	04/12/2020	10:20:00	1	50	15m	0	50
RP77-20/21	Wintering	VP, 4	04/12/2020	10:24:00	1	20	15m	0	20
RP95-20/21	Wintering	VP, 3	04/12/2020	13:51:00	1	60	80m	60	0
RP96-20/21	Wintering	VP, 1	04/12/2020	13:58:00	1	30	20m	0	30
RP97-20/21	Wintering	VP, 5	04/12/2020	14:02:00	1	10	15m	0	10
RP100-20/21	Wintering	VP, 2	14/01/2021	10:56:00	1	180	7.5m	180	0
RP108-20/21	Wintering	VP, 2	14/01/2021	13:12:00	3	366	25m	366	0
RP109-20/21	Wintering	VP, 2, VP, 3	14/01/2021	13:55:00	1	60	17.5m	60	0
RP110-20/21	Wintering	VP, 2	14/01/2021	13:55:00	1	140	25m	120	20
RP111-20/21	Wintering	VP, 2	14/01/2021	13:55:00	1	234	40m	164	70
RP112-20/21	Wintering	VP, 2	14/01/2021	14:20:00	1	20	22.5m	20	0
RP219-20/21	Wintering	VP3	14/01/2021	14:35:00	1	20	25m	20	0
RP120-20/21	Wintering	VP, 5	09/02/2021	11:27:00	1	17	10m	0	17
RP122-20/21	Wintering	VP, 2	09/02/2021	12:50:00	1	20	45m	0	20
RP123-20/21	Wintering	VP, 3	09/02/2021	12:54:00	1	0	20m	Unknown	0
RP125-20/21	Wintering	VP, 4	09/02/2021	13:20:00	1	10	7.5m	0	10
RP127-20/21	Wintering	VP, 4	09/02/2021	13:53:00	1	25	10m	0	25
RP221-20/21	Wintering	VP1	09/02/2021	11:56:00	1	70	62.5m	70	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP222-20/21	Wintering	VP1	09/02/2021	12:25:00	2	120	62.5m	0	120
RP223-20/21	Wintering	VP1	09/02/2021	12:30:00	1	60	100m	0	60
RP224-20/21	Wintering	VP1	09/02/2021	14:07:00	1	30	62.5m	30	0
RP134-20/21	Wintering	VP, 2	08/03/2021	09:35:00	2	105	27.5m	105	0
RP136-20/21	Wintering	VP, 3	08/03/2021	09:55:00	1	15	45m	15	0
RP137-20/21	Wintering	VP, 4	08/03/2021	10:03:00	1	34	20m	0	34
RP147-20/21	Wintering	VP, 4	08/03/2021	11:17:00	2	54	15m	0	54
RP150-20/21	Wintering	VP, 5	08/03/2021	11:44:00	2	300	70m	0	300
RP152-20/21	Wintering	VP, 2	08/03/2021	11:49:00	1	55	15m	55	0
RP153-20/21	Wintering	VP, 2	08/03/2021	11:50:00	1	25	37.5m	25	0
RP154-20/21	Wintering	VP, 2	08/03/2021	11:50:00	2	35	35m	35	0
RP155-20/21	Wintering	VP, 2	08/03/2021	11:51:00	1	210	55m	90	120
RP156-20/21	Wintering	VP, 2	08/03/2021	11:51:00	1	100	40m	100	0
RP157-20/21	Wintering	VP, 2	08/03/2021	11:54:00	3	470	152.5m	0	470
RP160-20/21	Wintering	VP, 2	08/03/2021	12:04:00	1	25	200m	0	25
RP162-20/21	Wintering	VP, 4	08/03/2021	12:18:00	2	60	100m	60	0
RP163-20/21	Wintering	VP, 3	08/03/2021	12:20:00	2	55	35m	0	55
RP164-20/21	Wintering	VP, 2	08/03/2021	12:27:00	1	135	100m	0	135
RP166-20/21	Wintering	VP, 5, VP, 2	08/03/2021	12:28:00	3	565	95m	0	565
RP167-20/21	Wintering	VP, 2	08/03/2021	12:31:00	1	385	225m	0	385
RP172-20/21	Wintering	VP, 4	08/03/2021	12:56:00	1	90	40m	90	0
RP174-20/21	Wintering	VP, 5	08/03/2021	12:58:00	1	70	50m	0	70
RP175-20/21	Wintering	VP, 5	08/03/2021	12:58:00	2	180	80m	180	0
RP176-20/21	Wintering	VP, 2	08/03/2021	13:00:00	1	70	150m	70	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP177-20/21	Wintering	VP, 4	08/03/2021	13:03:00	1	24	15m	0	24
RP179-20/21	Wintering	VP, 2	08/03/2021	13:07:00	1	660	30m	190	470
RP180-20/21	Wintering	VP, 2	08/03/2021	13:07:00	1	5	12.5m	5	0
RP181-20/21	Wintering	VP, 3	08/03/2021	13:08:00	1	120	55m	120	0
RP183-20/21	Wintering	VP, 4	08/03/2021	13:16:00	3	80	75m	0	80
RP184-20/21	Wintering	VP, 2	08/03/2021	13:19:00	1	195	70m	195	0
RP185-20/21	Wintering	VP, 2	08/03/2021	13:32:00	2	65	120m	0	65
RP185-20/21	Wintering	VP, 2	08/03/2021	13:33:00	3	10	75m	0	10
RP187-20/21	Wintering	VP, 5	08/03/2021	13:36:00	2	600	50m	0	600
RP188-20/21	Wintering	VP, 3	08/03/2021	13:38:00	1	85	50m	0	85
RP191-20/21	Wintering	VP, 4	08/03/2021	13:41:00	1	86	40m	86	0
RP192-20/21	Wintering	VP, 1	08/03/2021	13:46:00	2	140	70m	0	140
RP195-20/21	Wintering	VP, 4	08/03/2021	13:56:00	1	10	15m	0	10
RP196-20/21	Wintering	VP, 3	08/03/2021	14:01:00	1	86	70m	0	86
RP198-20/21	Wintering	VP, 4	08/03/2021	14:06:00	2	72	15m	0	72
RP199-20/21	Wintering	VP, 4	08/03/2021	14:15:00	1	53	25m	0	53
RP201-20/21	Wintering	VP, 3	08/03/2021	14:17:00	1	117	40m	0	117
RP202-20/21	Wintering	VP, 2	08/03/2021	14:23:00	1	90	40m	5	85
RP203-20/21	Wintering	VP, 4	08/03/2021	14:23:00	1	272	35m	0	272
RP204-20/21	Wintering	VP, 2	08/03/2021	14:28:00	1	750	130m	0	750
RP206-20/21	Wintering	VP, 4	08/03/2021	14:31:00	1	45	20m	0	45
RP208-20/21	Wintering	VP, 5	08/03/2021	14:32:00	1	40	40m	0	40
RP209-20/21	Wintering	VP, 2	08/03/2021	14:40:00	2	55	162.5m	0	55
RP210-20/21	Wintering	VP, 2	08/03/2021	14:41:00	1	225	130m	85	140
RP211-20/21	Wintering	VP, 2	08/03/2021	14:41:00	1	360	75m	0	360

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP212-20/21	Wintering	VP, 1	08/03/2021	14:44:00	1	30	45m	0	30
RP213-20/21	Wintering	VP, 2	08/03/2021	14:48:00	1	260	142.5m	120	140
RP214-20/21	Wintering	VP, 2	08/03/2021	14:52:00	2	165	250m	0	165
RP215-20/21	Wintering	VP, 2	08/03/2021	14:55:00	1	300	220m	0	300
RP216-20/21	Wintering	VP, 2	08/03/2021	14:55:00	1	15	220m	0	15
RP217-20/21	Wintering	VP, 2	08/03/2021	14:56:00	1	35	120m	0	35
RP218-20/21	Wintering	VP, 3	08/03/2021	14:57:00	1	165	12.5m	0	165
RP10-21	Breeding	VP3	23/04/2021	14:20:00	1	35	30m	35	0
RP11-21	Breeding	VP3	23/04/2021	14:57:00	2	240	25m	240	0
RP2-21	Breeding	VP1, VP2	23/04/2021	14:37:00	1	164	60m	120	44
RP3-21	Breeding	VP2	23/04/2021	10:55:00	3	59	25m	0	59
RP4-21	Breeding	VP2	23/04/2021	12:20:00	1	57	55m	0	57
RP9-21	Breeding	VP3	23/04/2021	12:43:00	1	15	15m	0	15
RP19-21	Breeding	VP3	14/05/2021	10:55:00	1	60	62.5m	0	60
RP20-21	Breeding	VP3	14/05/2021	11:08:00	2	15	62.5m	10	5
RP21-21	Breeding	VP3	14/05/2021	11:19:00	1	55	100m+	50	5
RP22-21	Breeding	VP3	14/05/2021	11:21:00	1	30	100m+	10	20
RP23-21	Breeding	VP3	14/05/2021	11:21:00	2	45	100m+	45	0
RP24-21	Breeding	VP3	14/05/2021	11:35:00	1	20	62.5m	0	20
RP25-21	Breeding	VP3	14/05/2021	11:47:00	1	240	62.5m	140	100
RP26-21	Breeding	VP3	14/05/2021	11:50:00	1	10	100m+	5	5
RP27-21	Breeding	VP3	14/05/2021	12:02:00	1	15	62.5m	15	0
RP28-21	Breeding	VP3	14/05/2021	12:22:00	2	35	100m+	0	35
RP29-21	Breeding	VP3	14/05/2021	12:29:00	1	10	17.5m	10	0
RP30-21	Breeding	VP3	14/05/2021	12:29:00	1	10	17.5m	10	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP32-21	Breeding	VP3	14/05/2021	13:05:00	1	10	2.5m	10	0
RP33-21	Breeding	VP3	14/05/2021	13:35:00	2	65	100m+	0	65
RP34-21	Breeding	VP3	14/05/2021	14:20:00	1	25	62.5m	0	25
RP35-21	Breeding	VP4	14/05/2021	11:01:00	1	180	70	0	180
RP36-21	Breeding	VP4	14/05/2021	11:39:00	2	100	130	0	100
RP37-21	Breeding	VP4	14/05/2021	12:18:00	1	120	100	0	120
RP40-21	Breeding	VP4, VP3	14/05/2021	14:05:00	1	240	130	0	240
RP43-21	Breeding	VP5	14/05/2021	11:50:00	1	400	105m	0	400
RP44-21	Breeding	VP5	14/05/2021	12:55:00	1	360	110m	360	0
RP47-21	Breeding	VP1	17/05/2021	09:33:00	1	240	2.5m	40	200
RP48-21	Breeding	VP1	17/05/2021	09:40:00	1	15	62.5m	0	15
RP49-21	Breeding	VP1	17/05/2021	10:05:00	1	30	100m+	0	30
RP52-21	Breeding	VP1	17/05/2021	12:05:00	1	20	17.5m	15	5
RP53-21	Breeding	VP1	17/05/2021	12:22:00	1	35	62.5m	30	5
RP54-21	Breeding	VP1	17/05/2021	12:53:00	1	10	62.5m	0	10
RP56-21	Breeding	VP1	17/05/2021	14:36:00	1	40	62.5m	0	40
RP57-21	Breeding	VP1	17/05/2021	14:40:00	2	20	100m+	0	20
RP59-21	Breeding	VP2	17/05/2021	13:11:00	1	30	25m	25	5
	Breeding	VP5	11/06/2021	12:32:00	2	120	62.5m		
RP60-21	Breeding	VP3	11/06/2021	11:43:00	1	360	80m	40	320
RP62-21	Breeding	VP3	11/06/2021	13:17:00	1	360	40m	360	0
RP66-21	Breeding	VP5	11/06/2021	12:10:00	1	30	100m	10	20
RP67-21	Breeding	VP5	11/06/2021	13:46:00	1	30	62.5m	0	30
RP68-21	Breeding	VP5	11/06/2021	14:05:00	1	10	62.5m	0	10
RP121-21	Breeding	VP4	14/06/2021	10:30:00	2	115	65m	70	45

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP122-21	Breeding	VP4	14/06/2021	11:26:00	1	60	5m	0	60
RP124-21	Breeding	VP4	14/06/2021	14:42:00	1	30	90m	5	25
RP69-21	Breeding	VP1	14/06/2021	12:05:00	1	20	62.5m	15	5
RP70-21	Breeding	VP1	14/06/2021	13:26:00	1	50	62.5m	40	10
RP72-21	Breeding	VP2	14/06/2021	09:07:00	1	20	30m	10	10
RP73-21	Breeding	VP2	14/06/2021	11:18:00	1	25	20m	25	0
RP74-21	Breeding	VP2	14/06/2021	14:36:00	1	20	30m	20	0
N/A	Breeding	VP1	16/07/2021	13:14:00	1	20	100m+	-	-
N/A	Breeding	VP1	16/07/2021	13:25:00	1	1	100m+		
RP76-21	Breeding	VP1	16/07/2021	10:50:00	1	180	17.5m	0	180
RP80-21	Breeding	VP2	16/07/2021	10:24:00	1	20	62.5m	0	20
RP82-21	Breeding	VP2	16/07/2021	12:29:00	1	125	62.5m	0	125
RP83-21	Breeding	VP2	16/07/2021	12:41:00	1	35	62.5m	0	35
RP85-21	Breeding	VP3	16/07/2021	13:26:00	1	180	45m	30	150
RP86-21	Breeding	VP5	16/07/2021	12:32:00	1	56	100m	6	50
RP87-21	Breeding	VP5	16/07/2021	13:11:00	1	28	100m	8	20
N/A	Breeding	VP4	21/07/2021	10:22:00	2	135	50m	-	-
RP102-21	Breeding	VP1	18/08/2021	13:35:00	1	92	80m	80	12
RP106-21	Breeding	VP1	18/08/2021	14:29:00	1	10	7.5m	10	0
RP108-21	Breeding	VP2, VP4	18/08/2021	10:22:00	1	131	17.5m	65	66
RP110-21	Breeding	VP2	18/08/2021	14:00:00	1	9	2.5m	8	1
RP111-21	Breeding	VP2, VP1	18/08/2021	14:43:00	1	550	135m	480	70
RP112-21	Breeding	VP4	18/08/2021	10:40:00	2	125	-	125	0
RP113-21	Breeding	VP4	18/08/2021	11:54:00	1	240	62.5m	20	220
RP114-21	Breeding	VP4	18/08/2021	13:30:00	1	180	100m+	10	170

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP115-21	Breeding	VP4	18/08/2021	14:27:00	1	20	62.5m	0	20
RP117-21	Breeding	VP5, VP4	18/08/2021	10:37:00	1	40	150m	0	40
RP128-21	Breeding	VP3	18/08/2021	10:31:00	1	100	45m	80	20
RP129-21	Breeding	VP3	18/08/2021	14:08:00	1	320	125m	160	160
RP93-21	Breeding	VP1	18/08/2021	09:49:00	1	20	25m	0	20
RP97-21	Breeding	VP1	18/08/2021	12:15:00	1	114	70m	0	114
RP1-21/22	Wintering	VP4	18/11/2021	11:26:00	1	8	5m	0	8
RP3-21/22	Wintering	VP3	18/11/2021	14:20:00	1	240	25m	0	240
RP13-21/22	Wintering	VP1	23/11/2021	14:24:00	1	2	5m	2	0
RP6-21/22	Wintering	VP1	23/11/2021	09:08:00	1	6000	5m	6000	0
RP7-21/22	Wintering	VP1	23/11/2021	10:23:00	1	420	5m	0	420
RP8-21/22	Wintering	VP1	23/11/2021	10:34:00	1	10860	5m	10800	60
RP9-21/22	Wintering	VP1	23/11/2021	11:45:00	1	900	5m	900	0
N/A	Wintering	VP4	02/12/2021	14:25:00	1	360	15m	0	360
RP15-21/22	Wintering	VP1, VP1	02/12/2021	09:40:00	1	2760	5m	0	2760
RP19-21/22	Wintering	VP4	02/12/2021	10:04:00	1	210	15m	0	210
RP21-21/22	Wintering	VP1, VP1	02/12/2021	10:41:00	1	180	0m	180	0
RP22-21/22	Wintering	VP1, VP1	02/12/2021	10:55:00	1	24	5m	20	4
RP23-21/22	Wintering	VP1, VP1	02/12/2021	11:01:00	1	65	5m	65	0
RP29-21/22	Wintering	VP1	02/12/2021	11:52:00	1	420	0m	0	420
RP31-21/22	Wintering	VP1	02/12/2021	12:20:00	1	900	5m	0	900
RP32-21/22	Wintering	VP4	02/12/2021	12:30:00	1	60	15m	0	60
RP33-21/22	Wintering	VP1	02/12/2021	12:35:00	1	120	0m	0	120
RP35-21/22	Wintering	VP1	02/12/2021	12:40:00	1	180	0m	180	0
RP36-21/22	Wintering	VP1	02/12/2021	12:40:00	1	1200	5m	0	1200

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP57-21/22	Wintering	VP5	06/12/2021	13:13:00	1	180	50m	0	180
RP68-21/22	Wintering	VP3	14/01/2022	09:08:00	1	300	5m	300	0
RP73-21/22	Wintering	VP4	14/01/2022	12:07:00	1	1680	5m	0	1680
RP74-21/22	Wintering	VP4	14/01/2022	12:27:00	1	3120	5m	0	3120
RP75-21/22	Wintering	VP4	14/01/2022	13:21:00	1	300	5m	0	300
RP76-21/22	Wintering	VP4	14/01/2022	13:47:00	1	54	5m	0	54
RP83-21/22	Wintering	VP2	17/01/2022	14:39:00	2	140	80m	0	140
RP85-21/22	Wintering	VP2	17/01/2022	14:43:00	1	15	10m	15	0
RP100-21/22	Wintering	VP3	10/02/2022	12:28:00	1	44	25m	0	44
RP101-21/22	Wintering	VP3	10/02/2022	12:30:00	2	1200	25m	0	1200
RP102-21/22	Wintering	VP3	10/02/2022	12:30:00	1	1200	25m	0	1200
RP103-21/22	Wintering	VP3	10/02/2022	12:30:00	1	1200	25m	0	1200
RP104-21/22	Wintering	VP3	10/02/2022	13:06:00	2	47	5m	0	47
RP105-21/22	Wintering	VP4	10/02/2022	13:19:00	1	300	25m	0	300
RP107-21/22	Wintering	VP4	10/02/2022	13:33:00	1	26	5m	0	26
RP110-21/22	Wintering	VP4	10/02/2022	13:48:00	2	480	25m	0	480
RP111-21/22	Wintering	VP3	10/02/2022	13:49:00	2	480	25m	0	480
RP114-21/22	Wintering	VP3	10/02/2022	14:16:00	1	13	5m	0	13
RP115-21/22	Wintering	VP4	10/02/2022	14:29:00	1	51	5m	0	51
RP116-21/22	Wintering	VP3	10/02/2022	14:30:00	1	195	25m	0	195
RP117-21/22	Wintering	VP3	10/02/2022	14:48:00	1	18	5m	18	0
RP87-21/22	Wintering	VP3	10/02/2022	10:12:00	1	840	25m	0	840
RP89-21/22	Wintering	VP3	10/02/2022	10:29:00	2	523	25m	43	480
RP90-21/22	Wintering	VP4	10/02/2022	10:34:00	1	26	25m	0	26
RP91-21/22	Wintering	VP3	10/02/2022	10:58:00	2	360	25m	0	360

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP92-21/22	Wintering	VP3	10/02/2022	11:09:00	2	420	25m	420	0
RP93-21/22	Wintering	VP4	10/02/2022	11:15:00	1	200	25m	20	180
RP94-21/22	Wintering	VP3	10/02/2022	11:24:00	2	300	25m	0	300
RP96-21/22	Wintering	VP3	10/02/2022	11:37:00	2	161	25m	0	161
RP97-21/22	Wintering	VP3	10/02/2022	12:12:00	1	138	25m	0	138
RP99-21/22	Wintering	VP3	10/02/2022	12:26:00	1	109	25m	0	109
RP118-21/22	Wintering	VP1	11/02/2022	09:06:00	1	540	0m	0	540
RP119-21/22	Wintering	VP1	11/02/2022	09:17:00	1	1020	0m	0	1020
RP121-21/22	Wintering	VP5	11/02/2022	09:39:00	2	50	50m	0	50
RP127-21/22	Wintering	VP1	11/02/2022	10:40:00	1	1200	5m	0	1200
RP130-21/22	Wintering	VP5	11/02/2022	11:02:00	1	40	30m	0	40
RP135-21/22	Wintering	VP1	11/02/2022	12:42:00	2	87	5m	69	18
RP136-21/22	Wintering	VP2	11/02/2022	12:42:00	1	55	5m	30	25
RP137-21/22	Wintering	VP1	11/02/2022	12:54:00	1	66	25m	27	39
RP140-21/22	Wintering	VP2	11/02/2022	13:31:00	1	15	5m	15	0
RP141-21/22	Wintering	VP2	11/02/2022	13:35:00	1	25	5m	0	25
RP142-21/22	Wintering	VP1	11/02/2022	14:12:00	1	64	25m	23	41
RP145-21/22	Wintering	VP2	11/02/2022	14:25:00	1	20	5m	20	0
RP146-21/22	Wintering	VP4	14/03/2022	09:20:00	1	6	20m	0	6
RP147-21/22	Wintering	VP5	14/03/2022	09:24:00	1	404	25m	306	98
RP148-21/22	Wintering	VP4	14/03/2022	09:25:00	1	5	20m	0	5
RP149-21/22	Wintering	VP3	14/03/2022	09:27:00	1	60	25m	0	60
RP150-21/22	Wintering	VP3	14/03/2022	09:44:00	1	25	5m	0	25
RP151-21/22	Wintering	VP4	14/03/2022	10:04:00	1	8	10m	0	8
RP154-21/22	Wintering	VP4	14/03/2022	11:00:00	1	4	10m	0	4

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP155-21/22	Wintering	VP2	14/03/2022	11:04:00	1	245	50m	245	0
RP156-21/22	Wintering	VP3	14/03/2022	11:05:00	1	120	25m	120	0
RP156-21/22	Wintering	VP5, VP3, VP2	14/03/2022	11:11:00	1	515	20m	320	195
RP158-21/22	Wintering	VP1	14/03/2022	11:17:00	1	55	30m	30	25
RP160-21/22	Wintering	VP4	14/03/2022	11:23:00	1	4	40m	0	4
RP161-21/22	Wintering	VP5	14/03/2022	11:38:00	1	146	25m	0	146
RP163-21/22	Wintering	VP2	14/03/2022	12:08:00	2	480	100m	0	480
RP164-21/22	Wintering	VP2	14/03/2022	12:08:00	1	600	100m	0	600
RP165-21/22	Wintering	VP2	14/03/2022	12:12:00	1	120	80m	0	120
RP167-21/22	Wintering	VP3	14/03/2022	12:12:00	1	120	25m	120	0
RP168-21/22	Wintering	VP5	14/03/2022	12:16:00	1	168	25m	0	168
RP169-21/22	Wintering	VP4	14/03/2022	12:17:00	1	7	30m	0	7
RP171-21/22	Wintering	VP3	14/03/2022	12:20:00	4	200	100m	0	200
RP172-21/22	Wintering	VP2	14/03/2022	12:24:00	1	32	25m	32	0
RP173-21/22	Wintering	VP2	14/03/2022	12:24:00	1	20	40m	20	0
RP174-21/22	Wintering	VP3	14/03/2022	12:25:00	1	20	25m	20	0
RP176-21/22	Wintering	VP5	14/03/2022	12:35:00	2	68	25m	0	68
RP177-21/22	Wintering	VP3	14/03/2022	12:55:00	1	30	5m	15	15
RP178-21/22	Wintering	VP5	14/03/2022	13:00:00	2	140	25m	0	140
RP179-21/22	Wintering	VP2	14/03/2022	13:02:00	1	272	100m	240	32
RP182-21/22	Wintering	VP3	14/03/2022	13:26:00	1	35	5m	0	35
RP183-21/22	Wintering	VP5	14/03/2022	13:28:00	2	245	25m	0	245
RP189-21/22	Wintering	VP2	14/03/2022	13:52:00	2	240	50m	0	240
RP191-21/22	Wintering	VP5	14/03/2022	13:55:00	2	290	25m	0	290

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP192-21/22	Wintering	VP1	14/03/2022	14:01:00	1	130	40m	0	130
RP193-21/22	Wintering	VP2	14/03/2022	14:03:00	1	95	30m	0	95
RP194-21/22	Wintering	VP2	14/03/2022	14:07:00	1	660	60m	0	660
RP195-21/22	Wintering	VP2	14/03/2022	14:12:00	1	150	150m	0	150
RP196-21/22	Wintering	VP2	14/03/2022	14:13:00	1	150	150m	0	150
RP198-21/22	Wintering	VP4	14/03/2022	14:14:00	2	12	80m	0	12
RP199-21/22	Wintering	VP1	14/03/2022	14:18:00	2	70	80m	0	70
RP200-21/22	Wintering	VP5	14/03/2022	14:27:00	1	24	25m	0	24
RP10-22/23	Wintering	VP2	28/11/2022	13:45:00	1	30	25m	23	7
RP5-22/23	Wintering	VP5	28/11/2022	11:48:00	1	98	15m	0	98
RP6-22/23	Wintering	VP2, VP1	28/11/2022	11:58:00	2	60	15m	40	20
RP7-22/23	Wintering	VP2	28/11/2022	12:45:00	1	10	25m	0	10
RP8-22/23	Wintering	VP1	28/11/2022	13:03:00	1	145	90m	145	0
RP13-22/23	Wintering	VPB, VPB	30/11/2022	09:37:00	1	96	10m	50	46
RP18-22/23	Wintering	VP3, VPA	30/11/2022	10:50:00	1	495	15m	45	450
RP19-22/23	Wintering	VPA	30/11/2022	10:57:00	1	48	20m	48	0
RP25-22/23	Wintering	VPA	30/11/2022	13:19:00	1	66	15m	0	66
RP32-22/23	Wintering	VP4, VP3	20/12/2022	09:41:00	3	360	62.5m	0	360
RP33-22/23	Wintering	VPB	20/12/2022	09:47:00	2	79	2.5m	79	0
RP34-22/23	Wintering	VPA	20/12/2022	09:49:00	1	24	30m	4	20
RP36-22/23	Wintering	VPB	20/12/2022	10:04:00	1	5	2.5m	5	0
RP37-22/23	Wintering	VP4	20/12/2022	10:32:00	1	49	62.5m	49	0
RP39-22/23	Wintering	VP3	20/12/2022	10:48:00	1	180	62.5m	0	180
RP43-22/23	Wintering	VP4	20/12/2022	10:58:00	1	43	15m	0	43

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP44-22/23	Wintering	VP3	20/12/2022	11:01:00	1	40	15m	27	13
RP47-22/23	Wintering	VP3	20/12/2022	12:00:00	1	70	62.5m	0	70
RP48-22/23	Wintering	VP3	20/12/2022	12:05:00	1	100	62.5m	0	100
RP51-22/23	Wintering	VP4	20/12/2022	14:32:00	1	83	15m	63	20
RP55-22/23	Wintering	VP2, VP1	21/12/2022	10:28:00	1	39	35m	0	39
RP62-22/23	Wintering	VP2	21/12/2022	13:38:00	1	26	30m	26	0
RP65-22/23	Wintering	VP5, VP2	21/12/2022	13:51:00	2	600	60m	0	600
RP161-22/23	Wintering	VP5	25/01/2023	14:26:00	1	220	40m		
RP155-22/23	Wintering	VPB	27/01/2023	10:01:00	1	25	5m	25	0
RP156-22/23	Wintering	VPB	27/01/2023	13:17:00	1	35	10m	35	0
RP100-22/23	Wintering	VP2	20/02/2023	14:37:00	1	238	15m	18	220
RP101-22/23	Wintering	VP1	20/02/2023	14:43:00	2	28	30m	5	23
RP70-22/23	Wintering	VP4	20/02/2023	09:58:00	1	25	5m	0	25
RP72-22/23	Wintering	VP2, VP1	20/02/2023	10:02:00	1	26	15m	0	26
RP73-22/23	Wintering	VP1	20/02/2023	10:03:00	1	5	20m	5	0
RP74-22/23	Wintering	VP3	20/02/2023	10:03:00	1	222	15m	0	222
RP75-22/23	Wintering	VP4	20/02/2023	10:04:00	1	200	5m	0	200
RP77-22/23	Wintering	VPA	20/02/2023	10:19:00	1	300	75m	225	75
RP79-22/23	Wintering	VP2, VP1	20/02/2023	12:10:00	1	203	15m	0	203
RP80-22/23	Wintering	VP1	20/02/2023	12:11:00	1	158	35m	0	158
RP81-22/23	Wintering	VP2, VP1	20/02/2023	12:17:00	1	72	15m	42	30
RP83-22/23	Wintering	VP1	20/02/2023	12:26:00	2	250	20	30	220
RP85-22/23	Wintering	VP4	20/02/2023	12:33:00	1	15	5m	3	12
RP87-22/23	Wintering	VP1	20/02/2023	12:43:00	1	10	40m	0	10
RP88-22/23	Wintering	VPA	20/02/2023	12:45:00	1	300	40m	0	300

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP89-22/23	Wintering	VP4	20/02/2023	12:45:00	1	60	25m	20	40
RP90-22/23	Wintering	VPA	20/02/2023	12:50:00	2	30	40m	0	30
RP92-22/23	Wintering	VP2	20/02/2023	13:27:00	1	204	15m	0	204
RP96-22/23	Wintering	VP2, VP1	20/02/2023	14:14:00	1	179	15m	179	0
RP97-22/23	Wintering	VP2, VP1	20/02/2023	14:17:00	1	30	5m	30	0
RP99-22/23	Wintering	VP4	20/02/2023	14:30:00	1	20	25m	12	8
RP103-22/23	Wintering	VPA	27/03/2023	09:00:00	1	32	2.5m	10	22
RP107-22/23	Wintering	VP1	27/03/2023	10:39:00	1	300	15m	300	0
RP108-22/23	Wintering	VP1	27/03/2023	10:39:00	1	300	15m	280	20
RP109-22/23	Wintering	VP1	27/03/2023	10:40:00	1	120	15m	110	10
RP111-22/23	Wintering	VP5	27/03/2023	10:52:00	1	64	45m	0	64
RP112-22/23	Wintering	VP2, VPB	27/03/2023	11:00:00	2	38	45m	28	10
RP113-22/23	Wintering	VP3	27/03/2023	11:15:00	2	160	115m	60	100
RP114-22/23	Wintering	VP4	27/03/2023	11:16:00	1	220	30m	50	170
RP115-22/23	Wintering	VP5	27/03/2023	11:16:00	1	279	175m	229	50
RP116-22/23	Wintering	VPA	27/03/2023	11:17:00	2	20	62.5m	0	20
RP117-22/23	Wintering	VP5	27/03/2023	11:19:00	1	99	125m	99	0
RP119-22/23	Wintering	VPA	27/03/2023	11:25:00	2	85	15m	43	42
RP120-22/23	Wintering	VP1	27/03/2023	11:25:00	2	91	62.5m	35	56
RP123-22/23	Wintering	VPA	27/03/2023	11:44:00	1	420	62.5m	420	0
RP124-22/23	Wintering	VP5	27/03/2023	11:45:00	3	393	125m	0	393
RP125-22/23	Wintering	VP5	27/03/2023	11:45:00	1	15	75m	0	15
RP127-22/23	Wintering	VPB	27/03/2023	11:55:00	2	180	100m	0	180
RP131-22/23	Wintering	VPB	27/03/2023	12:05:00	1	120	62.5m	0	120
RP133-22/23	Wintering	VPA	27/03/2023	12:07:00	2	275	62.5m	0	275

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP137-22/23	Wintering	VPA	27/03/2023	12:31:00	3	420	62.5m	0	420
RP143-22/23	Wintering	VP4	27/03/2023	13:02:00	1	35	40m	17	18
RP145-22/23	Wintering	VPA	27/03/2023	13:10:00	1	405	62.5m	40	365
RP146-22/23	Wintering	VPA	27/03/2023	13:15:00	2	195	62.5m	50	145
RP147-22/23	Wintering	VPA	27/03/2023	13:29:00	1	109	15m	30	79
RP149-22/23	Wintering	VP5	27/03/2023	13:47:00	2	114	100m	0	114
RP150-22/23	Wintering	VPA	27/03/2023	13:51:00	3	131	62.5m	0	131
RP151-22/23	Wintering	VP1	27/03/2023	14:05:00	1	72	15m	42	30
RP152-22/23	Wintering	VPB	27/03/2023	14:06:00	1	15	15m	0	15
RP1-23	Breeding	VPB	01/05/2023	09:53:00	1	86	15m	0	86
RP11-23	Breeding	VP4	01/05/2023	12:36:00	1	40	75m	40	0
RP13-23	Breeding	VPB	01/05/2023	12:31:00	1	125	62.5m	0	125
RP14-23	Breeding	VPB	01/05/2023	12:40:00	1	60	15m	60	0
RP15-23	Breeding	VPB	01/05/2023	12:55:00	1	58	15m	0	58
RP16-23	Breeding	VPB	01/05/2023	13:01:00	1	83	15m	60	23
RP17-23	Breeding	VPB	01/05/2023	13:13:00	2	138	62.5m	0	138
RP19-23	Breeding	VPB	01/05/2023	13:34:00	1	70	15m	0	70
RP2-23	Breeding	VPB	01/05/2023	10:08:00	1	28	15m	28	0
RP20-23	Breeding	VP4	01/05/2023	13:34:00	1	70	75m	21	49
RP21-23	Breeding	VPB	01/05/2023	13:40:00	2	33	15m	33	0
RP25-23	Breeding	VPB	01/05/2023	14:02:00	1	84	62.5m	0	84
RP26-23	Breeding	VPB	01/05/2023	14:08:00	1	190	62.5m	0	190
RP261-23	Breeding	VP5	01/05/2023	09:40:00	1	125	40m	0	125
RP262-23	Breeding	VP5	01/05/2023	10:08:00	1	350	62.5m	0	350
RP265-23	Breeding	VP5	01/05/2023	12:35:00	1	115	100m	0	115

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP267-23	Breeding	VP5	01/05/2023	14:19:00	1	100	75m	0	100
RP28-23	Breeding	VPB	01/05/2023	14:20:00	1	170	62.5m	20	150
RP29-23	Breeding	VP4	01/05/2023	14:26:00	1	130	65m	115	15
RP3-23	Breeding	VPB	01/05/2023	10:30:00	1	102	62.5m	0	102
RP30-23	Breeding	VPB	01/05/2023	14:55:00	1	155	62.5m	0	155
RP31-23	Breeding	VP4	01/05/2023	14:59:00	3	250	117.5m	250	0
RP5-23	Breeding	VPB	01/05/2023	10:46:00	2	132	62.5m	0	132
RP7-23	Breeding	VPB	01/05/2023	11:34:00	1	600	62.5m	400	200
RP8-23	Breeding	VPB	01/05/2023	11:50:00	1	70	5m	70	0
RP9-23	Breeding	VPB	01/05/2023	12:00:00	2	135	15m	90	45
RP35-23	Breeding	VPA	02/05/2023	09:48:00	1	76	15m	38	38
RP36-23	Breeding	VP1	02/05/2023	09:50:00	1	22	10m	14	8
RP37-23	Breeding	VP3	02/05/2023	10:10:00	1	166	62.5m	0	166
RP39-23	Breeding	VP3	02/05/2023	11:00:00	2	75	62.5m	0	75
RP43-23	Breeding	VPA	02/05/2023	11:31:00	1	21	15m	21	0
RP44-23	Breeding	VP3	02/05/2023	11:54:00	1	80	15m	72	8
RP49-23	Breeding	VP3	02/05/2023	12:39:00	1	193	62.5m	0	193
RP50-23	Breeding	VP1	02/05/2023	12:47:00	1	8	15m	0	8
RP51-23	Breeding	VP3	02/05/2023	12:54:00	1	185	15m	0	185
RP52-23	Breeding	VP3	02/05/2023	13:06:00	1	34	15m	0	34
RP56-23	Breeding	VP3	02/05/2023	13:48:00	1	58	15m	0	58
RP57-23	Breeding	VP3	02/05/2023	13:51:00	1	39	15m	0	39
RP59-23	Breeding	VP3	02/05/2023	14:11:00	1	40	62.5m	32	8
RP60-23	Breeding	VP3	02/05/2023	14:14:00	1	300	15m	250	50
RP65-23	Breeding	VP2	03/05/2023	14:31:00	1	10	25m	5	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Breeding	VP1	30/05/2023	12:03:00	1	0	30m	-	-
RP66-23	Breeding	VP1	30/05/2023	11:47:00	1	175	20m	145	30
RP68-23	Breeding	VPA	30/05/2023	12:15:00	1	20	5m	2	18
RP69-23	Breeding	VPA	30/05/2023	12:31:00	1	56	15m	40	16
RP70-23	Breeding	VP2	30/05/2023	12:35:00	1	148	80m	0	148
RP71-23	Breeding	VP2	30/05/2023	12:50:00	1	254	35m	64	190
RP72-23	Breeding	VP2	30/05/2023	12:51:00	1	53	50m	0	53
RP74-23	Breeding	VPA	30/05/2023	13:01:00	1	196	62.5m	140	56
RP76-23	Breeding	VPA	30/05/2023	13:15:00	1	60	8m	50	10
RP77-23	Breeding	VPA	30/05/2023	13:17:00	1	20	15m	16	4
RP79-23	Breeding	VP2, VP1	30/05/2023	13:32:00	1	42	45m	40	2
RP80-23	Breeding	VP2	30/05/2023	13:42:00	2	162	50m	72	90
RP81-23	Breeding	VPA	30/05/2023	14:09:00	1	28	15m	28	0
RP82-23	Breeding	VPA	30/05/2023	14:18:00	1	76	15m	40	36
RP83-23	Breeding	VP2	30/05/2023	14:30:00	1	81	30m	76	5
RP84-23	Breeding	VP2	30/05/2023	14:43:00	1	120	35m	100	20
RP100-23	Breeding	VP2	23/06/2023	12:28:00	1	43	15m	0	43
RP106-23	Breeding	VP2	23/06/2023	13:39:00	1	21	5m	0	21
RP86-23	Breeding	VP2	23/06/2023	10:12:00	1	230	62.5m	0	230
RP88-23	Breeding	VP2	23/06/2023	10:31:00	1	31	15m	0	31
RP89-23	Breeding	VP1, VP2	23/06/2023	10:42:00	1	180	62.5m	90	90
RP90-23	Breeding	VP1	23/06/2023	10:46:00	1	1200	15m	0	1200
RP93-23	Breeding	VP1	23/06/2023	11:14:00	1	200	15m	120	80
RP95-23	Breeding	VP2	23/06/2023	11:25:00	1	84	15m	14	70
RP96-23	Breeding	VP2	23/06/2023	11:37:00	2	188	15m	0	188

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP97-23	Breeding	VP2	23/06/2023	11:42:00	1	184	62.5m	0	184
RP98-23	Breeding	VP2	23/06/2023	11:56:00	1	92	15m	0	92
RP114-23	Breeding	VP5	27/06/2023	09:03:00	1	15	80m	0	15
RP115-23	Breeding	VP4	27/06/2023	09:06:00	1	120	15m	0	120
RP117-23	Breeding	VPA, VP4, VP3	27/06/2023	09:20:00	1	276	65m	216	60
RP119-23	Breeding	VPA, VP4, VP3	27/06/2023	09:29:00	1	17	40m	15	2
RP120-23	Breeding	VP4	27/06/2023	09:38:00	1	10	15m	10	0
RP123-23	Breeding	VP4	27/06/2023	10:19:00	1	360	15m	0	360
RP124-23	Breeding	VP3, VPA	27/06/2023	10:23:00	1	179	15m	0	179
RP126-23	Breeding	VP4	27/06/2023	10:37:00	1	240	15m	40	200
RP128-23	Breeding	VPA	27/06/2023	11:37:00	1	56	70m	0	56
RP131-23	Breeding	VP3	27/06/2023	11:59:00	1	318	15m	0	318
RP132-23	Breeding	VPA	27/06/2023	12:00:00	1	179	50m	0	179
RP134-23	Breeding	VP3	27/06/2023	12:11:00	1	18	15m	18	0
RP136-23	Breeding	VP3	27/06/2023	12:34:00	1	8	2.5m	8	0
RP138-23	Breeding	VPA	27/06/2023	13:00:00	1	140	25m	0	140
RP139-23	Breeding	VP4	27/06/2023	13:01:00	1	60	15m	0	60
RP142-23	Breeding	VP3	27/06/2023	13:57:00	1	1	15m	0	1
RP143-23	Breeding	VPA, VP3	27/06/2023	14:02:00	1	71	25m	0	71
RP147-23	Breeding	VPA	27/06/2023	14:32:00	1	122	25m	122	0
RP148-23	Breeding	VP3	27/06/2023	14:39:00	1	149	15m	149	0
RP149-23	Breeding	VPA	27/06/2023	14:48:00	1	82	22.5m	0	82
N/A	Breeding	VP4	20/07/2023	11:53:00	1	0	45m	-	-

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Breeding	VP4	20/07/2023	12:00:00	4	0	5m	-	-
RP151-23	Breeding	VP4	20/07/2023	09:25:00	1	2340	10m	0	2340
RP153-23	Breeding	VPA	20/07/2023	09:56:00	1	110	15m	110	0
RP154-23	Breeding	VP5	20/07/2023	10:00:00	1	110	15m	95	15
RP155-23	Breeding		20/07/2023	11:05:00	1	5	15m	0	5
RP156-23	Breeding	VP4	20/07/2023	11:05:00	1	14	20m	0	14
RP157-23	Breeding	VP5	20/07/2023	11:20:00	1	15	62.5m	0	15
RP159-23	Breeding	VPA	20/07/2023	11:36:00	1	1200	15m	1200	0
RP162-23	Breeding	VPA	20/07/2023	11:56:00	2	420	62.5m	0	420
RP165-23	Breeding	VPA	20/07/2023	13:10:00	1	60	15m	60	0
RP170-23	Breeding	VPA	20/07/2023	14:09:00	1	285	62.5m	285	0
RP173-23	Breeding	VPB	27/07/2023	09:08:00	1	2220	12.5m	0	2220
RP175-23	Breeding	VPB	27/07/2023	09:35:00	1	180	2.5m	0	180
RP176-23	Breeding	VP2, VP1	27/07/2023	10:08:00	1	183	40m	170	13
RP177-23	Breeding	VPB	27/07/2023	10:31:00	1	25	15m	0	25
RP181-23	Breeding	VP1, VP2	27/07/2023	11:08:00	1	48	15m	0	48
RP183-23	Breeding	VP1	27/07/2023	11:15:00	1	45	62.5m	40	5
RP184-23	Breeding	VP2	27/07/2023	11:18:00	1	139	45m	139	0
RP186-23	Breeding	VP2	27/07/2023	12:32:00	1	42	25	42	0
RP187-23	Breeding	VP1	27/07/2023	12:35:00	1	16	15m	10	6
RP193-23	Breeding	VP2	27/07/2023	13:24:00	1	63	40m	0	63
RP198-23	Breeding	VP2	27/07/2023	14:27:00	1	120	110m	20	100
N/A	Breeding	VP2	28/08/2023	11:19:00	1	0	-	-	-
N/A	Breeding	VP5	28/08/2023	12:12:00	1	0	2.5m	-	-
RP204-23	Breeding	VP4	28/08/2023	10:51:00	1	39	35m	0	39

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP205-23	Breeding	VPA	28/08/2023	10:56:00	1	47	35m	0	47
RP206-23	Breeding	VP5	28/08/2023	11:16:00	3	720	62.5m	0	720
RP207-23	Breeding	VPB	28/08/2023	11:18:00	1	448	80m	448	0
RP208-23	Breeding	VP3	28/08/2023	11:25:00	2	65	15m	0	65
RP210-23	Breeding	VP5	28/08/2023	12:01:00	1	85	62.5m	85	0
RP213-23	Breeding	VP5	28/08/2023	13:44:00	1	7	2.5m	0	7
RP215-23	Breeding	VP5	28/08/2023	13:59:00	2	540	62.5m	0	540
RP217-23	Breeding	VP4	28/08/2023	14:43:00	1	177	55m	0	177
RP218-23	Breeding	VP2	26/09/2023	08:29:00	1	3	15m	3	0
RP219-23	Breeding	VP2	26/09/2023	08:30:00	1	12	5m	12	0
RP233-23	Breeding	VP1, VP2	26/09/2023	11:16:00	1	270	35m	170	100
RP234-23	Breeding	VPA	26/09/2023	11:22:00	1	30	15m	30	0
RP235-23	Breeding	VP1, VP2	26/09/2023	11:25:00	1	122	110m	0	122
RP236-23	Breeding	VP2	26/09/2023	11:25:00	1	68	15m	0	68
RP238-23	Breeding	VPB	26/09/2023	11:26:00	2	270	62.5m	0	270
RP239-23	Breeding	VP5	26/09/2023	11:32:00	1	199	60m	0	199
RP241-23	Breeding	VP2	26/09/2023	11:51:00	1	46	15m	0	46
RP243-23	Breeding	VPA	26/09/2023	12:00:00	1	45	62.5m	45	0
RP244-23	Breeding	VP5	26/09/2023	12:06:00	2	122	30m	0	122
RP245-23	Breeding	VP2	26/09/2023	12:13:00	1	148	15m	120	28
RP247-23	Breeding	VP2	26/09/2023	12:17:00	1	114	62.5m	114	0
RP248-23	Breeding	VP5, VPA	26/09/2023	12:18:00	2	71	20m	0	71
RP249-23	Breeding	VP5	26/09/2023	12:18:00	1	71	20m	0	71
RP250-23	Breeding	VP1	26/09/2023	12:21:00	3	188	90m	188	0
RP251-23	Breeding	VPB	26/09/2023	12:23:00	1	84	62.5m	4	80

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP252-23	Breeding	VPB	26/09/2023	12:25:00	1	70	62.5m	0	70
RP253-23	Breeding	VP2	26/09/2023	12:26:00	1	334	62.5m	334	0
RP254-23	Breeding	VPA	26/09/2023	12:30:00	1	120	62.5m	0	120
RP255-23	Breeding	VPB	26/09/2023	12:32:00	1	134	62.5m	0	134
RP258-23	Breeding	VPB	26/09/2023	13:23:00	1	100	15m	0	100
RP259-23	Breeding	VPA	26/09/2023	13:45:00	1	25	15m	0	25
RP1-23/24	Wintering	VP1	24/10/2023	15:11:00	1	70	75m	5	65
RP11-23/24	Wintering	VP4	24/10/2023	10:13:00	1	420	15m	0	420
RP16-23/24	Wintering	VP4	24/10/2023	13:35:00	1	48	15m	40	8
RP17-23/24	Wintering	VP4	24/10/2023	13:43:00	1	88	62.5m	0	88
RP19-23/24	Wintering	VP4	24/10/2023	13:54:00	2	95	15m	50	45
RP2-23/24	Wintering	VP2	24/10/2023	13:46:00	1	60	2.5m	0	60
RP20-23/24	Wintering	VP4	24/10/2023	14:15:00	3	80	62.5m	40	40
RP26-23/24	Wintering	VPA	24/10/2023	08:35:00	1	60	10m	60	0
RP27-23/24	Wintering	VPA	24/10/2023	09:04:00	1	78	6.5m	75	3
RP3-23/24	Wintering	VP2	24/10/2023	14:22:00	1	60	62.5m	0	60
RP31-23/24	Wintering	VPA	24/10/2023	12:54:00	1	34	7.5m	28	6
RP32-23/24	Wintering	VPA	24/10/2023	13:56:00	1	58	7.5m	55	3
RP33-23/24	Wintering	VPA	24/10/2023	14:01:00	1	490	35m	30	460
RP34-23/24	Wintering	VPA	24/10/2023	14:01:00	1	284	40m	14	270
RP37-23/24	Wintering	VPB	24/10/2023	13:38:00	1	256	150m	110	146
RP4-23/24	Wintering	VP2	24/10/2023	14:23:00	2	180	62.5m	0	180
RP5-23/24	Wintering	VP2	24/10/2023	14:24:00	1	40	62.5m	335	5
RP9-23/24	Wintering	VP3	24/10/2023	14:03:00	2	150	80m	0	150
RP45-23/24	Wintering	VP1	27/11/2023	13:47:00	1	8	50m	0	8

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP46-23/24	Wintering	VP2	27/11/2023	11:09:00	1	41	62.5m	0	41
RP56-23/24	Wintering	VP2	27/11/2023	14:53:00	1	25	62.5m	25	0
RP57-23/24	Wintering	VP4	27/11/2023	10:49:00	1	76	15m	0	76
RP60-23/24	Wintering	VP4	27/11/2023	11:37:00	1	212	62.5m	0	212
RP67-23/24	Wintering	VP4	27/11/2023	13:20:00	1	44	15m	0	44
RP68-23/24	Wintering	VP4	27/11/2023	14:16:00	1	132	15m	0	132
RP71-23/24	Wintering	VPB	28/11/2023	11:46:00	1	42	3.5m	17	25
RP75-23/24	Wintering	VP2	20/12/2023	12:16:00	1	11	75m	11	0
RP79-23/24	Wintering	VP5	20/12/2023	11:18:00	1	98	30m	0	98
RP81-23/24	Wintering	VP5	20/12/2023	13:35:00	1	39	45m	0	39
RP82-23/24	Wintering	VP5	20/12/2023	13:07:00	2	178	75m	0	178
RP84-23/24	Wintering	VP5	20/12/2023	13:56:00	1	104	75m	0	104
RP85-23/24	Wintering	VPA	20/12/2023	08:30:00	1	32	2.5m	32	0
RP90-23/24	Wintering	VP4	11/01/2024	14:14:00	1	30	15m	0	30
RP100-23/24	Wintering	VP1	25/01/2024	14:17:00	2	480	15m	480	
RP101-23/24	Wintering	VP1	25/01/2024	14:26:00	1	240	15m	240	
RP105-23/24	Wintering	VP2	25/01/2024	13:00:00	1	120	62.5m	10	110
RP107-23/24	Wintering	VP2	25/01/2024	13:33:00	1	140	62.5m	0	140
RP112-23/24	Wintering	VP3	25/01/2024	10:26:00	1	22	62.5m	15	7
RP114-23/24	Wintering	VP3	25/01/2024	10:56:00	1	27	62.5m	0	27
RP116-23/24	Wintering	VP3	25/01/2024	11:08:00	1	32	62.5m	0	32
RP120-23/24	Wintering	VP3	25/01/2024	12:32:00	1	40	62.5m	40	0
RP121-23/24	Wintering	VP3	25/01/2024	13:12:00	1	280	62.5m	0	280
RP124-23/24	Wintering	VP3	25/01/2024	13:42:00	2	170	62.5m	0	170
RP125-23/24	Wintering	VP3	25/01/2024	13:58:00	3	480	62.5m	0	480

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP126-23/24	Wintering	VP3	25/01/2024	14:12:00	2	10	62.5m	5	5
RP128-23/24	Wintering	VP3	25/01/2024	14:38:00	1	56	62.5m	0	56
RP131-23/24	Wintering	VP4	25/01/2024	13:10:00	1	8	35m	8	0
RP91-23/24	Wintering	VP1	25/01/2024	10:23:00	1	176	62.5m	50	0
RP92-23/24	Wintering	VP1	25/01/2024	10:38:00	1	47	15m	0	47
RP93-23/24	Wintering	VP1	25/01/2024	10:55:00	2	300	62.5m	0	300
RP99-23/24	Wintering	VP1	25/01/2024	14:16:00	1	16	62.5m	8	8
RP138-23/24	Wintering	VP1	23/02/2024	12:06:00	1	840	15m	840	0
RP139-23/24	Wintering	VP1	23/02/2024	12:11:00	2	120	15m	120	0
RP141-23/24	Wintering	VP1	23/02/2024	12:53:00	1	1800	15m	1800	0
RP150-23/24	Wintering	VP2	23/02/2024	13:05:00	2	300	62.5m	120	180
RP152-23/24	Wintering	VP3, VP1	26/02/2024	09:14:00	1	345	80m	45	300
RP153-23/24	Wintering	VP3	26/02/2024	10:57:00	1	79	45m	9	70
RP154-23/24	Wintering	VP3, VPB	26/02/2024	11:07:00	2	256	90m		
RP155-23/24	Wintering	VP3	26/02/2024	12:40:00	1	107	20m	67	40
RP156-23/24	Wintering	VP3	26/02/2024	12:43:00	3	247	175m	247	0
RP158-23/24	Wintering	VP3	26/02/2024	13:21:00	1	367	85m	220	7
RP161-23/24	Wintering	VP4	26/02/2024	11:29:00	3	350	80m	90	260
RP163-23/24	Wintering	VP4	26/02/2024	13:28:00	1	390	75m	150	240
RP164-23/24	Wintering	VP5, VPA	26/02/2024	11:59:00	1	7	75m	0	7
RP165-23/24	Wintering	VP5	26/02/2024	12:10:00	1	10	35m	0	10
RP166-23/24	Wintering	VP5	26/02/2024	13:58:00	1	22	75m	0	22
RP167-23/24	Wintering	VPA	26/02/2024	10:53:00	1	82	15m	60	12
RP168-23/24	Wintering	VPA	26/02/2024	10:55:00	2	180	62.5m	0	180
RP170-23/24	Wintering	VPA	26/02/2024	11:09:00	3	480	62.5m	0	480

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP171-23/24	Wintering	VPA	26/02/2024	12:01:00	2	105	62.5m	0	105
RP173-23/24	Wintering	VPA	26/02/2024	12:35:00	1	265	62.5m	0	265
RP174-23/24	Wintering	VPA	26/02/2024	12:41:00	1	450	62.5m	50	400
RP176-23/24	Wintering	VPA	26/02/2024	13:04:00	3	96	15m	40	56
RP177-23/24	Wintering	VPA	26/02/2024	13:44:00	1	134	62.5m	134	0
RP178-23/24	Wintering	VPA	26/02/2024	14:43:00	1	54	62.5m	0	54
RP181-23/24	Wintering	VPB	26/02/2024	10:17:00	1	50	15m	50	0
RP182-23/24	Wintering	VPB	26/02/2024	11:15:00	1	120	62.5m	0	120
RP183-23/24	Wintering	VPB	26/02/2024	11:34:00	2	180	62.5m	0	180
RP185-23/24	Wintering	VPB	26/02/2024	12:13:00	1	50	15m	50	0
RP186-23/24	Wintering	VPB	26/02/2024	12:31:00	2	120	2.5m	60	60
RP187-23/24	Wintering	VPB	26/02/2024	12:47:00	1	180	62.5m	180	0
RP189-23/24	Wintering	VPB	26/02/2024	13:50:00	1	120	62.5m	20	100
RP190-23/24	Wintering	VPB	26/02/2024	14:30:00	3	60	62.5m	10	50
RP192-23/24	Wintering	VP1	21/03/2024	10:09:00	2	54	62.5m	54	0
RP193-23/24	Wintering	VP1	21/03/2024	10:10:00	1	840	15m	840	0
RP194-23/24	Wintering	VP1	21/03/2024	10:24:00	1	110	15m	110	0
RP195-23/24	Wintering	VP1	21/03/2024	10:26:00	1	120	15m	120	0
RP196-23/24	Wintering	VP1	21/03/2024	10:40:00	1	69	15m	9	60
RP197-23/24	Wintering	VP1	21/03/2024	10:45:00	1	203	15m	0	203
RP198-23/24	Wintering	VP1	21/03/2024	11:05:00	1	25	15m	0	25
RP199-23/24	Wintering	VP1	21/03/2024	12:22:00	1	128	15m	0	128
RP200-23/24	Wintering	VP1	21/03/2024	13:12:00	2	188	15m	0	188
RP201-23/24	Wintering	VP2, VP1	21/03/2024	09:52:00	2	7	22.5m	7	0
RP203-23/24	Wintering	VP1	21/03/2024	10:57:00	1	7	45m	0	7

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP205-23/24	Wintering	VP3	21/03/2024	09:35:00	1	33	62.5m	0	33
RP206-23/24	Wintering	VP3	21/03/2024	10:35:00	1	160	62.5m	160	0
RP207-23/24	Wintering	VP3	21/03/2024	10:43:00	1	60	62.5m	0	60
RP208-23/24	Wintering	VP3	21/03/2024	10:45:00	1	22	62.5m	18	4
RP209-23/24	Wintering	VP3	21/03/2024	11:43:00	1	134	62.5m	0	134
RP212-23/24	Wintering	VP3	21/03/2024	12:08:00	1	94	62.5m	0	94
RP213-23/24	Wintering	VP3	21/03/2024	13:20:00	1	46	62.5m	0	46
RP214-23/24	Wintering	VP3	21/03/2024	13:47:00	2	110	62.5m	0	110
RP215-23/24	Wintering	VP3	21/03/2024	14:34:00	3	162	62.5m	0	162
RP216-23/24	Wintering	VP3	21/03/2024	14:45:00	3	47	62.5m	0	47
RP217-23/24	Wintering	VP3	21/03/2024	14:48:00	1	32	62.5m	0	32
RP218-23/24	Wintering	VP4	27/03/2024	09:51:00	1	25	35m	25	0
RP219-23/24	Wintering	VP4	27/03/2024	10:03:00	2	21	75m	0	21
RP220-23/24	Wintering	VP4	27/03/2024	10:10:00	1	27	75m	27	0
RP221-23/24	Wintering	VP4	27/03/2024	10:53:00	2	65	140m	65	0
RP223-23/24	Wintering	VP5	27/03/2024	10:01:00	1	40	140m	0	40
RP224-23/24	Wintering	VP5	27/03/2024	11:30:00	1	22	20m	0	22
RP225-23/24	Wintering	VP5	27/03/2024	12:28:00	2	480	150m	360	120
RP226-23/24	Wintering	VP5	27/03/2024	12:28:00	2	120	30m	0	120
RP227-23/24	Wintering	VP5	27/03/2024	12:35:00	1	40	20m	0	40
RP230-23/24	Wintering	VP5	27/03/2024	14:41:00	1	21	42.5m	0	21
RP232-23/24	Wintering	VP5	27/03/2024	14:45:00	1	10	20m	0	10
RP233-23/24	Wintering	VPA	27/03/2024	09:44:00	2	100	62.5m	0	100
RP235-23/24	Wintering	VPA	27/03/2024	10:56:00	1	120	62.5m	0	120

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP236-23/24	Wintering	VPA, VPB	27/03/2024	12:22:00	1	40	62.5m	40	0
RP237-23/24	Wintering	VPA	27/03/2024	13:02:00	1	60	62.5m	0	60
RP239-23/24	Wintering	VPB	27/03/2024	09:03:00	1	104	62.5m	0	104
RP240-23/24	Wintering	VPB	27/03/2024	09:26:00	1	310	62.5m	0	310
RP241-23/24	Wintering	VPB	27/03/2024	09:47:00	3	210	62.5m	0	210
RP243-23/24	Wintering	VPB	27/03/2024	10:03:00	1	105	62.5m	0	105
RP246-23/24	Wintering	VPB	27/03/2024	10:44:00	1	48	15m	44	4
RP247-23/24	Wintering	VPB	27/03/2024	10:55:00	1	65	62.5m	0	65
RP248-23/24	Wintering	VPB	27/03/2024	10:57:00	1	35	62.5m	0	35
RP250-23/24	Wintering	VPB	27/03/2024	11:30:00	2	72	62.5m	0	72
RP251-23/24	Wintering	VPB	27/03/2024	11:38:00	1	36	62.5m	0	36
RP252-23/24	Wintering	VPB	27/03/2024	11:46:00	1	42	15m	42	0
RP253-23/24	Wintering	VPB	27/03/2024	12:01:00	1	40	62.5m	10	30
RP254-23/24	Wintering	VPB	27/03/2024	12:28:00	1	98	15m	98	0
RP256-23/24	Wintering	VPB	27/03/2024	13:23:00	2	44	62.5m	0	44
RP257-23/24	Wintering	VPB	27/03/2024	13:48:00	2	43	62.5m	0	43
RP258-23/24	Wintering	VPB	27/03/2024	14:24:00	1	110	62.5m	55	55
RP2-24	Breeding	VPA	28/05/2024	10:53:00	1	8	12.5m	0	8
RP3-24	Breeding	VPB	28/05/2024	11:10:00	1	50	35m	0	50
RP4-24	Breeding	VPB	28/05/2024	13:05:00	1	60	40m	0	60
RP10-24	Breeding	VP4	29/05/2024	12:59:00	1	120	25m	60	60
RP11-24	Breeding	VP4	29/05/2024	13:23:00	2	0	62.5m	Unknown	Unkown
RP12-24	Breeding	VP4	29/05/2024	13:35:00	1	600	62.5m	0	600
RP13-24	Breeding	VP4	29/05/2024	14:08:00	1	300	87.5m	100	200

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP6-24	Breeding	VP4	29/05/2024	11:18:00	1	360	20m	0	360
RP7-24	Breeding	VP4	29/05/2024	11:39:00	3	420	25m	0	420
RP8-24	Breeding	VP4	29/05/2024	11:41:00	3	360	35m	180	180
RP9-24	Breeding	VP4	29/05/2024	12:20:00	1	120	25m	20	100
RP15-24	Breeding	VP2	31/05/2024	09:14:00	1	780	15m	780	0
RP16-24	Breeding	VP5	31/05/2024	09:26:00	1	35	35m	35	0
RP17-24	Breeding	VP3	31/05/2024	09:27:00	1	15	30m	15	0
RP18-24	Breeding	VP2	31/05/2024	09:34:00	1	80	62.5m	0	80
RP21-24	Breeding	VP1	31/05/2024	10:11:00	1	60	25m	0	60
RP23-24	Breeding	VP2	31/05/2024	10:39:00	2	100	62.5m	0	100
RP25-24	Breeding	VP3	31/05/2024	10:53:00	1	26	55m	22	4
RP26-24	Breeding	VP3	31/05/2024	11:02:00	1	255	75m	255	0
RP27-24	Breeding	VP2	31/05/2024	11:03:00	1	34	62.5m	0	34
RP28-24	Breeding	VP2	31/05/2024	11:05:00	2	112	62.5m	112	0
RP29-24	Breeding	VP2	31/05/2024	11:10:00	1	152	62.5m	0	152
RP31-24	Breeding	VP2	31/05/2024	11:29:00	1	26	62.5m	26	0
RP32-24	Breeding	VP3	31/05/2024	11:30:00	1	50	200m	40	10
RP35-24	Breeding	VP3	31/05/2024	12:17:00	1	22	25m	22	0
RP36-24	Breeding	VP3	31/05/2024	12:38:00	1	45	32.5m	45	0
RP37-24	Breeding	VP3	31/05/2024	12:43:00	1	55	30m	55	0
RP38-24	Breeding	VP1	31/05/2024	12:51:00	1	1800	60m	0	1800
RP39-24	Breeding	VP5	31/05/2024	12:57:00	1	20	40m	0	20
RP41-24	Breeding	VP3	31/05/2024	13:27:00	1	28	27.5m	28	0
RP44-24	Breeding	VP5	31/05/2024	14:36:00	1	30	32.5m	0	30
RP45-24	Breeding	VP2	31/05/2024	14:40:00	1	88	62.5m	88	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP46-24	Breeding	VP3	31/05/2024	14:41:00	1	65	17.5m	65	0
RP47-24	Breeding	VP2, VP1	31/05/2024	14:48:00	1	600	50m	0	600
RP48-24	Breeding	VP3	31/05/2024	15:03:00	1	75	40m	40	35
RP100-24	Breeding	VP3	24/06/2024	14:44:00	1	40	62.5m	0	40
RP101-24	Breeding	VP3	24/06/2024	14:56:00	1	86	62.5m	0	86
RP51-24	Breeding	VP3	24/06/2024	09:15:00	1	82	62.5m	0	82
RP52-24	Breeding	VPB	24/06/2024	09:18:00	1	7	20m	4	3
RP53-24	Breeding	VP3	24/06/2024	09:35:00	1	35	62.5m	35	0
RP55-24	Breeding	VPB	24/06/2024	09:41:00	1	12	25m	0	12
RP57-24	Breeding	VP3	24/06/2024	09:45:00	1	58	62.5m	58	0
RP59-24	Breeding	VP3	24/06/2024	10:00:00	1	20	62.5m	20	0
RP61-24	Breeding	VP3	24/06/2024	11:03:00	1	53	62.5m	33	20
RP64-24	Breeding	VP3	24/06/2024	11:30:00	1	40	62.5m	0	40
RP66-24	Breeding	VP2	24/06/2024	11:48:00	1	58	42.5m	58	0
RP67-24	Breeding	VP1	24/06/2024	11:49:00	1	150	40m	30	120
RP68-24	Breeding	VPB	24/06/2024	11:51:00	1	210	30m	0	210
RP69-24	Breeding	VP3	24/06/2024	11:52:00	1	50	62.5m	0	50
RP71-24	Breeding	VP3	24/06/2024	12:07:00	1	70	62.5m	0	70
RP72-24	Breeding	VP3	24/06/2024	12:10:00	1	50	62.5m	50	0
RP73-24	Breeding	VP3	24/06/2024	12:10:00	1	50	62.5m	50	0
RP75-24	Breeding	VP2	24/06/2024	12:14:00	1	95	50m	95	0
RP76-24	Breeding	VP3	24/06/2024	12:14:00	1	50	62.5m	0	50
RP77-24	Breeding	VP2	24/06/2024	12:15:00	1	25	27.5m	10	15
RP81-24	Breeding	VP3	24/06/2024	12:32:00	1	65	62.5m	0	65
RP85-24	Breeding	VP1	24/06/2024	12:46:00	1	60	50m	30	30

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP87-24	Breeding	VP2	24/06/2024	13:06:00	1	22	30m	22	0
RP88-24	Breeding	VP1	24/06/2024	13:13:00	1	70	22.5m	70	0
RP89-24	Breeding	VP3	24/06/2024	13:24:00	1	84	62.5m	84	0
RP90-24	Breeding	VP3	24/06/2024	13:37:00	1	64	62.5m	64	0
RP91-24	Breeding	VP3	24/06/2024	14:01:00	2	34	62.5m	0	34
RP92-24	Breeding	VP3	24/06/2024	14:03:00	1	162	62.5m	0	162
RP94-24	Breeding	VP3	24/06/2024	14:21:00	1	44	62.5m	0	44
RP97-24	Breeding	VPB	24/06/2024	14:31:00	1	240	15m	0	240
RP98-24	Breeding	VP3, VPB	24/06/2024	14:32:00	3	150	75m	30	120
RP99-24	Breeding	VP3	24/06/2024	14:35:00	1	240	62.5m	240	0
RP103-24	Breeding	VP4	26/06/2024	11:48:00	1	300	30m	0	300
RP104-24	Breeding	VP4	26/06/2024	11:52:00	1	120	30m	0	120
RP108-24	Breeding	VP4	26/06/2024	14:47:00	1	180	25m	0	180
RP111-24	Breeding	VPA	27/06/2024	09:46:00	1	30	62.5m	0	30
RP113-24	Breeding	VPA	27/06/2024	13:59:00	1	30	15m	0	30
RP114-24	Breeding	VPA	27/06/2024	14:10:00	1	25	15m	0	25
RP122-24	Breeding	VP1, VP2	24/07/2024	11:59:00	1	63	12.5m	63	0
RP123-24	Breeding	VP2	24/07/2024	12:08:00	1	20	15m	20	0
RP126-24	Breeding	VP4	24/07/2024	13:17:00	1	130	15m	0	130
RP128-24	Breeding	VP4	24/07/2024	13:24:00	1	480	15m	0	480
RP129-24	Breeding	VP4	24/07/2024	13:36:00	1	200	2.5m	0	200
N/A	Breeding	VPB	29/07/2024	14:26:00	1	-	62.5m	-	-
RP132-24	Breeding	VPB	29/07/2024	09:20:00	1	40	15m	40	0
RP137-24	Breeding	VPB	29/07/2024	13:27:00	1	30	62.5m	20	10
RP138-24	Breeding	VPB	29/07/2024	13:50:00	1	60	62.5m	30	30

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP139-24	Breeding	VPA	29/07/2024	13:58:00	1	19	40m	12	7
RP141-24	Breeding	VPB	29/07/2024	14:05:00	1	70	100m	40	30
RP143-24	Breeding	VPA	29/07/2024	14:58:00	2	140	70m	120	20
RP147-24	Breeding	VP4	23/08/2024	12:00:00	1	9	25m	9	0
RP152-24	Breeding	VP4	23/08/2024	12:45:00	1	1260	7m	0	1260
RP153-24	Breeding	VP4	23/08/2024	13:06:00	1	223	27.5m	13	210
RP154-24	Breeding	VPA	23/08/2024	13:17:00	1	180	62.5m	0	180
RP157-24	Breeding	VP4	23/08/2024	15:02:00	1	180	62.5m	90	90
RP159-24	Breeding	VPB	28/08/2024	11:01:00	1	360	2.5m	360	0
RP165-24	Breeding	VPB	28/08/2024	12:49:00	1	60	2.5m	60	0
RP166-24	Breeding	VP2	28/08/2024	12:49:00	1	245	22.5m	105	140
RP174-24	Breeding	VP3	28/08/2024	13:24:00	1	140	40m	140	0
RP177-24	Breeding	VP1	28/08/2024	13:52:00	1	60	15m	0	60
RP184-24	Breeding	VP2	28/08/2024	14:18:00	1	115	75m	50	65
N/A	Breeding	VP1	23/09/2024	10:49:00	1	-	Unknown	-	-
N/A	Breeding	VP1	23/09/2024	11:29:00	1	-	Unknown	-	-
RP186-24	Breeding	VP2	23/09/2024	11:29:00	2	35	25m	35	0
RP189-24	Breeding	VP2, VP1	23/09/2024	13:33:00	2	750	85m	390	360
RP190-24	Breeding	VP1	23/09/2024	13:36:00	1	540	30m	10	530
RP192-24	Breeding	VP2	23/09/2024	13:40:00	1	330	45m	120	210
RP193-24	Breeding	VP1	23/09/2024	13:56:00	1	60	15m	10	50
N/A	Breeding	VP4	24/09/2024	12:35:00	1	-	62.5m	-	-
RP202-24	Breeding	VP5	24/09/2024	09:29:00	1	5	2.5m	5	0
RP203-24	Breeding	VP3	24/09/2024	09:45:00	1	50	40m	35	15
RP204-24	Breeding	VP4	24/09/2024	10:15:00	1	20	15m	0	20

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP206-24	Breeding	VP3	24/09/2024	10:57:00	1	65	80m	20	45
RP208-24	Breeding	VP5	24/09/2024	11:22:00	1	21	50m	0	21
RP216-24	Breeding	VP4	24/09/2024	13:30:00	2	140	62.5m	60	80
RP217-24	Breeding	VP5	24/09/2024	13:31:00	1	66	62.5m	33	33
RP221-24	Breeding	VP5	24/09/2024	14:18:00	2	264	62.5m	0	264
RP222-24	Breeding	VPA	27/09/2024	11:04:00	1	60	40m	40	20
RP224-24	Breeding	VPA	27/09/2024	11:56:00	1	40	50m	40	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00006	Winter	VP1	28/10/2025	11:30:00	1	36	0	0	0	0	36
F00008	Winter	VP1	28/10/2025	12:58:00	1	0	0	0	125	0	125
F00009	Winter	VP1	28/10/2025	13:27:00	1	15	0	0	0	0	15
F00015	Winter	VP1	28/10/2025	14:41:00	1	22	50	0	0	0	72
F00018	Winter	VP1	28/10/2025	15:02:00	1	13	20	20	0	0	53
F00024	Winter	VP2	30/10/2025	08:18:00	1	37	0	0	0	0	37
F00037	Winter	VP3	29/10/2025	12:37:00	1	15	15	0	0	0	30
F00038	Winter	VP3	29/10/2025	13:13:00	1	20	5	0	0	0	25
F00039	Winter	VP3	29/10/2025	13:17:00	1	0	0	60	240	30	330

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00041	Winter	VP3	29/10/2025	14:58:00	1	18	0	0	0	0	18
F00048	Winter	VP5	17/10/2025	09:13:00	1	0	20	0	0	0	20
F00071	Winter	VP5	19/11/2025	11:51:00	1	64	0	0	0	0	64
F00092	Winter	VP1	27/11/2025	12:32:00	1	0	0	0	0	33	33
F00097	Winter	VP1	27/11/2025	12:45:00	1	0	22	0	0	0	22
F00106	Winter	VP2	25/11/2025	11:17:00	1	0	0	34	0	0	34
F00135	Winter	VP3	28/11/2025	09:18:00	1	0	52	0	0	0	52
F00136	Winter	VP3	28/11/2025	09:45:00	2	5	6	80	0	0	91
F00141	Winter	VP3	28/11/2025	11:19:00	1	0	51	0	0	0	51
F00142	Winter	VP3	28/11/2025	11:25:00	1	0	45	0	0	0	45
F00164	Winter	VP5	08/12/2025	11:08:00	1	0	0	60	51	0	111
F00190	Winter	VP1	02/12/2025	11:51:00	1	0	8	0	0	0	8
F00213	Winter	VP1	02/12/2025	14:24:00	1	0	0	12	0	0	12
F00219	Winter	VP1	02/12/2025	15:18:00	1	12	0	0	0	0	12
F00220	Winter	VP1	02/12/2025	15:21:00	1	7	0	0	0	0	7
F00279	Winter	VP3	04/12/2025	12:24:00	1	0	11	0	0	0	11
F00280	Winter	VP3	04/12/2025	12:31:00	1	0	0	0	109	70	179
F00297	Winter	VP4	12/01/2026	13:29:00	1	5	15	120	0	0	140
F00298	Winter	VP4	12/01/2026	14:48:00	1	3	20	60	0	0	83
F00319	Winter	VP1	27/01/2026	11:26:00	1	0	17	0	0	0	17
F00338	Winter	VP2	21/01/2026	14:03:00	1	0	13	0	0	0	13
F00339	Winter	VP2	21/01/2026	14:07:00	1	0	39	0	0	0	39

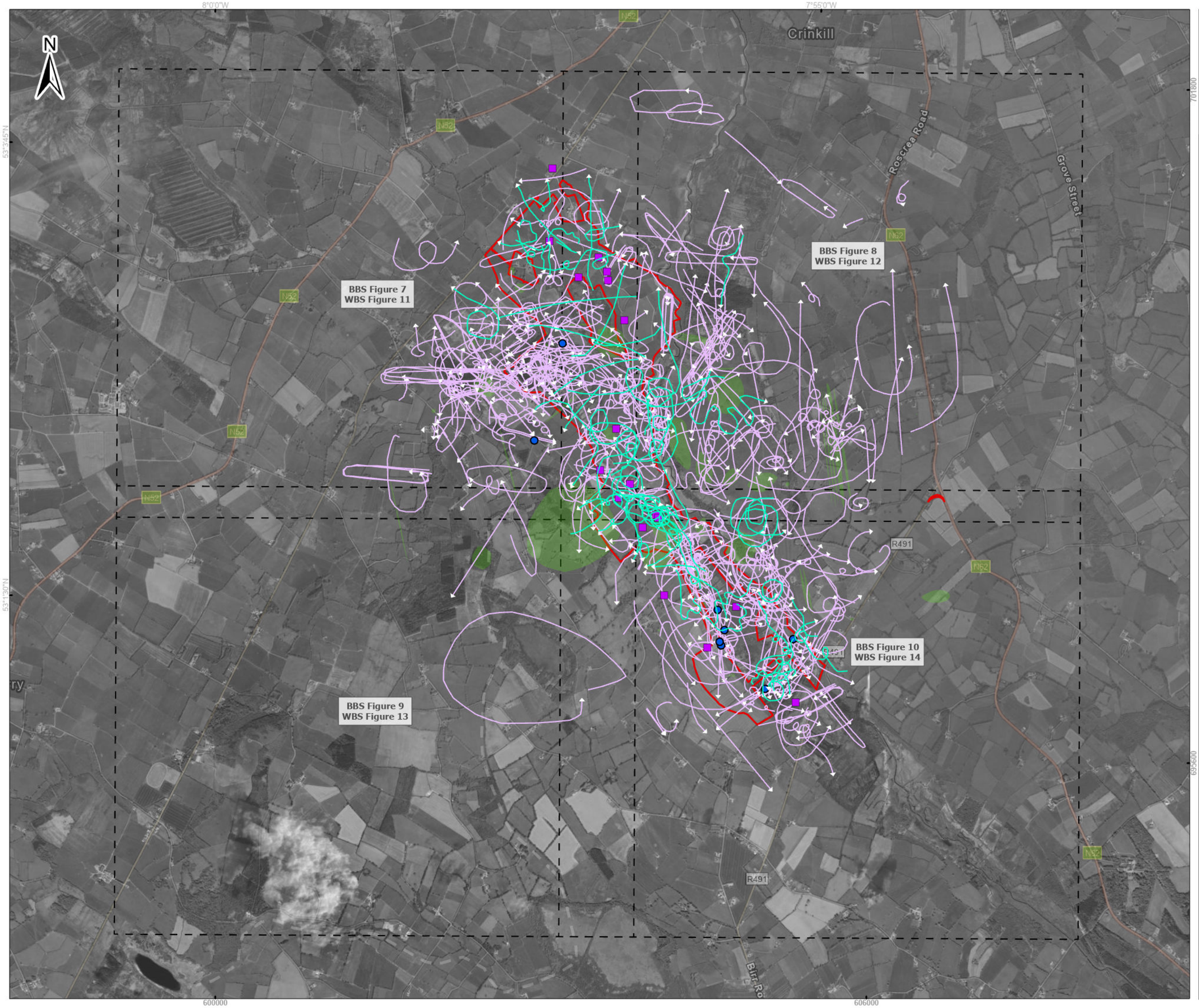
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00361	Winter	VP3	23/01/2026	14:25:00	1	17	40	0	0	0	57
F00369	Winter	VP5	09/02/2026	11:11:00	2	0	25	33	0	0	58
F00370	Winter	VP5	09/02/2026	11:13:00	1	0	20	75	0	0	95
F00394	Winter	VP4	11/02/2026	12:08:00	1	0	38	60	0	0	98
F00411	Winter	VP2	12/02/2026	11:16:00	1	21	0	0	0	0	21
F00419	Winter	VP3	13/02/2026	10:01:00	2	0	9	28	0	0	37
F00421	Winter	VP3	13/02/2026	11:34:00	1	0	17	0	0	0	17
F00422	Winter	VP3	13/02/2026	12:02:00	3	0	16	71	0	0	87
F00442	Winter	VP5	24/02/2026	09:44:00	1	5	33	0	0	0	38
F00447	Winter	VP5	24/02/2026	12:10:00	1	5	5	30	60	0	100
F00457	Winter	VP1	24/02/2026	14:11:00	1	0	0	34	29	0	63
F00461	Winter	VP1	24/02/2026	14:56:00	1	0	28	0	0	0	28
F00463	Winter	VP1	24/02/2026	15:14:00	1	0	0	47	0	0	47
F00472	Winter	VP2	25/02/2026	13:07:00	2	0	93	69	0	0	162
F00490	Winter	VP3	26/02/2026	12:55:00	1	0	22	0	0	0	22
F00494	Winter	VP3	26/02/2026	14:17:00	1	0	9	12	0	0	21
F00496	Winter	VP3	26/02/2026	14:43:00	1	34	0	0	0	0	34
F00497	Winter	VP3	26/02/2026	14:46:00	1	0	58	0	0	0	58
F00499	Winter	VP3	26/02/2026	15:08:00	1	0	48	0	0	0	48
F00526	Winter	VP2	17/02/2026	09:41:00	1	0	29	0	0	0	29

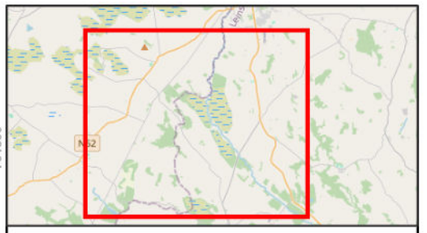
Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	1	1	-	-	1	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
2022/2023	1	1		1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1		2	1	1	1
2020/2021	-	-	2	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	-	1	-	-	-	2	-	1	-	1	1	-	1	-	-	-	-	1	-	-	-	2	-
2023/2024	-	1	1	1	1	1	-	1	-	-	1	1	-	-	-	-	-	-	-	-	1	-	1	-
2024	1	-	1	-	-	-	1	-	-	1		2	-	1	-	1	-	-	-	1	1	-	2	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00085	Winter	Transect	T3	13/10/2025	15:00:00	1	GA1	in flight
P00088	Winter	Transect	T3	13/10/2025	15:37:00	1	WL2	in flight
P00195	Winter	Transect	T3	20/11/2025	11:02:00	1	N/A	N/A
P00254	Winter	Transect	T2,5,6	24/11/2025	11:48:00	1	GA1	in flight
P00269	Winter	Transect	T2,5,6	24/11/2025	14:01:00	1	GA1	in flight
P00270	Winter	Transect	T2,5,6	24/11/2025	14:11:00	1	PB1	in flight
P00371	Winter	VP	VP1	02/12/2025	N/A	N/A	N/A	N/A
P00416	Winter	VP	VP3	04/12/2025	09:18:00	1	N/A	N/A
P00427	Winter	Transect	T2, T5, T6	05/12/2025	10:19:00	2	GA1	in flight
P00509	Winter	Transect	T1	13/01/2026	11:15:00	1	PB4	in flight
P00534	Winter	Transect	T4	13/01/2026	13:55:00	1	WD4	in flight
P00545	Winter	Transect	T2. T5, T6	22/01/2026	12:32:00	2	GA1	in flight
P00612	Winter	Transect	T1, T3, T4	10/02/2026	09:15:00	2	WD2	N/A
P00661	Winter	Transect	T1, T3, T4	11/02/2026	14:33:00	1	WN7	N/A
P00720	Winter	Transect	T3	09/03/2026	12:00:00	2	WD1	N/A

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00724	Winter	Transect	T4	09/03/2026	13:10:00	1	GA1	N/A
P00788	Winter	Transect	T6	13/03/2026	14:24:00	1	GA1	Flying
P00794	Winter	Transect	T6	13/03/2026	14:55:00	2	GA1	Flying
P00085	Winter	Transect	T3	13/10/2025	15:00:00	1	GA1	in flight
P00088	Winter	Transect	T3	13/10/2025	15:37:00	1	WL2	in flight
P00195	Winter	Transect	T3	20/11/2025	11:02:00	1	N/A	N/A
P00254	Winter	Transect	T2,5,6	24/11/2025	11:48:00	1	GA1	in flight
P00269	Winter	Transect	T2,5,6	24/11/2025	14:01:00	1	GA1	in flight
P00270	Winter	Transect	T2,5,6	24/11/2025	14:11:00	1	PB1	in flight
P00371	Winter	VP	VP1	02/12/2025	N/A	N/A	N/A	N/A
P00416	Winter	VP	VP3	04/12/2025	09:18:00	1	N/A	N/A
P00427	Winter	Transect	T2, T5, T6	05/12/2025	10:19:00	2	GA1	in flight
P00509	Winter	Transect	T1	13/01/2026	11:15:00	1	PB4	in flight
P00534	Winter	Transect	T4	13/01/2026	13:55:00	1	WD4	in flight
P00545	Winter	Transect	T2. T5, T6	22/01/2026	12:32:00	2	GA1	in flight
P00612	Winter	Transect	T1, T3, T4	10/02/2026	09:15:00	2	WD2	N/A
P00661	Winter	Transect	T1, T3, T4	11/02/2026	14:33:00	1	WN7	N/A
P00720	Winter	Transect	T3	09/03/2026	12:00:00	2	WD1	N/A
P00724	Winter	Transect	T4	09/03/2026	13:10:00	1	GA1	N/A
P00788	Winter	Transect	T6	13/03/2026	14:24:00	1	GA1	Flying
P00794	Winter	Transect	T6	13/03/2026	14:55:00	2	GA1	Flying

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Clonfree 1 (callow)	16/01/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Clonfree 2	26/11/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	16/01/2026	N/A	2	N/A	N/A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland (2020-2024)
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Buzzard

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 6:
Buzzard observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-003.ApX-VP-BZ-SUM-A_overview

Draft: A

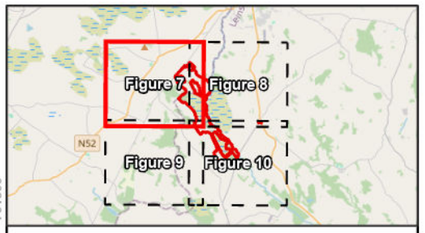
8°0'0"W

53°3'45"N

N52

RP14-20 RP258-23 RP77-23 RP132-24 RP68-24 RP20-23 RP82-23 RP97-24 RP59-23 RP7-23 RP73-20 RP29-23 RP175-23 RP11-20 RP207-23 RP48-20 RP159-24 RP165-24 RP58-20 RP203-24 RP45-20 RP68-20 RP21-23 RP40-21 RP52-24 RP63-20 RP34-21 RP120-23 RP14-23 RP44-23 RP252-23 RP37-21 RP22-20 RP234-23 RP91-24 RP68-21/22 RP24-20 RP143-23 RP8-23 RP64-24 RP69-24 RP36-21 RP204-24 RP142-23 RP104-20 RP112 RP110-20 RP29-21 RP36-24 RP158-20 RP35-21 RP38-20 RP124-21 RP6-20 RP53-24 RP100-24 RP43-23 RP101-24 RP115-21/22 RP115-20 RP59-21 RP69-24 RP128-21 RP23-24 RP25-24 RP105-20 RP202-24 RP99-24 RP86-20 RP157-24 RP31-23 RP67-20 RP177-23 RP217-24 RP30-20 RP57-23 RP3-24 RP117-21 RP129-24 RP115-23 RP116-20 RP243-23 RP32-20 RP24-20 RP5-20 RP152-24 RP153-24 RP50-20 RP205-23 RP74-21/22 RP151-23 RP7-20 RP68-23 RP37-24 RP134-23 RP3-21/22 RP157-23 RP113-20 RP11 RP43-20 RP127-20 RP117-20 RP123-24 RP32-21 RP131-23 RP178-21/22 RP41-24 RP251-23 RP34-20 RP66-21 RP44-21 RP21-21 RP27-21 RP5-23 RP20-21 RP32-20 RP17-24 RP191-21/22 RP9-20 RP136-23 RP43-21 RP10-24 RP29-20 RP24-23 RP21-24 RP32-24

600000



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 7:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 4 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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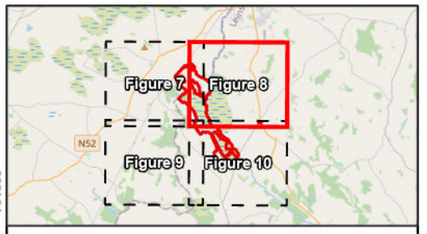

Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 8:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 4 -

Scale @ A3: 1:17,000

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Map Ref: 11333-003.ApX.BBS-VP-BZ-SUM-A

Draft: A

8°0'0"W

53°1'30"N

600000

639500

N

N52

RP5-23
RP251-23
RP54-20
RP178-21/22
RP41-24
RP66-21
RP20-21
RP44-21
RP10-21
RP48-24
RP131-23
RP21-21
RP21-24
RP32-20
RP17-24
RP191-21/22
RP43-21
RP9-20
RP29-20
RP136-23
RP10-24
RP210-23
RP247-23
RP184-23
RP21-24
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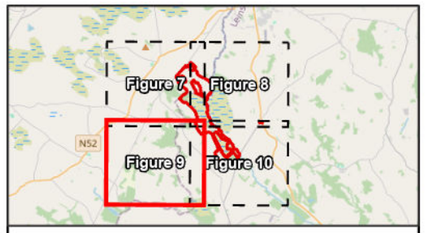
RP38-24
RP57-21



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
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Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 9:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 4 -

Scale @ A3: 1:17,000

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Map Ref: 11333-003.ApX.BBS-VP-BZ-SUM-A

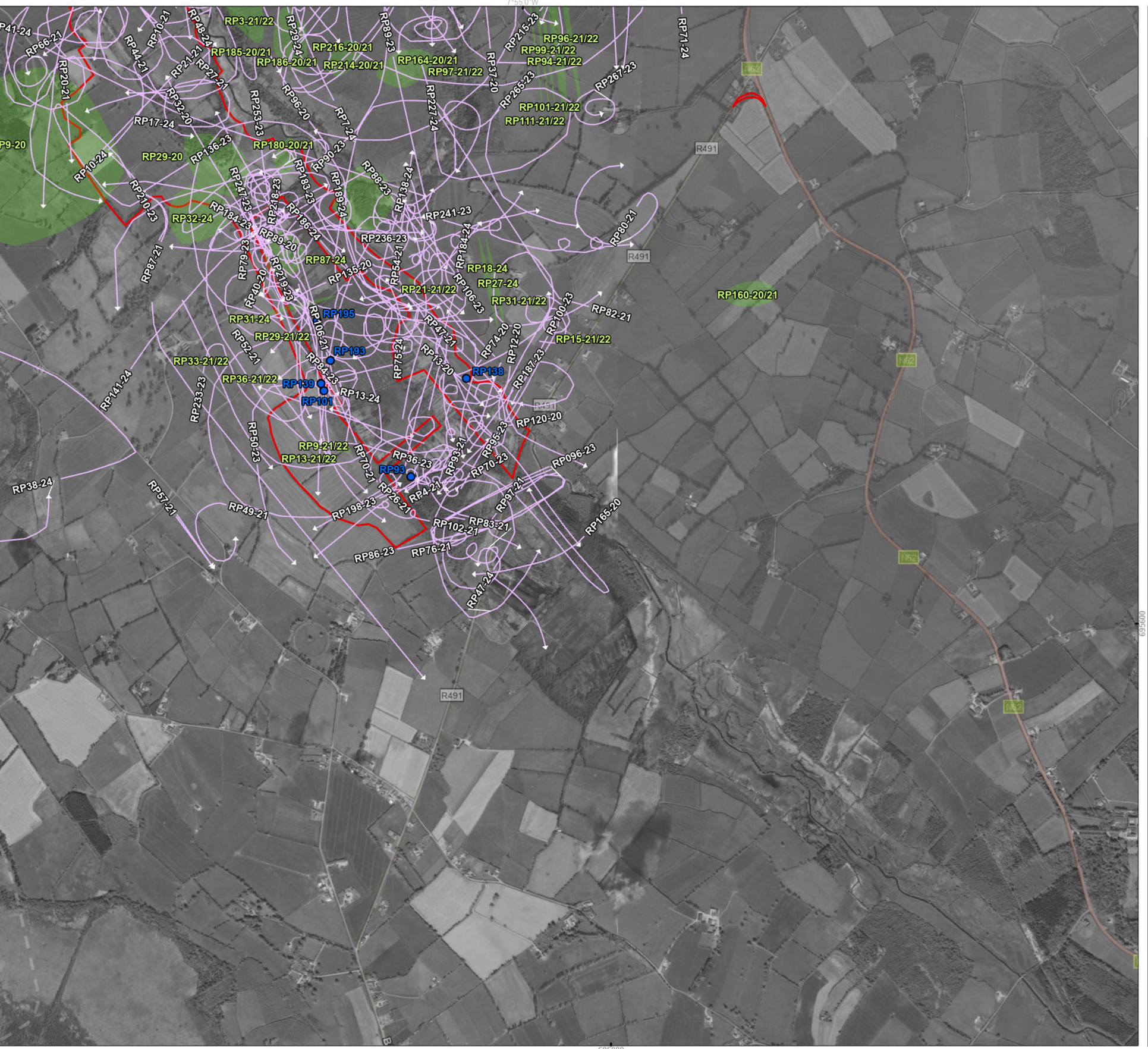
Draft: A

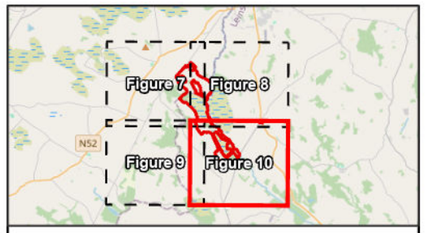
7°55'0"W

53°41'30"N

606000

695000





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
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Project:

Ballincor Wind Farm

Title: Appendix 7-I, Figure 10: Buzzard observations over the survey period (May 2020 – March 2026) - Sheet 4 of 4 -

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Map Ref: 11333-003.ApX.BBS-VP-BZ-SUM-A

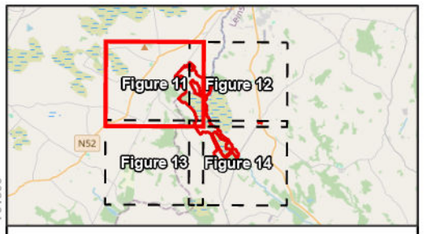
Draft: A

8°0'0"W

53°3'45"N

600000

700000



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Buzzard

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 11:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 4 -

Scale @ A3: 1:17,000

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Map Ref: 11333-003.ApX.WBS-VP-BZ-SUM-A

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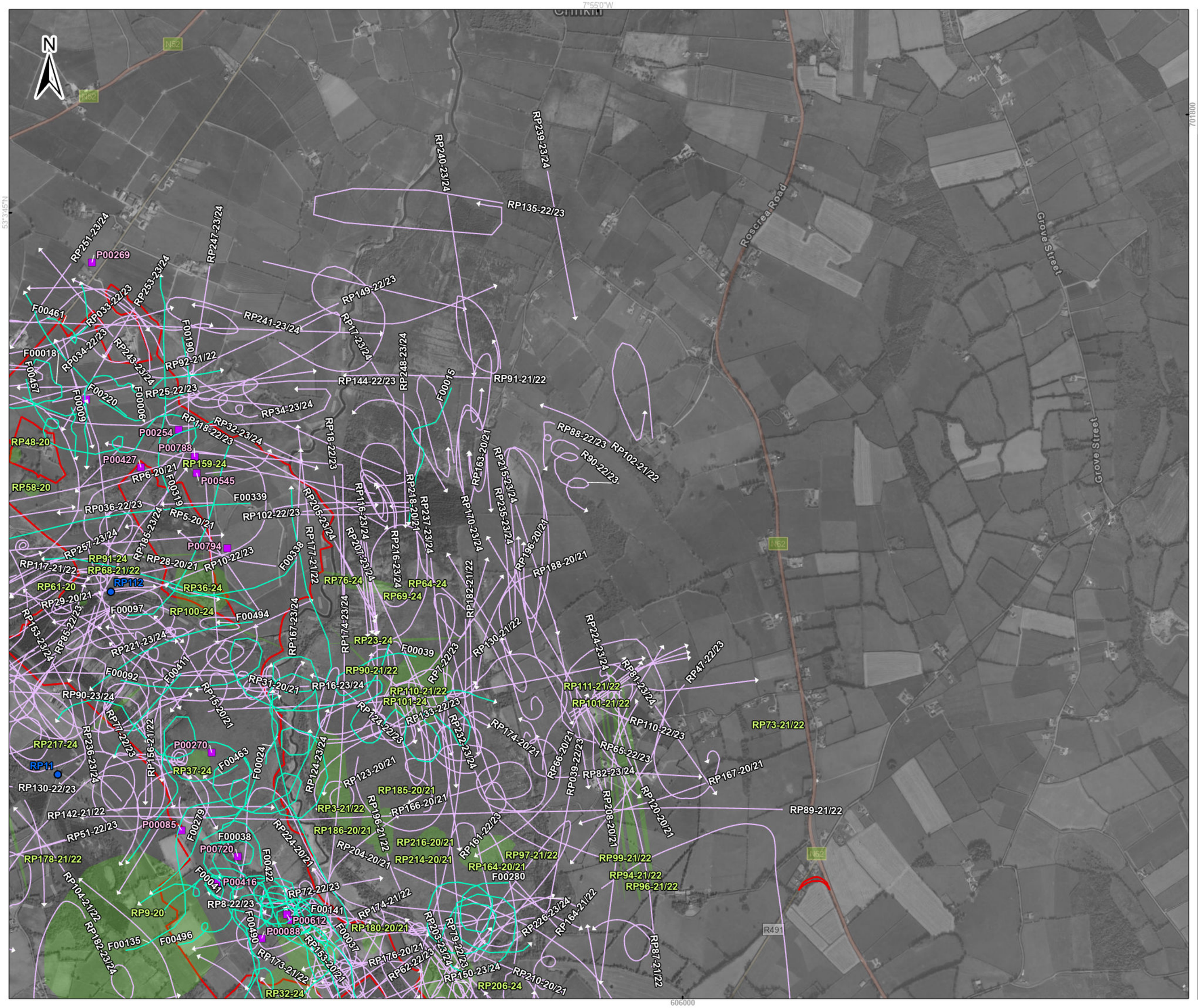

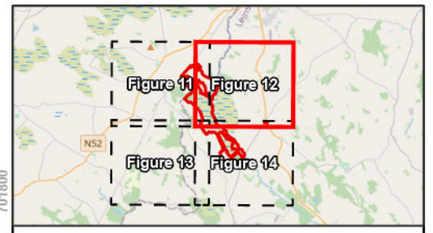

Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Buzzard

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 12:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 4 -

Scale @ A3:	1:17,000	
Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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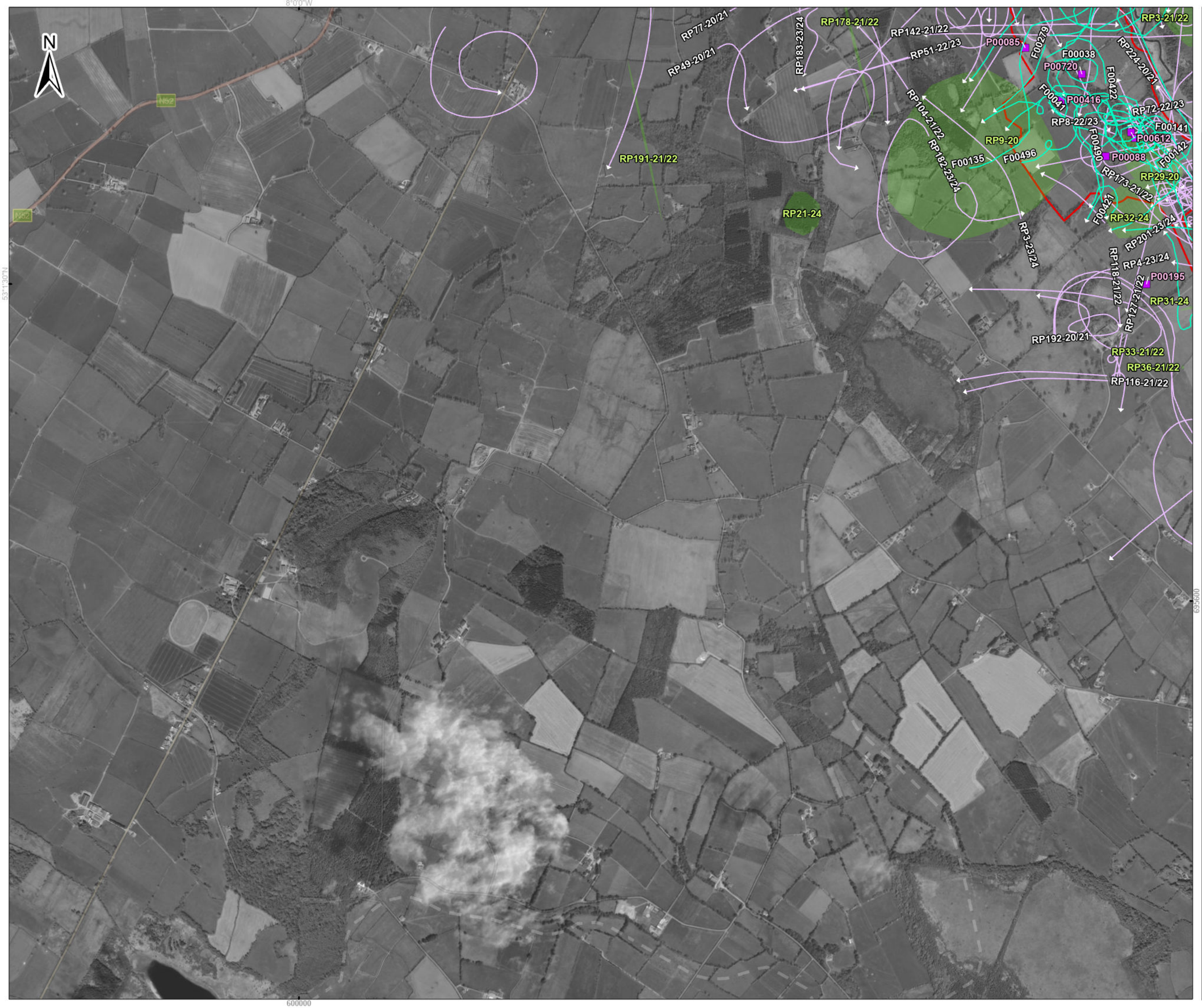
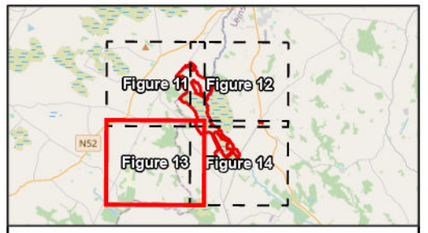
Map Ref: 11333-003.ApX.WBS-VP-BZ-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Buzzard

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 13:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 4 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-003.ApX.WBS-VP-BZ-SUM-A

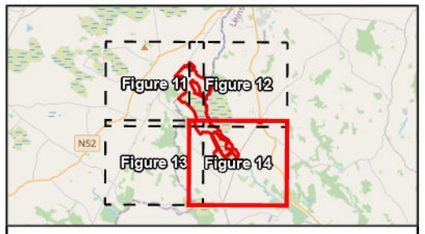
Draft: A

7°55'0"W

53°1'30"N

606000

695000



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Buzzard

Flightlines - Ecology Ireland 2020 - 2024

- Buzzard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community,

Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 14:
Buzzard observations
over the survey period
(May 2020 – March 2026)
- Sheet 4 of 4 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-003.ApX.WBS-VP-BZ-SUM-A

Draft: A

Appendix 7-1 - V CORMORANT

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT2-20	Breeding	VP1	28/04/2020	10:33:00	1	30	15m	30	0
WT3-20	Breeding	VP3	28/04/2020	11:44:00	1	30	85m	30	0
WT7-20	Breeding	VP1	28/04/2020	14:07:00	1	35	15m	35	0
N/A	Breeding	VP2	14/05/2020	11:06:00	1	50	27.5m	50	0
WT10-20	Breeding	VP3	14/05/2020	09:14:00	1	130	35m	130	0
WT11-20	Breeding	VP3	14/05/2020	09:14:00	1	57	35m	57	0
WT17-20	Breeding	VP1	14/05/2020	10:00:00	1	10	15m	0	10
WT18-20	Breeding	VP2	14/05/2020	10:09:00	1	15	25m	0	15
WT20-20	Breeding	VP2	14/05/2020	10:32:00	1	10	25m	5	5
WT21-20	Breeding	VP3	14/05/2020	10:33:00	1	101	85m	101	0
WT23-20	Breeding	VP3	14/05/2020	10:44:00	1	84	25m	84	0
WT24-20	Breeding	VP3	14/05/2020	10:44:00	1	84	50m	84	0
WT25-20	Breeding	VP1	14/05/2020	10:47:00	2	20	15m	10	10
WT26-20	Breeding	VP2	14/05/2020	10:47:00	2	40	17.5m	40	0
WT27-20	Breeding	VP1	14/05/2020	10:59:00	1	10	15m	10	0
WT28-20	Breeding	VP3, VP2	14/05/2020	10:59:00	1	69	22.5m	69	0
WT29-20	Breeding	VP1	14/05/2020	11:09:00	1	20	15m	20	0
WT31-20	Breeding	VP3, VP2	14/05/2020	11:28:00	2	72	22.5m	0	72
WT32-20	Breeding	VP1	14/05/2020	11:32:00	2	20	15m	20	0
WT34-20	Breeding	VP3, VP4	14/05/2020	12:38:00	1	178	65m	148	30
WT35-20	Breeding	VP3	14/05/2020	13:09:00	1	224	45m	160	64
WT36-20	Breeding	VP2	14/05/2020	13:11:00	1	40	30m	40	0
WT39-20	Breeding	VP3	14/05/2020	13:29:00	1	46	70m	0	46

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT40-20	Breeding	VP1	14/05/2020	14:01:00	1	10	67.5m	10	0
WT9-20	Breeding	VP2	14/05/2020	08:47:00	1	60	10m	60	0
WT44-20	Breeding	VP1	04/06/2020	08:58:00	1	20	15m	20	0
WT45-20	Breeding	VP3	04/06/2020	09:22:00	1	20	10m	20	0
WT46-20	Breeding	VP3	04/06/2020	09:30:00	1	35	12.5m	15	20
WT47-20	Breeding	VP2	04/06/2020	09:36:00	2	11	50m	0	11
WT48-20	Breeding	VP1	04/06/2020	09:39:00	2	45	15m	45	0
WT49-20	Breeding	VP4	04/06/2020	09:43:00	1	60	40m	0	60
WT52-20	Breeding	VP3	04/06/2020	11:03:00	1	40	20m	40	0
WT54-20	Breeding	VP4	04/06/2020	11:29:00	1	190	97.5m	190	0
WT55-20	Breeding	VP4	04/06/2020	11:52:00	1	240	125m	120	120
WT59-20	Breeding	VP3	04/06/2020	12:09:00	1	50	15m	50	0
WT62-20	Breeding	VP5	04/06/2020	12:20:00	1	20	15m	10	10
WT63-20	Breeding	VP4	04/06/2020	12:27:00	1	120	62.5m	0	120
WT64-20	Breeding	VP5	04/06/2020	12:30:00	1	40	15m	30	10
WT66-20	Breeding	VP4	04/06/2020	13:10:00	1	25	25m	25	0
WT68-20	Breeding	VP4	04/06/2020	13:48:00	1	50	62.5m	25	25
WT69-20	Breeding	VP2	04/06/2020	13:50:00	1	47	35m	47	0
WT70-20	Breeding	VP5	04/06/2020	13:52:00	2	10	15m	5	5
WT71-20	Breeding	VP2	04/06/2020	13:53:00	2	11	55m	11	0
WT74-20	Breeding	VP2	04/06/2020	14:28:00	1	33	60m	33	0
WT75-20	Breeding	VP3	04/06/2020	14:28:00	1	40	15m	40	0
WT76-20	Breeding	VP2	04/06/2020	14:46:00	2	36	50m	36	0
WT78-20	Breeding	VP2	10/07/2020	09:03:00	1	155	100m	120	35
WT85-20	Breeding	VP2, VP1	10/07/2020	10:56:00	1	75	35m	0	75

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT86-20	Breeding	VP3	10/07/2020	10:59:00	1	5	20m	0	5
WT87-20	Breeding	VP5	10/07/2020	11:21:00	1	32	20m	0	32
WT92-20	Breeding	VP1	10/07/2020	12:12:00	3	27	37.5m	12	15
WT98-20	Breeding	VP2, VP1	10/07/2020	14:33:00	3	85	40m	40	45
WT102-20	Breeding	VP5	14/08/2020	13:58:00	1	0	-	-	-
WT99-20	Breeding	VP3	14/08/2020	12:36:00	1	5	15m	5	0
WT14-20/21	Wintering	VP, 2	08/10/2020	09:43:00	1	10	25m	0	10
WT15-20/21	Wintering	VP, 1	08/10/2020	09:44:00	1	10	5m	10	0
WT16-20/21	Wintering	VP, 5	08/10/2020	09:45:00	5	17100	20m	0	17100
WT2-20/21	Wintering	VP, 3	08/10/2020	09:05:00	1	10	7m	10	0
WT20-20/21	Wintering	VP, 3	08/10/2020	10:05:00	1	90	40m	45	45
WT22-20/21	Wintering	VP, 3	08/10/2020	10:35:00	1	105	25m	105	0
WT23-20/21	Wintering	VP, 4	08/10/2020	10:38:00	1	20	15m	20	0
WT24-20/21	Wintering	VP, 3	08/10/2020	10:54:00	1	80	15m	40	40
WT26-20/21	Wintering	VP, 2	08/10/2020	11:35:00	1	25	45m	15	10
WT27-20/21	Wintering	VP, 1	08/10/2020	11:36:00	1	10	20m	10	0
WT28-20/21	Wintering	VP, 3	08/10/2020	13:17:00	1	35	20m	0	35
WT29-20/21	Wintering	VP, 3	08/10/2020	13:47:00	1	35	12.5m	0	35
WT7-20/21	Wintering	VP, 1	08/10/2020	09:15:00	1	30	3m	10	20
WT9-20/21	Wintering	VP, 3	08/10/2020	09:20:00	5	0	0m	Unknown	0
N/A	Wintering	VP, 1	05/11/2020	09:41:00	1	15	15m	0	15
N/A	Wintering	VP, 1	05/11/2020	09:51:00	1	15	20m	0	15
N/A	Wintering	VP, 1	05/11/2020	09:54:00	1	10	20m	0	10
N/A	Wintering	VP, 1	05/11/2020	10:59:00	1	27	30m	0	27
N/A	Wintering	VP, 1	05/11/2020	11:19:00	1	10	Unknown	10	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Wintering	VP, 1	05/11/2020	12:45:00	1	15	10m	15	0
N/A	Wintering	VP, 1	05/11/2020	14:02:00	1	15	30m	15	0
N/A	Wintering	VP, 1	05/11/2020	14:05:00	1	40	Unknown	40	0
N/A	Wintering	VP, 1	05/11/2020	15:00:00	1	28	15m	0	28
WT32-20/21	Wintering	VP, 5	05/11/2020	09:16:00	1	110	42.5m	110	0
WT33-20/21	Wintering	VP, 3	05/11/2020	09:38:00	1	38	12.5m	0	38
WT34-20/21	Wintering	VP, 3	05/11/2020	09:42:00	1	100	17.5m	0	100
WT36-20/21	Wintering	VP, 5	05/11/2020	09:48:00	6	0	Unknown	Unknown	0
WT37-20/21	Wintering	VP, 3	05/11/2020	10:39:00	1	24	25m	0	24
WT39-20/21	Wintering	VP, 5	05/11/2020	11:16:00	1	15	15m	15	0
WT40-20/21	Wintering	VP, 5, VP, 3	05/11/2020	11:20:00	1	41	17.5m	20	21
WT44-20/21	Wintering	VP, 1	05/11/2020	12:04:00	1	50	35m	40	10
WT45-20/21	Wintering	VP, 5	05/11/2020	12:04:00	1	10	27.5m	10	0
WT46-20/21	Wintering	VP, 2	05/11/2020	12:05:00	1	20	15m	20	0
WT48-20/21	Wintering	VP, 1	05/11/2020	12:21:00	1	50	40m	50	0
WT49-20/21	Wintering	VP, 5	05/11/2020	12:22:00	1	10	12.5m	10	0
WT50-20/21	Wintering	VP, 3	05/11/2020	12:35:00	1	50	35m	50	0
WT51-20/21	Wintering	VP, 1	05/11/2020	12:37:00	4	27	35m	27	0
WT52-20/21	Wintering	VP, 2	05/11/2020	12:37:00	4	20	15m	20	0
WT53-20/21	Wintering	VP, 3	05/11/2020	12:43:00	1	34	15m	0	34
WT54-20/21	Wintering	VP, 2	05/11/2020	12:44:00	1	15	15m	0	15
WT55-20/21	Wintering	VP, 3	05/11/2020	13:06:00	1	29	20m	15	14
WT57-20/21a	Wintering	VP, 2	05/11/2020	13:52:00	1	15	15m	0	15
WT59-20/21	Wintering	VP, 2	05/11/2020	14:06:00	1	15	15m	0	15

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT60-20/21	Wintering	VP, 5	05/11/2020	14:06:00	1	55	80m	55	0
WT61-20/21	Wintering	VP, 3	05/11/2020	14:09:00	1	34	12.5m	0	34
WT62-20/21	Wintering	VP, 1	05/11/2020	14:38:00	1	34	22.5m	34	0
WT63-20/21	Wintering	VP, 5	05/11/2020	14:40:00	1	40	30m	40	0
WT64-20/21	Wintering	VP, 1	05/11/2020	14:43:00	1	20	15m	0	20
WT65-20/21	Wintering	VP, 3	05/11/2020	14:50:00	1	58	12.5m	18	40
WT68-20/21	Wintering	VP, 3	05/11/2020	15:20:00	1	27	20m	0	27
WT70-20/21	Wintering	VP, 1, VP, 2	04/12/2020	11:00:00	1	39	35m	0	39
WT71-20/21	Wintering	VP, 1, VP, 2	04/12/2020	11:13:00	1	87	55m	0	87
WT72-20/21	Wintering	VP, 1	04/12/2020	11:17:00	1	21	25m	0	21
WT73-20/21	Wintering	VP, 3	04/12/2020	11:17:00	1	30	150m	30	0
WT74-20/21	Wintering	VP, 2	04/12/2020	11:18:00	1	25	30m	25	0
WT75-20/21	Wintering	VP, 2	04/12/2020	11:30:00	1	15	25m	0	15
WT76-20/21	Wintering	VP, 1, VP, 2	04/12/2020	11:43:00	1	85	30m	50	35
WT77-20/21	Wintering	VP, 5	04/12/2020	11:44:00	1	60	15m	60	0
WT79-20/21	Wintering	VP, 2	04/12/2020	12:38:00	1	4	25m	4	0
WT80-20/21	Wintering	VP, 2, VP, 1	04/12/2020	12:42:00	1	114	40m	114	0
WT81-20/21	Wintering	VP, 5	04/12/2020	12:46:00	2	600	Unknown	600	0
WT82-20/21	Wintering	VP, 1	04/12/2020	13:15:00	1	15	25m	0	15
WT83-20/21	Wintering	VP, 2, VP, 1	04/12/2020	13:34:00	1	65	30m	0	65

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT84-20/21	Wintering	VP, 2, VP, 1	04/12/2020	13:34:00	1	29	30m	0	29
WT85-20/21	Wintering	VP, 1	04/12/2020	13:45:00	1	35	25m	0	35
WT86-20/21	Wintering	VP, 2	04/12/2020	13:45:00	1	20	30m	20	0
WT87-20/21	Wintering	VP, 1	04/12/2020	13:50:00	1	33	25m	0	33
WT89-20/21	Wintering	VP, 3	04/12/2020	14:25:00	1	17	100m	7	10
WT90-20/21	Wintering	VP, 1	04/12/2020	14:27:00	2	40	30m	0	40
WT91-20/21	Wintering	VP, 2	04/12/2020	14:30:00	1	17	30m	0	17
WT92-20/21	Wintering	VP, 1	04/12/2020	14:49:00	1	35	20m	0	35
WT93-20/21	Wintering	VP, 3	04/12/2020	15:23:00	2	0	Unknown	Unknown	Unknown
WT100-20/21	Wintering	VP, 2	14/01/2021	12:52:00	1	200	35m	60	140
WT104-20/21	Wintering	VP, 2	14/01/2021	14:26:00	1	55	25m	0	55
WT105-20/21	Wintering	VP, 2	14/01/2021	14:32:00	1	69	25m	30	39
WT106-20/21	Wintering	VP, 2	14/01/2021	15:26:00	1	35	15m	0	35
WT148-20/21	Wintering	VP3	14/01/2021	10:10:00	1	25	12.5m	10	15
WT149-20/21	Wintering	VP3	14/01/2021	10:24:00	1	30	12.5m	0	30
WT151-20/21	Wintering	VP3	14/01/2021	13:03:00	1	40	15m	40	0
WT154-20/21	Wintering	VP3	14/01/2021	15:27:00	1	35	35m	35	0
WT95-20/21	Wintering	VP, 2	14/01/2021	10:47:00	5	79	27.5m	0	79
WT96-20/21	Wintering	VP, 2	14/01/2021	11:21:00	1	30	27.5m	0	30
WT97-20/21	Wintering	VP, 2	14/01/2021	11:23:00	1	206	27.5m	206	0
WT98-20/21	Wintering	VP, 2	14/01/2021	11:30:00	1	114	22.5m	114	0
WT99-20/21	Wintering	VP, 2	14/01/2021	12:52:00	1	90	25m	0	90
WT107-20/21	Wintering	VP, 1	21/01/2021	09:30:00	1	10	10m	10	0
WT111-20/21	Wintering	VP, 1	21/01/2021	11:51:00	1	20	15m	20	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT112-20/21	Wintering	VP, 1	21/01/2021	12:56:00	1	30	10m	0	30
WT113-20/21	Wintering	VP, 1	21/01/2021	14:31:00	1	40	10m	0	40
WT114-20/21	Wintering	VP, 1	21/01/2021	14:54:00	1	50	10m	50	0
N/A	Wintering	VP1	09/02/2021	10:25:00	1	20	15m	-	-
WT115-20/21	Wintering	VP, 2	09/02/2021	09:15:00	1	45	80m	40	5
WT118-20/21	Wintering	VP, 2	09/02/2021	10:17:00	1	30	30m	25	5
WT123-20/21	Wintering	VP, 2	09/02/2021	12:51:00	1	25	25m	25	0
WT125-20/21	Wintering	VP, 2	09/02/2021	14:03:00	4	15	25m	15	0
WT126-20/21	Wintering	VP, 3	08/03/2021	09:40:00	1	7500	10m	7500	0
WT127-20/21	Wintering	VP, 3	08/03/2021	10:02:00	3	15	12.5m	15	0
WT129-20/21	Wintering	VP, 2	08/03/2021	10:53:00	1	110	22.5m	110	0
WT130-20/21	Wintering	VP, 1	08/03/2021	11:01:00	1	16	25m	0	16
WT131-20/21	Wintering	VP, 1	08/03/2021	11:18:00	1	20	60m	20	0
WT134-20/21	Wintering	VP, 3	08/03/2021	11:21:00	1	20	15m	20	0
WT135-20/21	Wintering	VP, 3	08/03/2021	12:00:00	6	3600	10m	3600	0
WT137-20/21	Wintering	VP, 3	08/03/2021	13:13:00	1	120	10m	120	0
WT138-20/21	Wintering	VP, 1	08/03/2021	13:24:00	2	25	30m	0	25
WT139-20/21	Wintering	VP, 2	08/03/2021	13:36:00	2	95	30m	95	0
WT140-20/21	Wintering	VP, 3	08/03/2021	13:45:00	1	43	15m	43	0
WT141-20/21	Wintering	VP, 3	08/03/2021	13:51:00	3	26	25m	26	0
WT142-20/21	Wintering	VP, 2	08/03/2021	13:54:00	1	25	17.5m	25	0
WT143-20/21	Wintering	VP, 3	08/03/2021	14:20:00	1	38	31m	38	0
WT144-20/21	Wintering	VP, 3	08/03/2021	14:33:00	7	45	15m	45	0
WT145-20/21	Wintering	VP, 3	08/03/2021	14:51:00	8	36	15m	36	0
WT146-20/21	Wintering	VP, 3	08/03/2021	14:56:00	1	5	45m	5	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT14-21	Breeding	VP5	23/04/2021	09:15:00	1	10	17.5m	10	0
WT15-21	Breeding	VP5	23/04/2021	09:20:00	1	40	62.5m	35	5
WT16-21	Breeding	VP5	23/04/2021	09:25:00	1	240	-	240	0
WT17-21	Breeding	VP5	23/04/2021	11:33:00	1	3600	17.5m	3000	600
WT5-21	Breeding	VP2	23/04/2021	12:25:00	1	15	30m	12	3
WT25-21	Breeding	VP1	17/05/2021	09:20:00	1	10	17.5m	8	2
WT26-21	Breeding	VP1	17/05/2021	10:35:00	1	20	2.5m	15	5
WT32-21	Breeding	VP2	17/05/2021	13:08:00	1	10	20m	2	8
WT33-21	Breeding	VP2	17/05/2021	14:25:00	1	11	25m	0	11
WT36-21	Breeding	VP3	11/06/2021	11:21:00	1	25	50m	20	5
WT39-21	Breeding		11/06/2021	11:46:00	2	3600	-	3600	0
WT47-21	Breeding	VP1	18/08/2021	10:09:00	1	45	35m	30	15
WT50-21	Breeding	VP1, VP2	18/08/2021	11:57:00	1	47	45m	27	20
WT51-21	Breeding	VP1	18/08/2021	12:05:00	4	165	30m	120	45
WT52-21	Breeding	VP2	18/08/2021	09:54:00	1	2	17.5m	0	2
WT53-21	Breeding	VP2	18/08/2021	11:16:00	1	84	62.5m	0	84
WT54-21	Breeding	VP2, VP5	18/08/2021	12:13:00	4	47	17.5m	27	20
WT55-21	Breeding	VP2	18/08/2021	14:26:00	1	3	16.5m	2	1
WT59-21	Breeding	VP4	18/08/2021	14:26:00	1	65	62.5m	45	20
WT1-21/22	Wintering	VP3	18/11/2021	08:40:00	1	2	25m	2	0
WT2-21/22	Wintering	VP3	18/11/2021	08:51:00	1	46	25m	46	0
WT3-21/22	Wintering	VP3	18/11/2021	08:51:00	1	20	25m	10	10
WT4-21/22	Wintering	VP3	18/11/2021	09:04:00	1	105	25m	105	0
WT5-21/22	Wintering	VP3	18/11/2021	09:22:00	2	200	25m	100	100
WT6-21/22	Wintering	VP3	18/11/2021	09:26:00	1	2	5m	2	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT8-21/22	Wintering	VP3	18/11/2021	10:50:00	3	13320	5m	13320	0
WT9-21/22	Wintering	VP3	18/11/2021	13:16:00	1	93	5m	80	13
WT11-21/22	Wintering	VP2, VP1	23/11/2021	09:08:00	18	26	5m	20	6
WT12-21/22	Wintering	VP1, VP2	23/11/2021	09:33:00	1	56	5m	56	0
WT13-21/22	Wintering	VP1	23/11/2021	09:52:00	1	42	5m	42	0
WT14-21/22	Wintering	VP1, VP5	23/11/2021	09:56:00	1	157	25m	96	61
WT15-21/22	Wintering	VP2, VP5	23/11/2021	09:57:00	1	89	10m	89	0
WT16-21/22	Wintering	VP5	23/11/2021	10:32:00	2	52	15m	52	0
WT19-21/22	Wintering	VP1, VP2	23/11/2021	11:32:00	2	56	5m	56	0
WT20-21/22	Wintering	VP1, VP2	23/11/2021	11:39:00	1	145	25m	145	0
WT21-21/22	Wintering	VP1, VP2, VP5	23/11/2021	12:01:00	1	72	5m	72	0
WT22-21/22	Wintering	VP1	23/11/2021	12:47:00	1	103	5m	103	0
WT24-21/22	Wintering	VP1, VP5	23/11/2021	13:14:00	1	93	5m	93	0
WT25-21/22	Wintering	VP2	23/11/2021	13:15:00	1	60	5m	60	0
WT26-21/22	Wintering	VP1	23/11/2021	13:44:00	1	26	5m	0	26
WT27-21/22	Wintering	VP2	23/11/2021	13:48:00	1	30	5m	30	0
WT28-21/22	Wintering	VP2	23/11/2021	13:53:00	1	60	5m	60	0
WT29-21/22	Wintering	VP1	23/11/2021	13:57:00	1	90	25m	90	0
WT30-21/22	Wintering	VP1, VP2	23/11/2021	13:59:00	1	141	25m	141	0
WT31-21/22	Wintering	VP2	23/11/2021	14:00:00	1	45	5m	45	0
N/A	Wintering	VP3	02/12/2021	12:39:00	1	30	5m	20	10
WT35-21/22	Wintering	VP1	02/12/2021	08:50:00	11	161	35m	100	61
WT36-21/22	Wintering	VP1	02/12/2021	08:51:00	8	160	35m	100	60
WT38-21/22	Wintering	VP1	02/12/2021	08:58:00	1	132	25m	42	90

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT41-21/22	Wintering	VP3	02/12/2021	09:05:00	1	300	0m	300	0
WT42-21/22	Wintering	VP1	02/12/2021	09:13:00	1	50	25m	32	18
WT43-21/22	Wintering	VP3	02/12/2021	09:17:00	1	30	5m	30	0
WT44-21/22	Wintering	VP1	02/12/2021	09:19:00	1	146	25m	120	26
WT45-21/22	Wintering	VP5	02/12/2021	09:20:00	9	14400	10m	14400	0
WT46-21/22	Wintering	VP3	02/12/2021	09:22:00	1	35	5m	35	0
WT47-21/22	Wintering	VP1	02/12/2021	09:23:00	1	46	25m	33	13
WT49-21/22	Wintering	VP3	02/12/2021	09:41:00	1	15	5m	15	0
WT52-21/22	Wintering	VP1	02/12/2021	09:59:00	1	83	5m	83	0
WT54-21/22	Wintering	VP2	02/12/2021	10:00:00	1	10	20m	0	10
WT55-21/22	Wintering	VP3	02/12/2021	10:00:00	1	15	5m	15	0
WT56-21/22	Wintering	VP2	02/12/2021	11:46:00	1	25	30m	0	25
WT57-21/22	Wintering	VP3	02/12/2021	12:05:00	1	40	5m	10	30
WT58-21/22	Wintering	VP1, VP1, VP2	02/12/2021	12:06:00	1	77	5m	37	40
WT60-21/22	Wintering	VP1, VP1	02/12/2021	13:19:00	1	32	5m	0	32
WT61-21/22	Wintering	VP1, VP1, VP2	02/12/2021	13:23:00	1	42	30m	0	42
WT62-21/22	Wintering	VP2	02/12/2021	13:25:00	1	20	30m	0	20
WT63-21/22	Wintering	VP1	02/12/2021	13:32:00	1	21	25m	21	0
WT64-21/22	Wintering	VP1	02/12/2021	13:42:00	1	19	25m	19	0
WT65-21/22	Wintering	VP1, VP1	02/12/2021	13:57:00	1	27	25m	27	0
WT66-21/22	Wintering	VP1, VP1	02/12/2021	14:13:00	2	57	25m	57	0
WT67-21/22	Wintering	VP1, VP1	02/12/2021	14:14:00	1	63	25m	0	63
WT69-21/22	Wintering	VP1	02/12/2021	14:43:00	1	61	5m	45	16

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT75-21/22	Wintering	VP5	06/12/2021	12:27:00	3	9180	8m	9180	0
WT76-21/22	Wintering	VP5	06/12/2021	13:44:00	1	62	40m	62	0
WT77-21/22	Wintering	VP5	06/12/2021	13:51:00	1	40	30m	40	0
WT80-21/22	Wintering	VP3	07/12/2021	11:05:00	1	60	10m	0	60
WT83-21/22	Wintering	VP3	07/12/2021	13:40:00	1	180	35m	0	180
WT84-21/22	Wintering	VP3	07/12/2021	14:24:00	1	20	10m	20	0
WT100-21/22	Wintering	VP2	10/12/2021	12:55:00	1	8	20m	8	0
WT101-21/22	Wintering	VP1	10/12/2021	13:09:00	1	30	15m	0	30
WT102-21/22	Wintering	VP1	10/12/2021	14:37:00	1	30	15m	0	30
WT103-21/22	Wintering	VP1	10/12/2021	14:50:00	1	60	40m	0	60
WT104-21/22	Wintering	VP1	10/12/2021	14:55:00	1	60	35m	0	60
WT85-21/22	Wintering	VP2	10/12/2021	09:43:00	3	4	20m	4	0
WT86-21/22	Wintering	VP2, VP1	10/12/2021	10:00:00	7	67	15m	7	60
WT87-21/22	Wintering	VP1, VP2	10/12/2021	10:09:00	1	65	15m	5	60
WT89-21/22	Wintering	VP1	10/12/2021	10:34:00	1	60	15m	0	60
WT90-21/22	Wintering	VP1	10/12/2021	11:58:00	2	120	35m	0	120
WT92-21/22	Wintering	VP1	10/12/2021	11:58:00	1	60	10m	0	60
WT93-21/22	Wintering	VP2	10/12/2021	12:00:00	2	5	20m	5	0
WT94-21/22	Wintering	VP1	10/12/2021	12:06:00	1	60	35m	0	60
WT95-21/22	Wintering	VP1	10/12/2021	12:16:00	1	60	10m	0	60
WT98-21/22	Wintering	VP1	10/12/2021	12:48:00	2	30	5m	0	30
WT99-21/22	Wintering	VP1	10/12/2021	12:55:00	2	30	30m	0	30
N/A	Wintering	VP5	14/01/2022	09:36:00	3	120	0m	120	0
N/A	Wintering	VP5	14/01/2022	11:40:00	1	10	5m	10	0
WT106-21/22	Wintering	VP3	14/01/2022	09:20:00	9	19920	5m	19920	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT108-21/22	Wintering	VP3, VP5	14/01/2022	09:30:00	25	80	5m	15	65
WT109-21/22	Wintering	VP5	14/01/2022	09:30:00	17	200	0m	200	0
WT110-21/22	Wintering	VP5	14/01/2022	09:45:00	1	10	5m	0	10
WT111-21/22	Wintering	VP5	14/01/2022	10:05:00	18	120	0m	120	0
WT112-21/22	Wintering	VP5	14/01/2022	11:05:00	1	15	5m	15	0
WT113-21/22	Wintering	VP5	14/01/2022	11:06:00	4	400	0m	400	0
WT114-21/22	Wintering	VP3	14/01/2022	11:07:00	2	52	25m	26	26
WT115-21/22	Wintering	VP3	14/01/2022	11:20:00	1	84	25m	60	24
WT116-21/22	Wintering	VP3	14/01/2022	11:20:00	1	30	25m	15	15
WT117-21/22	Wintering	VP4	14/01/2022	11:28:00	1	72	25m	72	0
WT118-21/22	Wintering	VP5	14/01/2022	11:30:00	2	25	5m	25	0
WT119-21/22	Wintering	VP3	14/01/2022	12:12:00	1	44	5m	34	10
WT124-21/22	Wintering	VP5	14/01/2022	13:35:00	4	350	0m	350	0
WT125-21/22	Wintering	VP5	14/01/2022	14:15:00	3	200	0m	200	0
WT126-21/22	Wintering	VP4	14/01/2022	14:56:00	1	63	25m	0	63
WT127-21/22	Wintering	VP1, VP2	17/01/2022	09:43:00	1	55	20m	55	0
WT128-21/22	Wintering	VP1, VP2	17/01/2022	10:51:00	1	56	20m	56	0
WT129-21/22	Wintering	VP2	17/01/2022	11:00:00	1	35	20m	35	0
WT130-21/22	Wintering	VP1, VP2	17/01/2022	11:05:00	2	92	20m	92	0
WT131-21/22	Wintering	VP1, VP2	17/01/2022	11:41:00	6	68	20m	68	0
WT132-21/22	Wintering	VP1, VP2	17/01/2022	12:26:00	1	26	20m	26	0
WT133-21/22	Wintering	VP1	17/01/2022	12:30:00	1	8	20m	8	0
WT134-21/22	Wintering	VP2	17/01/2022	12:35:00	1	5	10m	5	0
WT137-21/22	Wintering	VP2	17/01/2022	13:11:00	1	40	40m	40	0
WT138-21/22	Wintering	VP1, VP2	17/01/2022	13:14:00	1	53	20m	53	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT139-21/22	Wintering	VP2	17/01/2022	13:19:00	1	77	30m	60	17
WT140-21/22	Wintering	VP1, VP2	17/01/2022	13:25:00	1	160	30m	130	30
WT141-21/22	Wintering	VP1, VP2	17/01/2022	13:39:00	1	61	20m	61	0
WT142-21/22	Wintering	VP1, VP2	17/01/2022	13:55:00	2	180	20m	150	30
WT143-21/22	Wintering	VP1	17/01/2022	14:19:00	1	15	30m	15	0
WT144-21/22	Wintering	VP2	17/01/2022	15:02:00	1	50	30m	50	0
WT145-21/22	Wintering	VP2	17/01/2022	15:12:00	2	101	30m	36	65
WT147-21/22	Wintering	VP3	10/02/2022	09:50:00	5	7200	5m	0	7200
WT148-21/22	Wintering	VP3	10/02/2022	09:55:00	1	11	5m	0	11
WT149-21/22	Wintering	VP3	10/02/2022	09:58:00	1	48	25m	31	17
WT150-21/22	Wintering	VP3	10/02/2022	10:28:00	1	12	5m	0	12
WT153-21/22	Wintering	VP3	10/02/2022	11:40:00	1	7200	5m	0	7200
WT156-21/22	Wintering	VP3	10/02/2022	13:22:00	1	18	5m	0	18
WT157-21/22	Wintering	VP3	10/02/2022	13:58:00	1	156	25m	0	156
WT158-21/22	Wintering	VP3	10/02/2022	14:01:00	1	53	25m	0	53
WT160-21/22	Wintering	VP3	10/02/2022	14:41:00	1	88	25m	0	88
WT163-21/22	Wintering	VP5	11/02/2022	09:05:00	2	300	5m	0	300
WT164-21/22	Wintering	VP5	11/02/2022	10:25:00	1	93	15m	43	50
WT165-21/22	Wintering	VP1, VP5	11/02/2022	10:38:00	1	64	15m	49	15
WT166-21/22	Wintering	VP2	11/02/2022	10:44:00	1	15	5m	15	0
WT169-21/22	Wintering	VP1	11/02/2022	11:34:00	1	29	25m	0	29
WT170-21/22	Wintering	VP5	11/02/2022	11:34:00	1	20	50m	0	20
WT175-21/22	Wintering	VP2	11/02/2022	13:26:00	1	110	5m	110	0
WT176-21/22	Wintering	VP5	11/02/2022	13:27:00	1	61	60m	61	0
WT177-21/22	Wintering	VP1	11/02/2022	13:30:00	1	24	25m	0	24

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT179-21/22	Wintering	VP2	11/02/2022	13:36:00	1	10	5m	10	0
WT182-21/22	Wintering	VP1	11/02/2022	13:53:00	2	54	25m	0	54
WT183-21/22	Wintering	VP1	11/02/2022	14:16:00	1	42	25m	0	42
WT184-21/22	Wintering	VP2	11/02/2022	14:30:00	1	11	5m	10	1
WT185-21/22	Wintering	VP1	11/02/2022	14:32:00	1	38	25m	0	38
WT188-21/22	Wintering	VP5	11/02/2022	15:03:00	1	45	50m	45	0
WT189-21/22	Wintering	VP2, VP5	14/03/2022	08:55:00	3	144	40m	89	55
WT190-21/22	Wintering	VP2, VP5	14/03/2022	09:01:00	1	146	30m	98	48
WT199-21/22	Wintering	VP2	14/03/2022	10:36:00	1	109	30m	100	9
WT203-21/22	Wintering	VP5	14/03/2022	12:22:00	1	38	25m	0	38
WT205-21/22	Wintering	VP5	14/03/2022	14:06:00	1	29	25m	0	29
WT206-21/22	Wintering	VP2, VP5	14/03/2022	14:35:00	1	76	30m	56	20
WT10-22/23	Wintering	VP1	28/11/2022	14:27:00	1	0	10m	0	0
WT12-22/23	Wintering	VP1, VP2	28/11/2022	14:46:00	1	47	7.5m	0	47
WT13-22/23	Wintering	VP5, VP2	28/11/2022	14:47:00	1	18	15m	18	0
WT2-22/23	Wintering	VP2	28/11/2022	09:45:00	2	30	15m	12	18
WT3-22/23	Wintering	VP1	28/11/2022	09:46:00	2	46	15m	46	0
WT7-22/23	Wintering	VP1	28/11/2022	11:11:00	1	10	20m	0	10
WT9-22/23	Wintering	VP2	28/11/2022	13:26:00	1	10	5m	10	0
WT15-22/23	Wintering	VP1	30/11/2022	09:15:00	1	12	20m	12	0
WT16-22/23	Wintering	VP1	30/11/2022	09:47:00	1	25	40m	25	0
WT23-22/23	Wintering	VP4	30/11/2022	10:05:00	1	10	15m	0	10
WT57-22/23	Wintering	VPB	30/11/2022	12:50:00	1	70	160m	0	70
WT58-22/23	Wintering	VPA	30/11/2022	12:51:00	1	46	15m	6	40
WT64-22/23	Wintering	VP3	30/11/2022	13:53:00	1	113	15m	25	88

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT68-22/23	Wintering	VP3	30/11/2022	14:04:00	3	74	15m	34	40
WT71-22/23	Wintering	VP1	30/11/2022	14:30:00	2	40	60m	25	15
WT72-22/23	Wintering	VPA, VP3	30/11/2022	14:58:00	1	53	2.5m	0	53
WT73-22/23	Wintering	VPA	30/11/2022	15:07:00	1	42	15m	0	42
WT105-22/23	Wintering	VPA, VPB	20/12/2022	12:54:00	1	50	20m	20	30
WT119-22/23	Wintering	VP3	20/12/2022	14:35:00	1	20	15m	20	0
WT75-22/23	Wintering	VP4, VP3	20/12/2022	09:04:00	5	42	15m	30	12
WT88-22/23	Wintering	VPA	20/12/2022	10:29:00	1	970	35m	0	48
WT124-22/23	Wintering	VP2	21/12/2022	08:59:00	2	21	25m	18	3
WT126-22/23	Wintering	VP2	21/12/2022	09:36:00	3	33	25m	15	18
WT130-22/23	Wintering	VP2, VP1	21/12/2022	10:07:00	1	212	55m	180	32
WT131-22/23	Wintering	VP2, VP1	21/12/2022	10:15:00	3	92	32.5m	81	11
WT133-22/23	Wintering	VP1	21/12/2022	10:28:00	1	20	40m	15	5
WT136-22/23	Wintering	VP2	21/12/2022	12:12:00	1	59	22.5m	34	25
WT145-22/23	Wintering	VP1, VP2	21/12/2022	13:16:00	1	218	90m	178	40
WT148-22/23	Wintering	VP1, VP2	21/12/2022	14:02:00	1	103	90m	35	68
WT149-22/23	Wintering	VP1	21/12/2022	14:53:00	1	80	90m	0	80
WT150-22/23	Wintering	VP1	21/12/2022	15:04:00	1	42	90m	0	42
WT268-22/23	Wintering	VP2	25/01/2023	13:19:00		25	45m	25	
WT270-22/23	Wintering	VP2	25/01/2023	13:36:00	1	25	30m		25
WT271-22/23	Wintering	VP2	25/01/2023	13:59:00	1	20	30m	15	5
WT272-22/23	Wintering	VP2	25/01/2023	14:17:00	1	25	30m		25
WT284-22/23	Wintering	VP1	25/01/2023	09:03:00	1	40	25m	30	10
WT285-22/23	Wintering	VP1	25/01/2023	09:18:00	1	30	12.5m	5	25

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT287-22/23	Wintering	VP1	25/01/2023	11:55:00	1	85	15m	85	0
WT290-22/23	Wintering	VP1	25/01/2023	14:29:00	2	30	15m	25	5
WT293-22/23	Wintering	VP5	25/01/2023	10:33:00	1	35	20m	5	30
WT295-22/23	Wintering	VP5	25/01/2023	11:47:00	1	35	15m	5	30
WT296-22/23	Wintering	VP5	25/01/2023	11:55:00	1	50	20m	50	0
WT275-22/23	Wintering	VP3	27/01/2023	10:56:00	1	107	50m	107	
WT276-22/23	Wintering	VP3	27/01/2023	11:32:00	1	22	12.5m	22	
WT278-22/23	Wintering	VP3	27/01/2023	12:56:00	1	75	20m	15	60
WT279-22/23	Wintering	VP3	27/01/2023	13:42:00	1	82	12.5m	82	
WT280-22/23	Wintering	VP3	27/01/2023	14:41:00	2	70	17.5m	70	
WT281-22/23	Wintering	VP3	27/01/2023	14:45:00	1	85	20m	85	
WT282-22/23	Wintering	VP3	27/01/2023	14:54:00	1	75	20m	15	60
WT283-22/23	Wintering	VP3	27/01/2023	15:10:00	1	40	25m		40
WT151-22/23	Wintering	VP2	20/02/2023	08:55:00	1	83	15m	10	73
WT156-22/23	Wintering	VP3	20/02/2023	09:26:00	1	1440	15m	0	1440
WT160-22/23	Wintering	VP2	20/02/2023	09:51:00	1	44	15m	22	22
WT161-22/23	Wintering	VP2, VP1	20/02/2023	10:24:00	1	92	15m	32	60
WT162-22/23	Wintering	VP1	20/02/2023	10:25:00	1	46	35m	36	10
WT166-22/23	Wintering	VP1	20/02/2023	11:05:00	1	15	10m	0	15
WT167-22/23	Wintering	VPB	20/02/2023	11:08:00	1	78	30m	48	30
WT168-22/23	Wintering	VPA	20/02/2023	11:28:00	1	69	32.5m	50	19
WT171-22/23	Wintering	VP2	20/02/2023	12:04:00	1	2	15m	1	1
WT172-22/23	Wintering	VPA	20/02/2023	12:25:00	1	10	20m	10	0
WT173-22/23	Wintering	VP5	20/02/2023	12:28:00	40	35	6m	10	25
WT175-22/23	Wintering	VP2, VP1	20/02/2023	12:55:00	1	90	15m	60	30

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT176-22/23	Wintering	VP2, VP1	20/02/2023	13:39:00	1	48	62.5m	8	40
WT177-22/23	Wintering	VP1	20/02/2023	13:46:00	1	10	25m	10	0
WT178-22/23	Wintering	VP1	20/02/2023	14:00:00	1	12	60m	1	11
WT179-22/23	Wintering	VPA	20/02/2023	14:35:00	1	94	20m	94	0
WT180-22/23	Wintering	VP1	20/02/2023	14:50:00	1	5	25m	5	0
WT188-22/23	Wintering	VP1	27/03/2023	09:04:00	1	70	15m	20	50
WT191-22/23	Wintering	VPA	27/03/2023	09:18:00	1	54	15m	44	10
WT215-22/23	Wintering	VP1	27/03/2023	11:02:00	1	17	2.5m	3	14
WT223-22/23	Wintering	VPA	27/03/2023	11:50:00	1	18	15m	12	6
WT229-22/23	Wintering	VPA	27/03/2023	13:18:00	3	20	2.5m	20	0
WT231-22/23	Wintering	VP1	27/03/2023	14:00:00	3	2	2.5m	2	0
WT238-22/23	Wintering	VP2	27/03/2023	15:15:00	2	44	20m	10	34
WT1-23	Breeding	VPB	01/05/2023	09:20:00	1	50	15m	10	40
N/A	Breeding	VP3	02/05/2023	08:52:00	2	0	2.5m	-	-
N/A	Breeding	VP3	02/05/2023	13:50:00	1	0	15m	0	0
WT13-23	Breeding	VP1	02/05/2023	13:40:00	1	14	12m	6	8
WT5-23	Breeding	VP3	02/05/2023	08:47:00	1	22	15m	0	22
WT7-23	Breeding	VP3	02/05/2023	10:37:00	4	8	15m	2	6
WT18-23	Breeding	VP2, VP1	23/06/2023	08:53:00	1	23	15m	0	23
WT25-23	Breeding	VP1	23/06/2023	12:30:00	1	10	15m	2	8
WT29-23	Breeding	VP3	27/06/2023	10:34:00	1	9	15m	2	7
WT32-23	Breeding	VPA	27/06/2023	14:55:00	1	111	35m	74	37
N/A	Breeding	VP5	20/07/2023	11:32:00	5	0	2.5m	-	-
N/A	Breeding	VP5	20/07/2023	12:30:00	3	0	15m	0	0
WT44-23	Breeding	VPA	20/07/2023	10:10:00	1	44	15m	44	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT45-23	Breeding	VP5	20/07/2023	10:16:00	1	10	15m	10	0
WT64-23	Breeding	VP3	27/07/2023	10:47:00	1	45	40m	45	0
WT72-23	Breeding	VP1	27/07/2023	11:12:00	1	36	15m	16	20
WT100-23	Breeding	VP1	28/08/2023	10:43:00	5	41	35m	37	4
WT109-23	Breeding	VP3	28/08/2023	12:40:00	1	30	2.5m	30	0
WT113-23	Breeding	VP3	28/08/2023	13:20:00	1	25	15m	13	12
WT118-23	Breeding	VPA	28/08/2023	14:08:00	1	77	10m	7	70
WT119-23	Breeding	VP5	28/08/2023	14:09:00	4	1680	2.5m	0	1680
WT77-23	Breeding	VP3	28/08/2023	09:38:00	1	15	15m	15	0
WT90-23	Breeding	VP2	28/08/2023	09:57:00	3	10	18m	10	0
WT91-23	Breeding	VP3	28/08/2023	09:15:00	1	40	15m	40	0
WT93-23	Breeding	VP3	28/08/2023	09:38:00	1	15	15m	15	0
WT94-23	Breeding	VP3	28/08/2023	10:17:00	1	1200	15m	0	1200
WT130-23	Breeding	VP3	26/09/2023	09:06:00	1	18	15m	16	2
WT131-23	Breeding	VPB	26/09/2023	09:08:00	1	75	62.5m	0	75
WT134-23	Breeding	VP2, VP1	26/09/2023	09:13:00	4	154	25	64	90
WT137-23	Breeding	VPA, VPB	26/09/2023	10:20:00	1	42	40m	20	22
WT10-23/24	Wintering	VP2	24/10/2023	12:59:00	1	20	15m	20	0
WT13-23/24	Wintering	VP3	24/10/2023	09:01:00	2	1800	35m	1800	0
WT14-23/24	Wintering	VP3	24/10/2023	09:21:00	1	20	30m	10	10
WT15-23/24	Wintering	VP3	24/10/2023	09:27:00	1	10	25m	10	0
WT16-23/24	Wintering	VP3, VPA	24/10/2023	09:31:00	4	20	30m	20	0
WT17-23/24	Wintering	VP3	24/10/2023	10:14:00	1	30	35m	0	30
WT22-23/24	Wintering	VP3	24/10/2023	14:35:00	1	25	30m	0	25

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT3-23/24	Wintering	VP1	24/10/2023	12:48:00	1	40	70m	25	15
WT4-23/24	Wintering	VP1	24/10/2023	13:29:00	1	15	30m	10	5
WT40-23/24	Wintering	VP5	24/10/2023	08:20:00	9	4380	12.5m	0	4380
WT41-23/24	Wintering	VP5	24/10/2023	09:26:00	11	18	15m	0	18
WT47-23/24	Wintering	VPA	24/10/2023	09:36:00	1	60	25m	60	0
WT48-23/24	Wintering	VPA	24/10/2023	09:44:00	4	30	30m	0	30
WT51-23/24	Wintering	VPA	24/10/2023	10:53:00	1	76	30m	76	0
WT58-23/24	Wintering	VPA	24/10/2023	13:31:00	1	41	7.5m	30	11
WT6-23/24	Wintering	VP1	24/10/2023	15:18:00	1	35	35m	30	5
WT8-23/24	Wintering	VP2	24/10/2023	09:44:00	5	30	15m	0	30
N/A	Wintering	VP3	20/12/2023	12:15:00	1	28	15m	-	-
WT147-23/24	Wintering	VP1	20/12/2023	10:52:00	1	6	10m	4	2
WT149-23/24	Wintering	VP2	20/12/2023	08:56:00	1	12	35m	6	6
WT150-23/24	Wintering	VP2	20/12/2023	10:10:00	1	14	35m	12	2
WT152-23/24	Wintering	VP3	20/12/2023	08:44:00	1	10	25m	10	0
WT153-23/24	Wintering	VP3, VPA	20/12/2023	08:53:00	14	104	25m	104	0
WT156-23/24	Wintering	VP3, VP2	20/12/2023	10:15:00	5	240	20m	250	0
WT157-23/24	Wintering	VP3	20/12/2023	11:16:00	1	48	12.5m	48	0
WT158-23/24	Wintering	VP3	20/12/2023	13:30:00	1	56	15m	56	0
WT160-23/24	Wintering	VP3	20/12/2023	13:43:00	1	117	20m	55	62
WT172-23/24	Wintering	VPA	20/12/2023	11:53:00	1	58	62.5m	8	50
WT173-23/24	Wintering	VPA, VPB	20/12/2023	11:57:00	1	52	62.5m	40	12
WT176-23/24	Wintering	VPA	20/12/2023	13:49:00	1	32	62.5m	15	17
WT183-23/24	Wintering	VPB	20/12/2023	10:22:00	1	141	62.5m	40	100

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT190-23/24	Wintering	VP1, VP2	25/01/2024	08:52:00	9	107	15m	50	57
WT192-23/24	Wintering	VP1	25/01/2024	09:11:00	1	138	25m	0	138
WT195-23/24	Wintering	VP1	25/01/2024	10:11:00	1	35	15m	30	5
WT196-23/24	Wintering	VP1	25/01/2024	11:09:00	1	48	15m	24	24
WT204-23/24	Wintering	VP2	25/01/2024	09:01:00	6	15	15m	15	0
WT213-23/24	Wintering	VP3	25/01/2024	09:03:00	2	54	15m	34	20
WT216-23/24	Wintering	VP3	25/01/2024	09:51:00	1	38	15m	19	19
WT226-23/24	Wintering	VP3	25/01/2024	14:42:00	1	21	15m	17	4
WT230-23/24	Wintering	VP4, VP3	25/01/2024	09:07:00	1	83	15m	60	24
WT237-23/24	Wintering	VP5	29/01/2024	13:44:00	3	48	15m		
WT241-23/24	Wintering	VP5	29/01/2024	14:15:00	1	24	15m	0	24
WT243-23/24	Wintering	VP5	29/01/2024	14:23:00	3	52	15m	0	52
WT244-23/24	Wintering	VP5	29/01/2024	14:35:00	1	33	62.5m	3	30
WT245-23/24	Wintering	VP5	29/01/2024	14:40:00	1	39	62.5m	4	35
WT249-23/24	Wintering	VPB	29/01/2024	12:48:00	1	10	35m	8	2
WT251-23/24	Wintering	VPB	29/01/2024	13:42:00	1	14	35m	11	3
WT255-23/24	Wintering	VPA	02/02/2024	09:01:00	1	30	62.5m	10	20
WT261-23/24	Wintering	VPA	02/02/2024	10:00:00	1	200	62.5m	180	20
WT281-23/24	Wintering	VP1	23/02/2024	09:38:00	1	120	62.5m	0	120
WT292-23/24	Wintering	VP2	23/02/2024	08:42:00	1	150	15m	60	90
WT299-23/24	Wintering	VP3, VPA, VPB	26/02/2024	10:51:00	1	66	22.5m	66	0
WT300-23/24	Wintering	VP3, VPA	26/02/2024	14:01:00	1	55	18.5m	55	0
WT328-23/24	Wintering	VP1, VP2	21/03/2024	11:34:00	1	82	62.5m	57	25

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT329-23/24	Wintering	VP1	21/03/2024	11:48:00	3	49	15m	30	19
WT338-23/24	Wintering	VP2, VP1	21/03/2024	10:05:00	1	12	30m	6	6
WT366-23/24	Wintering	VP3	21/03/2024	12:37:00	1	140	62.5m	70	70
WT369-23/24	Wintering	VP3	21/03/2024	12:58:00	1	3000	15m		
WT11-24	Breeding	VPA	28/05/2024	13:05:00	1	25	32.5m	0	25
WT6-24	Breeding	VPA	28/05/2024	11:28:00	2	45	15m	5	40
WT38-24	Breeding	VP2	31/05/2024	13:00:00	1	300	62.5m	0	300
WT39-24	Breeding	VP1, VP2, VP3	31/05/2024	13:01:00	1	120	40m	120	0
WT40-24	Breeding	VP1, VP2, VP3	31/05/2024	13:01:00	1	120	40m	120	0
WT44-24	Breeding	VP2	31/05/2024	14:31:00	1	16	15m	0	16
WT46-24	Breeding	VP3	31/05/2024	14:52:00	1	20	15m	0	20
WT54-24	Breeding	VP3	24/06/2024	10:04:00	1	46	62.5m	0	46
WT58-24	Breeding	VP3	24/06/2024	11:00:00	1	155	62.5m	0	155
WT64-24	Breeding	VP5	24/06/2024	13:00:00	1	30	15m	25	5
WT68-24	Breeding	VP2	24/06/2024	14:35:00	1	21	27.5m	21	0
WT73-24	Breeding	VPA	27/06/2024	12:53:00	1	70	62.5m	70	0
WT78-24	Breeding	VP3	24/07/2024	09:13:00	1	25	25m	25	0
WT79-24	Breeding	VP1, VP2	24/07/2024	09:24:00	1	54	15m	30	24
WT86-24	Breeding	VP3	24/07/2024	11:33:00	2	45	40m	30	15
WT87-24	Breeding	VP1, VP2	24/07/2024	11:39:00	2	55	62.5m	30	25
WT89-24	Breeding	VP1	24/07/2024	11:58:00	1	46	15m	23	23
WT90-24	Breeding	VP1, VP2	24/07/2024	12:03:00	1	52	62.5m	26	26
WT93-24	Breeding	VP2	24/07/2024	12:08:00	1	10	15m	10	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT94-24	Breeding	VP1	24/07/2024	13:18:00	1	107	62.5m	54	53
N/A	Breeding	VPB	29/07/2024	12:48:00	1	-	62.5m	-	-
WT100-24	Breeding	VPB	29/07/2024	11:28:00	2	60	62.5m	20	40
WT101-24	Breeding	VPB	29/07/2024	11:37:00	1	30	62.5m	10	20
WT99-24	Breeding	VPA	29/07/2024	09:58:00	1	95	17.5m	0	95
WT112-24	Breeding	VPA	23/08/2024	09:46:00	1	35	62.5m	35	0
WT115-24	Breeding	VPA	23/08/2024	11:06:00	1	15	15m	15	0
WT130-24	Breeding	VP4	23/08/2024	15:05:00	1	180	90m	120	60
WT132-24	Breeding	VP5	28/08/2024	08:50:00	1	32	62.5m	0	32
WT134-24	Breeding	VP5, VP1	28/08/2024	09:08:00	4	53	62.5m	25	28
WT138-24	Breeding	VP5	28/08/2024	11:12:00	1	205	100m	0	205
WT143-24	Breeding	VP2	28/08/2024	12:02:00	2	55	35m	35	20
WT145-24	Breeding	VP3	28/08/2024	12:08:00	1	20	17.5m	0	20
WT152-24	Breeding	VP2, VP1	23/09/2024	09:40:00	7	130	40m	120	10
WT153-24	Breeding	VP2	23/09/2024	09:40:00	1	130	40m	120	10
WT155-24	Breeding	VP1	23/09/2024	10:36:00	1	60	17.5m	60	0
WT156-24	Breeding	VP2	23/09/2024	10:36:00	2	45	37.5m	40	5
WT157-24	Breeding	VP2, VP1	23/09/2024	10:57:00	1	30	17.5m	30	0
WT158-24	Breeding	VP2, VP1	23/09/2024	11:30:00	1	50	27.5m	50	0
WT159-24	Breeding	VP2, VP1	23/09/2024	13:46:00	2	120	32.5m	60	60
WT160-24	Breeding	VP2, VP1	23/09/2024	14:00:00	1	42	17.5m	30	12
WT163-24	Breeding	VP1	23/09/2024	14:36:00	1	60	25m	60	0
WT164-24	Breeding	VP2	23/09/2024	14:58:00	1	90	37.5m	45	45
WT165-24	Breeding	VP5	24/09/2024	08:48:00	8	12600	15m	0	12600
WT166-24	Breeding	VP3	24/09/2024	09:08:00	10	30	40m	10	20

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT167-24	Breeding	VP3	24/09/2024	09:15:00	2	50	80m	40	10
WT169-24	Breeding	VP5	24/09/2024	09:40:00	2	16	15m	0	16
WT172-24	Breeding	VP5	24/09/2024	10:09:00	1	14	15m	0	14
WT179-24	Breeding	VP5	24/09/2024	12:07:00	1	24	15m	0	24
WT180-24	Breeding	VP5, VP3	24/09/2024	12:17:00	9	195	62.5m	100	95
WT182-24	Breeding	VP3	24/09/2024	12:29:00	1	50	35m	5	45
WT186-24	Breeding	VP3	24/09/2024	13:29:00	1	60	35m	15	45
WT188-24	Breeding	VP5	24/09/2024	14:37:00	1	180	15m	0	180
WT194-24	Breeding	VPA	27/09/2024	14:21:00	1	15	5m	0	15
WT195-24	Breeding	VPA	27/09/2024	14:24:00	2	70	32.5m	0	70
WT197-24	Breeding	VPB	28/09/2024	08:59:00	2	60	15m	60	0
WT201-24	Breeding	VPB	28/09/2024	10:10:00	1	25	15m	25	0
WT203-24	Breeding	VPB	28/09/2024	12:04:00	1	10	15m	10	0
WT204-24	Breeding	VPB	28/09/2024	12:09:00	1	30	15m	5	25
WT210-24	Breeding	VPB	28/09/2024	13:45:00	3	35	62.5m	35	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00023	Winter	VP2	30/10/2025	07:15:00	1	25	0	0	0	0	25
F00025	Winter	VP2	30/10/2025	08:30:00	1	21	0	0	0	0	21

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00026	Winter	VP2	30/10/2025	08:32:00	4	55	30	0	0	0	85
F00031	Winter	VP2	30/10/2025	09:15:00	1	8	35	0	0	0	43
F00032	Winter	VP2	30/10/2025	10:27:00	1	20	0	0	0	0	20
F00034	Winter	VP2	30/10/2025	13:12:00	1	12	5	0	0	0	17
F00042	Winter	VP3	29/10/2025	15:45:00	4	33	0	0	0	0	33
F00047	Winter	VP4	16/10/2025	17:37:00	3	5	35	0	0	0	40
F00052	Winter	VP4	21/11/2025	08:09:00	4	18	0	0	0	0	18
F00054	Winter	VP4	21/11/2025	08:38:00	3	21	0	0	0	0	21
F00057	Winter	VP4	21/11/2025	09:48:00	7	28	0	0	0	0	28
F00065	Winter	VP4	21/11/2025	12:29:00	1	0	0	116	0	0	116
F00075	Winter	VP5	19/11/2025	14:58:00	1	35	0	0	0	0	35
F00076	Winter	VP5	19/11/2025	14:59:00	1	0	45	0	0	0	45
F00079	Winter	VP5	19/11/2025	15:50:00	2	0	55	0	0	0	55
F00080	Winter	VP5	19/11/2025	16:20:00	1	0	35	0	0	0	35
F00081	Winter	VP1	27/11/2025	08:29:00	2	0	0	32	0	0	32
F00083	Winter	VP1	27/11/2025	08:54:00	4	0	0	8	12	0	20
F00088	Winter	VP1	27/11/2025	10:08:00	1	13	0	0	0	0	13
F00101	Winter	VP1	27/11/2025	13:01:00	1	12	0	0	0	0	12
F00109	Winter	VP2	25/11/2025	12:23:00	1	0	45	0	0	0	45
F00112	Winter	VP2	25/11/2025	12:54:00	1	0	0	49	0	0	49
F00114	Winter	VP2	25/11/2025	14:56:00	1	0	23	0	0	0	23
F00115	Winter	VP2	25/11/2025	15:04:00	2	21	0	0	0	0	21
F00116	Winter	VP2	25/11/2025	15:05:00	1	0	23	0	0	0	23
F00117	Winter	VP2	25/11/2025	15:18:00	2	0	31	0	0	0	31
F00118	Winter	VP2	25/11/2025	15:18:00	2	0	42	0	0	0	42

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00119	Winter	VP2	25/11/2025	15:30:00	1	0	16	0	0	0	16
F00121	Winter	VP2	25/11/2025	15:45:00	2	0	22	0	0	0	22
F00122	Winter	VP2	25/11/2025	15:48:00	1	0	29	0	0	0	29
F00123	Winter	VP2	25/11/2025	15:49:00	1	0	31	0	0	0	31
F00124	Winter	VP2	25/11/2025	15:52:00	2	0	29	0	0	0	29
F00125	Winter	VP2	25/11/2025	16:00:00	1	0	21	0	0	0	21
F00127	Winter	VP2	25/11/2025	16:01:00	2	0	29	0	0	0	29
F00132	Winter	VP3	28/11/2025	08:54:00	1	0	34	0	0	0	34
F00147	Winter	VP3	28/11/2025	12:55:00	2	0	35	0	0	0	35
F00158	Winter	VP3	28/11/2025	13:57:00	1	19	0	0	0	0	19
F00160	Winter	VP3	28/11/2025	14:03:00	1	0	23	0	0	0	23
F00169	Winter	VP5	08/12/2025	15:12:00	3	0	95	20	0	0	115
F00170	Winter	VP5	08/12/2025	15:42:00	12	0	0	120	0	0	120
F00173	Winter	VP4	10/12/2025	08:36:00	9	17	50	0	0	0	67
F00174	Winter	VP4	10/12/2025	08:57:00	1	0	0	36	0	0	36
F00178	Winter	VP4	10/12/2025	10:47:00	1	15	0	0	0	0	15
F00181	Winter	VP4	10/12/2025	11:50:00	1	0	68	0	0	0	68
F00182	Winter	VP4	10/12/2025	13:39:00	1	0	82	0	0	0	82
F00191	Winter	VP1	02/12/2025	11:54:00	1	6	0	0	0	0	6
F00204	Winter	VP1	02/12/2025	13:01:00	1	0	0	66	0	0	66
F00212	Winter	VP1	02/12/2025	13:44:00	1	0	25	0	0	0	25
F00221	Winter	VP1	02/12/2025	15:35:00	1	22	0	0	0	0	22
F00224	Winter	VP1	02/12/2025	16:17:00	1	22	0	0	0	0	22
F00226	Winter	VP1	02/12/2025	16:22:00	1	0	20	0	0	0	20
F00233	Winter	VP2	03/12/2025	09:06:00	1	0	57	0	0	0	57

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00234	Winter	VP2	03/12/2025	09:13:00	1	0	52	0	0	0	52
F00235	Winter	VP2	03/12/2025	09:15:00	7	0	0	21	0	0	21
F00236	Winter	VP2	03/12/2025	09:26:00	1	0	0	54	0	0	54
F00237	Winter	VP2	03/12/2025	09:27:00	1	0	32	0	0	0	32
F00240	Winter	VP2	03/12/2025	09:51:00	1	0	29	0	0	0	29
F00253	Winter	VP2	03/12/2025	12:33:00	1	0	0	36	0	0	36
F00257	Winter	VP2	03/12/2025	13:32:00	1	0	3	17	0	0	20
F00258	Winter	VP2	03/12/2025	13:37:00	1	0	22	0	0	0	22
F00261	Winter	VP2	03/12/2025	13:55:00	1	0	24	0	0	0	24
F00265	Winter	VP3	04/12/2025	08:44:00	1	0	20	0	0	0	20
F00270	Winter	VP3	04/12/2025	09:32:00	1	16	0	0	0	0	16
F00274	Winter	VP3	04/12/2025	10:45:00	1	0	0	44	0	0	44
F00289	Winter	VP4	12/01/2026	09:09:00	8	0	0	36	0	0	36
F00291	Winter	VP4	12/01/2026	09:18:00	1	0	22	10	0	0	32
F00293	Winter	VP4	12/01/2026	09:34:00	1	0	0	29	0	0	29
F00296	Winter	VP4	12/01/2026	13:12:00	1	5	35	0	0	0	40
F00301	Winter	VP5	14/01/2026	09:44:00	1	24	0	0	0	0	24
F00304	Winter	VP5	14/01/2026	11:40:00	1	0	13	60	0	0	73
F00307	Winter	VP1	27/01/2026	08:39:00	1	0	0	39	0	0	39
F00309	Winter	VP1	27/01/2026	08:43:00	6	0	0	15	0	0	15
F00327	Winter	VP1	27/01/2026	12:56:00	1	0	12	0	0	0	12
F00341	Winter	VP2	21/01/2026	14:56:00	1	0	0	32	0	0	32
F00342	Winter	VP2	21/01/2026	15:05:00	1	0	0	29	0	0	29
F00343	Winter	VP2	21/01/2026	15:27:00	1	0	37	0	0	0	37
F00344	Winter	VP2	21/01/2026	15:35:00	1	0	22	0	0	0	22

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00345	Winter	VP2	21/01/2026	15:38:00	1	0	31	0	0	0	31
F00346	Winter	VP2	21/01/2026	15:46:00	1	0	45	0	0	0	45
F00347	Winter	VP2	21/01/2026	15:48:00	1	0	29	0	0	0	29
F00348	Winter	VP2	21/01/2026	15:50:00	2	0	30	0	0	0	30
F00349	Winter	VP2	21/01/2026	16:18:00	4	0	13	11	0	0	24
F00350	Winter	VP2	21/01/2026	16:21:00	2	0	21	0	0	0	21
F00351	Winter	VP2	21/01/2026	16:24:00	5	0	32	0	0	0	32
F00352	Winter	VP2	21/01/2026	16:36:00	1	0	17	0	0	0	17
F00355	Winter	VP3	23/01/2026	12:21:00	4	0	0	39	0	0	39
F00364	Winter	VP3	23/01/2026	15:16:00	4	0	21	0	0	0	21
F00365	Winter	VP3	23/01/2026	15:19:00	5	0	0	43	0	0	43
F00366	Winter	VP3	23/01/2026	15:44:00	1	0	24	0	0	0	24
F00386	Winter	VP4	11/02/2026	08:50:00	4	0	25	0	0	0	25
F00403	Winter	VP2	12/02/2026	08:46:00	3	0	72	0	0	0	72
F00404	Winter	VP2	12/02/2026	09:08:00	1	0	36	0	0	0	36
F00412	Winter	VP2	12/02/2026	11:20:00	1	0	40	0	0	0	40
F00423	Winter	VP3	13/02/2026	12:49:00	5	0	20	0	0	0	20
F00431	Winter	VP4	23/02/2026	16:13:00	1	0	0	55	0	0	55
F00433	Winter	VP4	23/02/2026	16:44:00	3	0	0	69	0	0	69
F00437	Winter	VP5	24/02/2026	07:53:00	8	0	0	60	68	0	128
F00443	Winter	VP5	24/02/2026	10:17:00	3	0	0	44	0	0	44
F00448	Winter	VP5	24/02/2026	12:18:00	2	0	30	0	0	0	30
F00474	Winter	VP2	25/02/2026	13:33:00	1	0	0	39	8	0	47
F00486	Winter	VP2	25/02/2026	17:42:00	5	6	12	7	0	0	25
F00492	Winter	VP3	26/02/2026	14:08:00	1	0	0	62	0	0	62

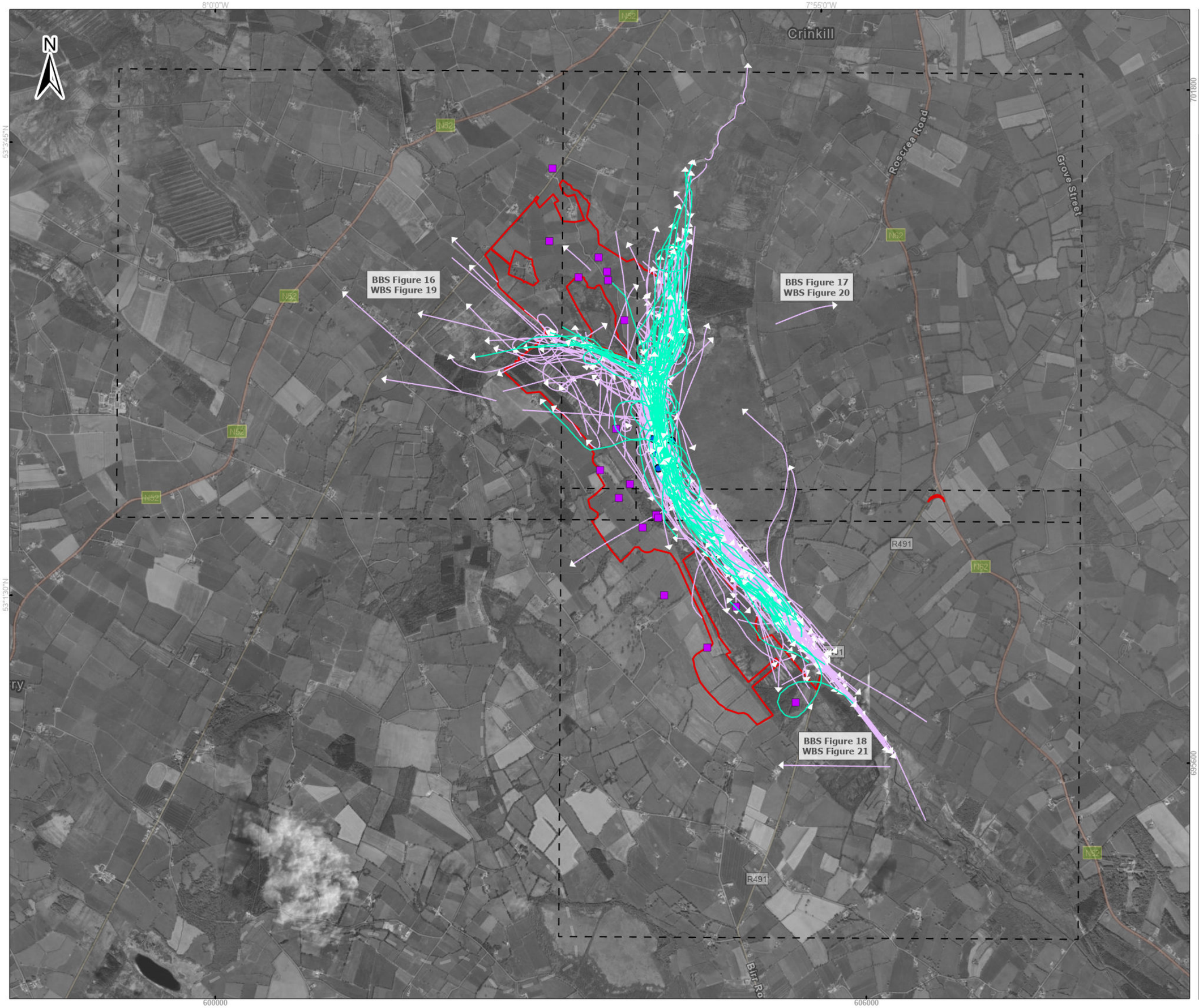
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00504	Winter	VP3	26/02/2026	16:59:00	2	0	20	0	0	0	20
F00506	Winter	VP3	26/02/2026	17:32:00	1	0	29	0	0	0	29
F00509	Winter	VP2	17/02/2026	08:33:00	1	23	0	0	0	0	23
F00514	Winter	VP2	17/02/2026	08:45:00	1	0	50	0	0	0	50
F00523	Winter	VP2	17/02/2026	09:22:00	1	16	0	0	0	0	16

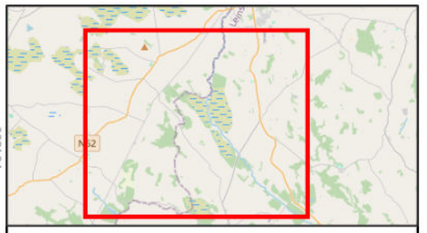
Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	1	1	-	-	-	2	-	-	-	-	1	-	-	2	-	1	-	-	-	-	-	-	-	-
2022/2023	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2020/2021	-	-	-	1	1	2	-	1	-	-	-	-	-	1	-		-	-	-	-	-	-	-	-
2023	-	-	-	3	-	-	1	2	-	1	-	-	-	-	-	-	-	-	1	-	1	2	-	4
2023/2024	-	1	-	1	-	-	-	4	-	-	-	1	-	1	-	1	-	-	-	2	-	2	-	1
2024	-	1	-	3	-	1	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	3	-	1

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00022	Winter	VP	VP2	30/10/2025	07:25:00	4	N/A	Perched
P00052	Winter	HH roost	HHVP1	14/10/2025	17:55:00	5	WL2	Perched

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00196	Winter	Transect	T3	20/11/2025	11:25:00	8	N/A	N/A
P00276	Winter	HH roost	HHVP1	24/11/2025	15:44:00	2	FW2	in flight
P00278	Winter	HH roost	HHVP1	24/11/2025	16:13:00	11	WN7	on ground
P00389	Winter	VP	VP3	03/12/2025	N/A	3	N/A	on tree
P00421	Winter	Transect	T2, T5, T6	05/12/2025	08:54:00	2	PB1	in flight
P00481	Winter	HH roost	HHVP2	03/12/2025	15:25:00	9	WN7	N/A
P00483	Winter	HH roost	HHVP2	03/12/2025	15:57:00	3	WN7	N/A
P00582	Winter	HH roost	HHVP1	22/01/2026	17:27:00	9	WN7	on tree
P00640	Winter	HH roost	HHVP1	11/02/2026	17:25:00	9	WN7	N/A
P00805	Winter	Transect	T2	13/03/2026	16:22:00	2	WN7	Resting
P00810	Winter	HH roost	HHVP1	13/03/2026	18:34:00	2	WN7	Roosting

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	01/12/2025	N/A	8	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	09/02/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Riverstown bridge	09/02/2026	N/A	1	N/A	N/A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Cormorant

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 15:
Cormorant observations over the survey period (May 2020 – March 2026) Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-004.ApX-VP-CA-SUM-A_overview

Draft: A

8°0'0"W

53°3'45"N

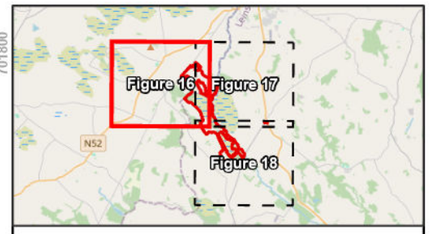
600000

701800

N

N52

WT59-21
WT63-20
WT54-20
WT55-20
WT66-20
WT77-23
WT109-23
WT3-20
WT204-24
WT86-24
WT11-20
WT52-20
WT21-20
WT49-20
WT78-24
WT145-24



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 16:
Cormorant observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-004.ApX.BBS-VP-CA-SUM-A

Draft: A

7°55'0"W

53°3'45"N

N

Roscrea Road

Grove Street

N52

WT131-23
WT99-24
WT112-24
WT137-23
WT54-20
WT55-20
WT45-23
WT70-20
WT44-23
WT64-24
WT1-23
WT197-24
WT118-23
WT194-24
WT14-21
WT77-23
WT101-24
WT11-24
WT172-24
WT73-24
WT109-23
WT132-24
WT195-24
WT65-23
WT115-24
WT204-24
WT179-24
WT11-20
WT166-24
WT75-20
WT52-20
WT201-24
WT203-24
WT46-24
WT21-20
WT78-24
WT99-20
WT46-20
WT119-23
WT5-23
WT45-20
WT145-24
WT36-21
WT32-23
WT186-24
WT91-23
WT369
WT29-23
WT54-24
WT130-23
WT40
WT167-24
WT10-20
WT16
WT39
WT93-24
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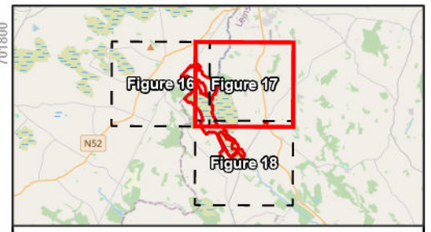
WT39-24
WT28-20

606000



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 17:
Cormorant observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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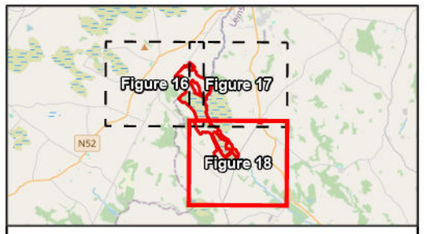
Map Ref: 11333-004.ApX.BBS-VP-CA-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 250 500
Meters

Spatial Reference
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 18:
Cormorant observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

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K.Kale	J.Sherry	April 2026

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Map Ref: 11333-004.ApX.BBS-VP-CA-SUM-A

Draft: A

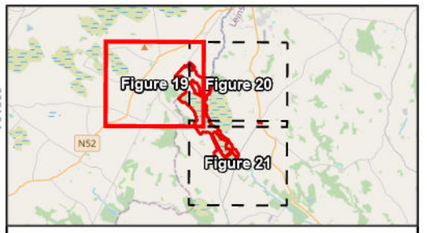
8°0'0"W

53°3'45"N

600000

701800

N



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Cormorant

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 19:
Cormorant observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:15,000

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Map Ref: 11333-004.ApX.WBS-CA-SUM-A

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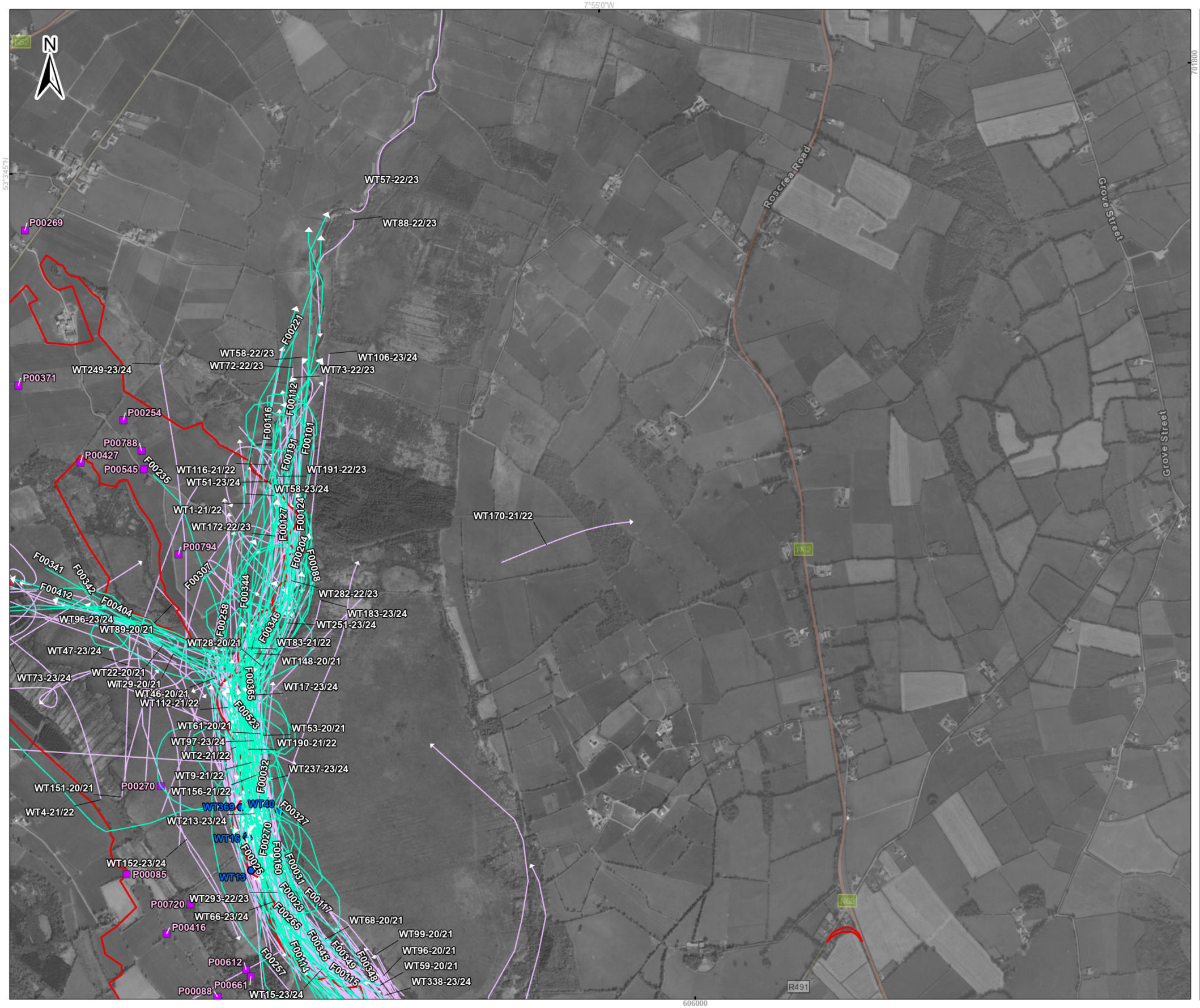

Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Cormorant

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 20:
Cormorant observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
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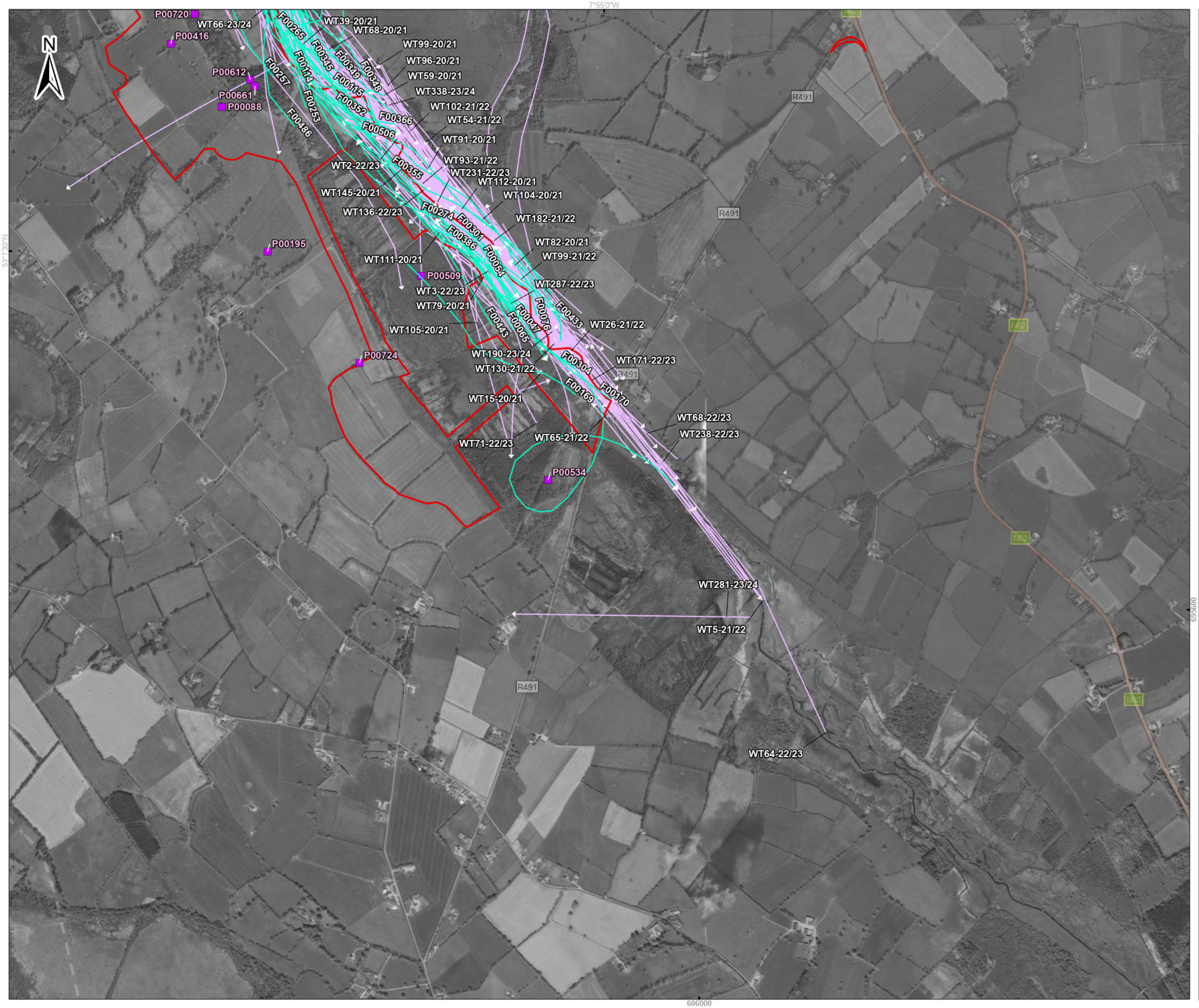
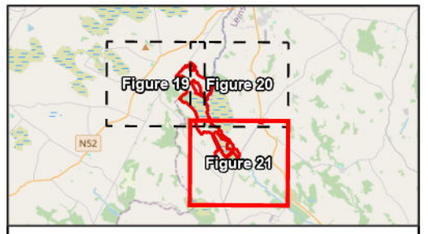
Map Ref: 11333-004.ApX.WBS-CA-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Cormorant

Flightlines - Ecology Ireland 2020 - 2024

- Cormorant

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 21:
Cormorant observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-004.ApX.WBS-CA-SUM-A

Draft: A

Appendix 7-1 - VI GOLDEN PLOVER

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD1-20/21	Wintering	VP, 4	08/10/2020	08:50:00	100	30	100m	30	0
WD3-20/21	Wintering	VP, 5	08/10/2020	10:38:00	15	90	30m	90	0
WD4-20/21	Wintering	VP, 5	08/10/2020	10:45:00	15	15	65m	5	10
WD23-20/21	Wintering	VP, 2	04/12/2020	09:43:00	28	840	100m	0	840
WD28-20/21	Wintering	VP, 4	04/12/2020	12:45:00	20	120	100m	0	120
WD29-20/21	Wintering	VP, 1	04/12/2020	12:58:00	1	130	40m	0	130
WD31-20/21	Wintering	VP, 5	04/12/2020	13:02:00	10	10	62.5m	0	10
WD33-20/21	Wintering	VP, 2	14/01/2021	12:19:00	100	67	45m	0	67
WD35-20/21	Wintering	VP, 1	21/01/2021	10:44:00	50	30	100m	30	0
WD36-20/21	Wintering	VP, 1	21/01/2021	13:25:00	50	60	100m	60	0
N/A	Wintering	VP1	09/02/2021	11:25:00	22	30	15m	-	-
WD39-20/21	Wintering	VP, 4	09/02/2021	14:45:00	150	180	65m	0	180
WD47-20/21	Wintering	VP1	09/02/2021	14:40:00	4	20	15m	20	0
WD41-20/21	Wintering	VP, 4	08/03/2021	11:44:00	120	243	90m	243	0
WD42-20/21	Wintering	VP, 4	08/03/2021	12:14:00	65	270	150m	270	0
WD43-20/21	Wintering	VP, 2	08/03/2021	12:19:00	7	45	125m	10	35
WD44-20/21	Wintering	VP, 4	08/03/2021	12:30:00	25	106	50m	60	46
WD45-20/21	Wintering	VP, 3	08/03/2021	13:56:00	15	48	100m	0	48
WD46-20/21	Wintering	VP, 3	08/03/2021	14:56:00	25	15	100m	0	15
WD7-21/22	Wintering	VP4	14/01/2022	09:26:00	100	154	25m	150	4
WD8-21/22	Wintering	VP4	14/01/2022	09:31:00	50	58	25m	22	36
WD9-21/22	Wintering	VP2	17/01/2022	10:19:00	30	131	100m	0	131
N/A	Wintering	VP5	14/03/2022	12:25:00	450	0	25m	0	Unknown

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD14-21/22	Wintering	VP3	14/03/2022	13:36:00	300	30	100m	0	30
WD8-22/23	Wintering	VP4	30/11/2022	12:38:00	100	30	62.5m	0	30
WD9-22/23	Wintering	VPA	30/11/2022	12:46:00	20	70	62.5m	0	70
WD16-22/23	Wintering	VPA	20/12/2022	14:35:00	9	51	55m	51	0
WD18-22/23	Wintering	VP3	20/12/2022	14:37:00	6	40	62.5m	40	0
WD32-22/23	Wintering	VP1	27/03/2023	08:44:00	400	240	62.5m	0	240
WD33-22/23	Wintering	VP5	27/03/2023	09:35:00	100	314	55m	0	314
WD34-22/23	Wintering	VPA	27/03/2023	09:43:00	40	46	62.5m	0	46
WD35-22/23	Wintering	VP1, VP5	27/03/2023	10:08:00	22	77	62.5m	35	42
WD36-22/23	Wintering	VP1	27/03/2023	10:09:00	400	6	15m	3	3
WD37-22/23	Wintering	VPA	27/03/2023	10:18:00	60	185	62.5m	0	185
WD38-22/23	Wintering	VP1	27/03/2023	10:25:00	36	180	15m	90	90
WD39-22/23	Wintering	VPA	27/03/2023	10:45:00	21	47	62.5m	0	47
WD41-22/23	Wintering	VPB	27/03/2023	11:01:00	12	20	62.5m	18	2
WD42-22/23	Wintering	VP1	27/03/2023	12:33:00	36	16	15m	6	10
WD43-22/23	Wintering	VP1, JD, (VP5	27/03/2023	12:50:00	700	1200	15m	0	1200
WD44-22/23	Wintering	VPA	27/03/2023	13:08:00	50	101	62.5m	0	101
WD45-22/23	Wintering	VP1, VP5	27/03/2023	14:30:00	50	360	62.5m	0	360
WD6-23	Breeding	VPA	26/09/2023	10:22:00	300	1200	62.5m	0	1200
WD7-23	Breeding	VPA	26/09/2023	11:17:00	200	600	62.5m	0	600
WD8-23	Breeding	VPA	26/09/2023	11:23:00	30	30	62.5m	0	30
WD12-23/24	Wintering	VP5, VP2	24/10/2023	09:10:00	80	12	60m	0	12
WD17-23/24	Wintering	VPB	24/10/2023	12:45:00	17	70	150m	25	45
WD3-23/24	Wintering	VP2	24/10/2023	09:38:00	40	15	62.5m	10	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD4-23/24	Wintering	VP2	24/10/2023	09:50:00	70	640	62.5m	0	640
WD7-23/24	Wintering	VP3	24/10/2023	09:24:00	16	45	50m	45	0
WD20-23/24	Wintering	VP2	27/11/2023	10:16:00	50	160	62.5m	0	160
WD21-23/24	Wintering	VP2	27/11/2023	10:53:00	50	42	62.5m	0	42
WD22-23/24	Wintering	VP2	27/11/2023	11:02:00	20	53	62.5m	0	53
WD23-23/24	Wintering	VP2	27/11/2023	12:00:00	30	53	62.5m	0	53
WD26-23/24	Wintering	VP5	27/11/2023	10:56:00	150	-	100m	-	-
WD28-23/24	Wintering	VPA	27/11/2023	11:59:00	80	62	75m	0	62
WD29-23/24	Wintering	VPA	27/11/2023	12:03:00	30	56	35m	0	56
WD18-23/24	Wintering	VP3	14/12/2023	10:32:00	50	189	175m	0	189
WD19-23/24	Wintering	VP3	14/12/2023	13:25:00	55	166	100m	0	166
WD35-23/24	Wintering	VP4	11/01/2024	09:10:00	30	30	62.5m	20	10
WD36-23/24	Wintering	VP4	11/01/2024	09:45:00	100	600	100m	0	600
WD37-23/24	Wintering	VP4	11/01/2024	10:25:00	100	100	100m		100
WD38-23/24	Wintering	VP4	11/01/2024	11:05:00	100	70	100m		70
WD39-23/24	Wintering	VP2	25/01/2024	09:04:00	20	30	100m	10	20
WD42-23/24	Wintering	VP3	25/01/2024	09:03:00	25	120	62.5m	0	120
WD43-23/24	Wintering	VP1	23/02/2024	08:54:00	19	80	62.5m	0	80
WD44-23/24	Wintering	VP1	23/02/2024	09:40:00	30	90	62.5m	0	90
WD45-23/24	Wintering	VP1	23/02/2024	13:02:00	300	120	100m+	0	120
WD46-23/24	Wintering	VP1	23/02/2024	13:38:00	250	600	62.5m	0	600
WD48-23/24	Wintering	VPA	26/02/2024	09:45:00	25	120	62.5m	0	120
WD52-23/24	Wintering	VPA	26/02/2024	10:59:00	50	120	62.5m	0	120
WD54-23/24	Wintering	VP3	21/03/2024	09:30:00	200	360	62.5m	0	360
N/A	Wintering	VPA	27/03/2024	14:20:00	10	40	62.5m	-	-

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD56-23/24	Wintering	VPA	27/03/2024	10:37:00	100	180	100m	0	180
WD57-23/24	Wintering	VPB	27/03/2024	14:37:00	20	48	62.5m	3	55
WD4-24	Breeding	VP4	24/09/2024	09:10:00	8	70	62.5m	70	0
WD6-24	Breeding	VP4	24/09/2024	11:05:00	70	120	100m	60	60

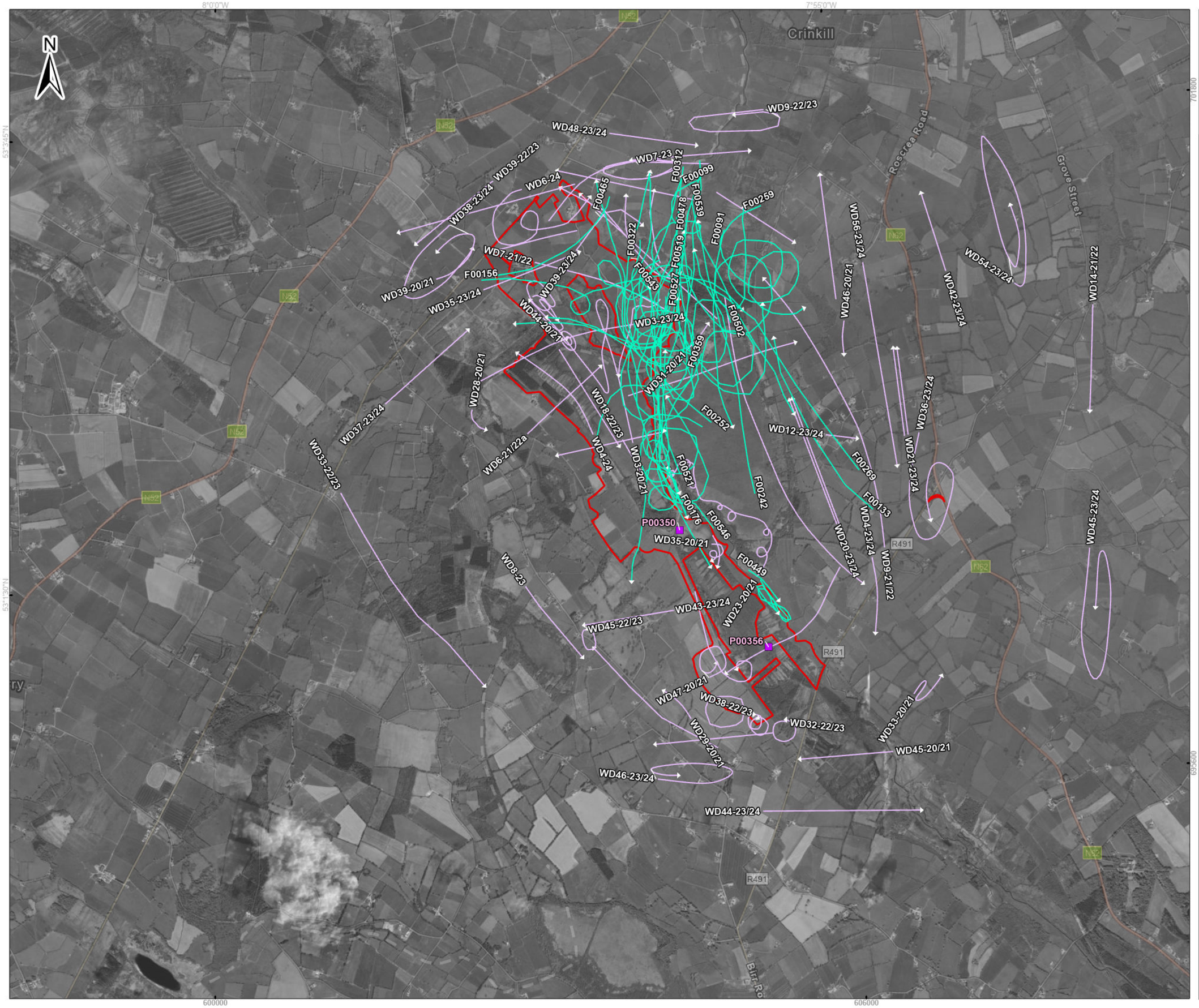
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00091	Winter	VP1	27/11/2025	11:52:00	17	0	0	0	0	36	36
F00094	Winter	VP1	27/11/2025	12:33:00	61	85	61	129	0	0	275
F00099	Winter	VP1	27/11/2025	12:54:00	62	8	23	167	0	0	198
F00105	Winter	VP1	27/11/2025	14:04:00	10	0	0	0	0	65	65
F00133	Winter	VP3	28/11/2025	08:59:00	36	0	0	76	0	0	76
F00138	Winter	VP3	28/11/2025	09:50:00	33	0	6	53	0	0	59
F00143	Winter	VP3	28/11/2025	11:53:00	72	0	45	52	0	0	97
F00156	Winter	VP3	28/11/2025	13:48:00	62	0	0	78	0	0	78
F00176	Winter	VP4	10/12/2025	09:51:00	300	0	0	30	200	0	230
F00242	Winter	VP2	03/12/2025	10:00:00	32	0	0	55	0	0	55
F00252	Winter	VP2	03/12/2025	12:30:00	29	0	0	0	0	71	71
F00259	Winter	VP2	03/12/2025	13:40:00	600	0	0	0	0	352	352
F00269	Winter	VP3	04/12/2025	09:19:00	121	0	0	0	0	59	59

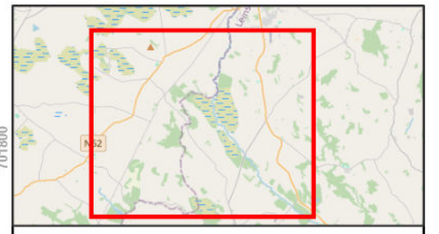
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00312	Winter	VP1	27/01/2026	09:12:00	68	0	0	68	0	0	68
F00320	Winter	VP1	27/01/2026	11:30:00	27	0	0	76	0	0	76
F00322	Winter	VP1	27/01/2026	11:34:00	10	0	0	0	72	0	72
F00359	Winter	VP3	23/01/2026	12:27:00	52	0	0	72	21	0	93
F00371	Winter	VP5	09/02/2026	11:22:00	25	185	0	0	0	0	185
F00408	Winter	VP2	12/02/2026	10:05:00	27	0	0	49	0	0	49
F00449	Winter	VP5	24/02/2026	12:32:00	60	0	25	0	0	0	25
F00465	Winter	VP1	24/02/2026	16:00:00	8	0	0	36	0	0	36
F00478	Winter	VP2	25/02/2026	14:42:00	167	0	0	89	22	0	111
F00502	Winter	VP3	26/02/2026	16:27:00	59	0	0	0	0	69	69
F00519	Winter	VP2	17/02/2026	09:03:00	24	0	0	59	0	0	59
F00521	Winter	VP2	17/02/2026	09:20:00	121	0	0	0	0	89	89
F00527	Winter	VP2	17/02/2026	09:48:00	48	0	0	51	12	0	63
F00529	Winter	VP2	17/02/2026	09:57:00	228	0	0	124	47	0	171
F00530	Winter	VP2	17/02/2026	10:04:00	61	0	20	36	0	0	56
F00531	Winter	VP2	17/02/2026	10:47:00	93	0	0	51	0	0	51
F00539	Winter	VP2	17/02/2026	12:12:00	72	0	0	0	0	48	48
F00543	Winter	VP2	17/02/2026	13:00:00	4	0	54	21	0	0	75
F00545	Winter	VP2	17/02/2026	13:23:00	520	0	0	0	0	64	64
F00546	Winter	VP2	17/02/2026	13:24:00	51	0	0	71	0	0	71

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2022/2023	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-
2020/2021	-	-	-	12	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023/2024	-	-	-	11	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00350	Winter	Transect	T3	11/12/2025	11:00:00	80	GS4	on ground
P00356	Winter	HH roost	HHVP2	10/12/2025	16:15:00	90	PB4	in flight

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	400	N/A	N/A
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	1700	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	2500	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	1200	N/A	N/A
Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	4000	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	12/03/2026	N/A	15	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	12/03/2026	N/A	474	N/A	N/A





Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Golden Plover

Flightlines - Ecology Ireland 2020 - 2024

- Golden Plover

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 22:
Golden Plover observations over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-005.ApX-VP-GP-SUM-A

Draft: A

Appendix 7-1 - VII GREY HERON

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT1-20	Breeding	VP5	28/04/2020	10:12:00	1	180	40m	0	180
WT5-20	Breeding	VP5	28/04/2020	12:22:00	1	-	30m	-	-
WT8-20	Breeding	VP1	28/04/2020	15:18:00	1	20	15m	20	0
WT13-20	Breeding	VP2	14/05/2020	09:21:00	2	20	27.5m	20	0
WT14-20	Breeding	VP3	14/05/2020	09:33:00	2	210	65m	100	110
WT15-20	Breeding	VP4	14/05/2020	09:46:00	1	25	35m	10	15
WT19-20	Breeding	VP1	14/05/2020	10:26:00	1	30	15m	15	15
WT22-20	Breeding	VP2	14/05/2020	10:35:00	1	20	17.5m	4	16
WT30-20	Breeding	VP2	14/05/2020	11:14:00	1	20	20m	20	0
WT33-20	Breeding	VP1	14/05/2020	12:15:00	1	20	15m	20	0
WT42-20	Breeding	VP3	14/05/2020	14:47:00	2	99	45m	0	99
WT43-20	Breeding	VP1	04/06/2020	08:49:00	2	45	7.5m	25	20
WT50-20	Breeding	VP2	04/06/2020	09:46:00	1	22	45m	22	0
WT51-20	Breeding	VP2, VP1	04/06/2020	09:59:00	2	58	17.5m	58	0
WT58-20	Breeding	VP4, VP3	04/06/2020	12:05:00	1	345	97.5m	300	45
WT61-20	Breeding	VP1	04/06/2020	12:19:00	1	5	5m	5	0
WT65-20	Breeding	VP4	04/06/2020	12:38:00	1	40	20m	40	0
WT67-20	Breeding	VP4	04/06/2020	13:24:00	1	70	22.5m	15	55
N/A	Breeding	VP3	10/07/2020	14:25:00	2	10	30m	10	0
WT79-20	Breeding	VP3	10/07/2020	09:29:00	2	120	22.5m	120	0
WT88-20	Breeding	VP5	10/07/2020	11:26:00	1	15	15m	0	15
WT30-20/21	Wintering	VP, 1	08/10/2020	14:24:00	1	10	4m	0	10
WT35-20/21	Wintering	VP, 3	05/11/2020	09:45:00	1	25	12.5m	5	20

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT88-20/21	Wintering	VP, 2, VP, 1	04/12/2020	14:25:00	1	40	80m	25	15
WT150-20/21	Wintering	VP3	14/01/2021	11:13:00	1	65	15m	0	65
WT152-20/21	Wintering	VP3	14/01/2021	13:08:00	1	40	10m	20	20
WT108-20/21	Wintering	VP, 1	21/01/2021	09:32:00	1	60	10m	60	0
WT109-20/21	Wintering	VP, 1	21/01/2021	11:22:00	1	10	15m	10	0
WT110-20/21	Wintering	VP, 1	21/01/2021	11:37:00	1	30	10m	30	0
WT155-20/21	Wintering	VP1	09/02/2021	09:50:00	1	15	15m	15	0
WT156-20/21	Wintering	VP1	09/02/2021	10:05:00	1	20	15m	18	2
WT128-20/21	Wintering	VP, 3	08/03/2021	10:25:00	1	66	17.5m	66	0
WT147-20/21	Wintering	VP, 2	08/03/2021	15:05:00	1	90	42.5m	0	90
WT10-21	Breeding	VP3	23/04/2021	12:42:00	1	25	20m	10	15
WT12-21	Breeding	VP3	23/04/2021	14:24:00	1	15	20m	5	10
WT18-21	Breeding	VP5	23/04/2021	11:35:00	1	30	17.5m	10	20
WT19-21	Breeding	VP5	23/04/2021	12:45:00	1	20	17.5m	5	15
WT2-21	Breeding	VP2	23/04/2021	10:08:00	1	40	25m	40	0
WT6-21	Breeding	VP2	23/04/2021	12:36:00	2	23	10m	23	0
WT7-21	Breeding	VP2	23/04/2021	14:26:00	1	62	12.5m	62	0
WT8-21	Breeding	VP2	23/04/2021	14:26:00	1	42	12.5m	42	0
WT42-21	Breeding	VP1	14/06/2021	10:32:00	1	10	62.5m	0	10
WT46-21	Breeding	VP1	18/08/2021	09:00:00	1	201	40m	120	81
WT48-21	Breeding	VP1, VP2, VP4	18/08/2021	10:45:00	4	216	90m	60	156
WT49-21	Breeding	VP1, VP2	18/08/2021	11:10:00	2	45	40m	10	35
WT23-21/22	Wintering	VP1	23/11/2021	12:53:00	1	228	5m	114	114

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT68-21/22	Wintering	VP3	02/12/2021	14:30:00	1	30	5m	30	0
WT159-21/22	Wintering	VP3	10/02/2022	14:18:00	1	280	25m	0	280
WT191-21/22	Wintering	VP4, VP5	14/03/2022	09:02:00	2	108	20m	63	45
WT193-21/22	Wintering	VP5	14/03/2022	09:23:00	2	59	25m	0	59
WT194-21/22	Wintering	VP2	14/03/2022	09:44:00	1	73	30m	60	13
WT200-21/22	Wintering	VP1, VP2	14/03/2022	10:52:00	1	96	20m	6	90
WT1-22/23	Wintering	VP1	28/11/2022	09:25:00	1	5	7.5m	0	5
WT36-22/23	Wintering	VPA	30/11/2022	10:54:00	2	300	2.5m	300	0
WT47-22/23	Wintering	VP4, VP3	30/11/2022	11:45:00	1	60	62.5m	4	56
WT100-22/23	Wintering	VPB	20/12/2022	11:59:00	1	9	2.5m	3	6
WT109-22/23	Wintering	VPA	20/12/2022	13:07:00	1	10	10m	5	5
WT112-22/23	Wintering	VPB	20/12/2022	13:47:00	1	3	2.5m	3	0
WT116-22/23	Wintering	VPB	20/12/2022	14:27:00	2	17	2.5m	8	9
WT118-22/23	Wintering	VPA	20/12/2022	14:34:00	1	20	5m	0	20
WT121-22/23	Wintering	VPB	20/12/2022	14:36:00	1	720	2.5m	0	720
WT92-22/23	Wintering	VP3	20/12/2022	11:03:00	1	10	2.5m	0	10
WT123-22/23	Wintering	VP2	21/12/2022	08:53:00	2	22	5m	22	0
WT125-22/23	Wintering	VP2	21/12/2022	09:25:00	1	3	7.5m	3	0
WT140-22/23	Wintering	VP1	21/12/2022	13:00:00	1	2	15m	2	0
WT144-22/23	Wintering	VP1	21/12/2022	13:13:00	1	25	15m	15	10
WT267-22/23	Wintering	VP2	25/01/2023	12:20:00	2	120	0m		120
WT288-22/23	Wintering	VP1	25/01/2023	12:30:00	1	60	10m	0	60
WT299-22/23	Wintering	VP5	25/01/2023	14:42:00	1	30	20m		
WT244-22/23	Wintering	VPA	27/01/2023	10:10:00	1	60	2.5m		60
WT252-22/23	Wintering	VPA	27/01/2023	15:11:00	1	18	25m	9	9

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT277-22/23	Wintering	VP3, VPB	27/01/2023	11:39:00	2	114	45m	104	10
WT155-22/23	Wintering	VP4	20/02/2023	09:20:00	1	10	5m	0	10
WT157-22/23	Wintering	VPA	20/02/2023	09:38:00	1	15	15m	15	0
WT158-22/23	Wintering	VP3, VP2	20/02/2023	09:41:00	1	36	15m	20	16
WT159-22/23	Wintering	VP1	20/02/2023	09:46:00	1	5	25m	0	5
WT163-22/23	Wintering	VP2, VP3, VP1	20/02/2023	10:39:00	1	192	62.5m	0	192
WT164-22/23	Wintering	VP1	20/02/2023	10:40:00	1	50	60m	0	50
WT165-22/23	Wintering	VPA	20/02/2023	10:45:00	1	58	50m	5	53
WT170-22/23	Wintering	VP4	20/02/2023	12:03:00	1	20	5m	16	4
WT174-22/23	Wintering	VP2	20/02/2023	12:43:00	1	164	62.5m	110	54
WT182-22/23	Wintering	VPA	27/03/2023	08:42:00	2	7200	2.5m	7200	0
WT185-22/23	Wintering	VP1	27/03/2023	08:57:00	1	90	62.5m	0	90
WT186-22/23	Wintering	VP1	27/03/2023	08:57:00	1	90	15m	0	90
WT198-22/23	Wintering	VP1	27/03/2023	09:51:00	1	7	2.5m	7	0
WT207-22/23	Wintering	VP1	27/03/2023	10:29:00	1	23	2.5m	15	8
WT210-22/23	Wintering	VP2	27/03/2023	10:42:00	1	12	25m	12	0
WT211-22/23	Wintering	VPB	27/03/2023	10:44:00	1	20	15m	20	0
WT216-22/23	Wintering	VP1, VP2	27/03/2023	11:09:00	1	370	2.5m	370	0
WT222-22/23	Wintering	VP2	27/03/2023	11:28:00	1	5	15m	3	2
WT230-22/23	Wintering	VP2	27/03/2023	13:45:00	1	19	20m	19	0
WT235-22/23	Wintering	VP2	27/03/2023	14:48:00	2	25	40m	25	0
WT147-23	Breeding	VP5	01/05/2023	11:01:00	1	40	37.5m	15	25
WT2-23	Breeding	VPB	01/05/2023	09:32:00	1	39	15m	0	39
WT11-23	Breeding	VPA	02/05/2023	12:46:00	1	25	15m	25	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT12-23	Breeding	VPA, VP3	02/05/2023	13:11:00	1	353	62.5m	75	278
WT15-23	Breeding	VP1	02/05/2023	14:20:00	2	24	8m	20	4
WT6-23	Breeding	VPA	02/05/2023	09:35:00	1	125	15m	62	63
WT9-23	Breeding	VPA	02/05/2023	11:31:00	1	16	15m	16	0
N/A	Breeding	VP2	03/05/2023	14:10:00	1	0	-	-	-
WT24-23	Breeding	VP2	23/06/2023	12:19:00	1	52	62.5m	0	52
WT27-23	Breeding	VP2	23/06/2023	14:35:00	1	251	62.5m	0	251
N/A	Breeding	VP5	20/07/2023	11:31:00	1	0	2.5m	-	-
WT37-23	Breeding	VPA	20/07/2023	09:17:00	3	52	2.5m	52	0
WT58-23	Breeding	VPB	27/07/2023	09:18:00	1	163	15m	73	90
WT60-23	Breeding	VP1	27/07/2023	09:37:00	1	3	2.5m	0	3
WT61-23	Breeding	VP1, VP2	27/07/2023	09:39:00	1	29	15m	14	15
WT63-23	Breeding	VP1	27/07/2023	10:45:00	1	14	15m	4	10
N/A	Breeding	VP2	28/08/2023	09:37:00	1	0	-	-	-
WT101-23	Breeding	VP3, VP5	28/08/2023	10:48:00	1	70	15m	70	0
WT102-23	Breeding	VP1	28/08/2023	10:57:00	1	18	15m	16	2
WT110-23	Breeding	VP1	28/08/2023	12:52:00	1	14	55m	14	0
WT122-23	Breeding	VP1	28/08/2023	14:15:00	1	54	30m	40	14
WT81-23	Breeding	VP2	28/08/2023	09:47:00	1	27	20m	27	0
WT86-23	Breeding	VPA	28/08/2023	09:06:00	2	87	10m	0	87
WT95-23	Breeding	VP4	28/08/2023	10:28:00	1	5	20m	0	5
WT141-23	Breeding	VP3	26/09/2023	13:19:00	1	12	4m	12	0
WT142-23	Breeding	VPA	26/09/2023	13:28:00	1	10	2.5m	10	0
WT11-23/24	Wintering	VP2	24/10/2023	13:45:00	1	20	2.5m	0	20
WT18-23/24	Wintering	VP3	24/10/2023	10:33:00	1	20	30m	20	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT20-23/24	Wintering	VP3	24/10/2023	14:01:00	1	40	35m	30	10
WT36-23/24	Wintering	VP4	24/10/2023	11:01:00	1	24	62.5m	0	24
WT38-23/24	Wintering	VP4	24/10/2023	12:26:00	1	26	15m	6	20
WT61-23/24	Wintering	VPB	24/10/2023	10:59:00	1	118	10m	90	28
N/A	Wintering	VPB	20/12/2023	10:36:00	1	1	2.5m	-	-
WT148-23/24	Wintering	VP1	20/12/2023	12:55:00	1	5	10m	0	5
WT154-23/24	Wintering	VP3	20/12/2023	09:05:00	1	91	12.5m	91	0
WT155-23/24	Wintering	VP3	20/12/2023	09:25:00	1	97	10m	97	0
WT161-23/24	Wintering	VP3	20/12/2023	14:01:00	1	10	10m	10	0
WT164-23/24	Wintering	VPA	20/12/2023	08:38:00	2	21600	2.5m	21600	0
WT202-23/24	Wintering	VP1	25/01/2024	13:50:00	1	142	15m	0	142
WT203-23/24	Wintering	VP1	25/01/2024	13:57:00	1	43	15m	43	0
WT212-23/24	Wintering	VP2	25/01/2024	14:00:00	1	120	-	0	120
WT225-23/24	Wintering	VP3	25/01/2024	13:47:00	3	252	62.5m	52	200
WT227-23/24	Wintering	VP3	25/01/2024	14:48:00	1	85	62.5m	85	0
WT232-23/24	Wintering	VP4	25/01/2024	13:56:00	1	10	35m	10	0
WT239-23/24	Wintering	VP5	29/01/2024	13:50:00	3	55	62.5m	0	55
WT266-23/24	Wintering	VPA	02/02/2024	11:25:00	1	25	15m	18	7
WT271-23/24	Wintering	VPA	02/02/2024	12:54:00	2	20	2.5m	15	5
WT276-23/24	Wintering	VP1	23/02/2024	08:53:00	1	44	62.5m	0	44
WT282-23/24	Wintering	VP2, VP1	23/02/2024	09:43:00	1	139	62.5m	69	70
WT283-23/24	Wintering	VP1	23/02/2024	09:50:00	2	35	15m	0	35
WT284-23/24	Wintering	VP1	23/02/2024	09:52:00	1	44	62.5m	0	44
WT285-23/24	Wintering	VP1	23/02/2024	10:09:00	1	12	2.5m	0	12
WT291-23/24	Wintering	VP2	23/02/2024	08:32:00	1	107	62.5m	70	37

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT293-23/24	Wintering	VP2	23/02/2024	08:45:00	3	208	62.5m	104	104
WT294-23/24	Wintering	VP2	23/02/2024	11:10:00	1	2	5m - 25m	0	2
WT308-23/24	Wintering	VPA	26/02/2024	08:54:00	1	21600	2.5m	21600	0
WT317-23/24	Wintering	VPB	26/02/2024	10:01:00	1	10	2.5m	0	10
WT327-23/24	Wintering	VP1, VP2	21/03/2024	11:00:00	4	45	20m	5	40
WT331-23/24	Wintering	VP1	21/03/2024	12:41:00	1	73	62.5m	0	73
WT332-23/24	Wintering	VP2, VP1	21/03/2024	12:52:00	1	161	62.5m	5	156
WT336-23/24	Wintering	VP1	21/03/2024	09:52:00	2	4	30m	4	0
WT346-23/24	Wintering	VP3	21/03/2024	08:56:00	1	27	15m	24	3
WT348-23/24	Wintering	VP3	21/03/2024	09:16:00	1	29	62.5m	25	4
WT351-23/24	Wintering	VP3	21/03/2024	09:28:00	2	52	15m	26	26
WT360-23/24	Wintering	VP3	21/03/2024	11:01:00	4	60	62.5m	60	0
WT361-23/24	Wintering	VP3	21/03/2024	11:24:00	5	21	15m	21	
WT364-23/24	Wintering	VP3	21/03/2024	11:55:00	1	20	62.5m	20	0
WT367-23/24	Wintering	VP3	21/03/2024	12:50:00	1	120	62.5m	60	60
WT370-23/24	Wintering	VP3	21/03/2024	13:03:00	1	46	62.5m	40	6
WT371-23/24	Wintering	VP3	21/03/2024	13:27:00	1	50	62.5m	25	25
WT373-23/24	Wintering	VP3	21/03/2024	13:58:00	1	20	62.5m	12	8
WT375-23/24	Wintering	VP4	27/03/2024	09:09:00	2	8	10m	2	6
WT385-23/24	Wintering	VPA	27/03/2024	09:30:00	1	30	2.5m	0	30
WT397-23/24	Wintering	VPA, VPB	27/03/2024	14:17:00	4	120	62.5m	0	120
WT401-23/24	Wintering	VPB	27/03/2024	09:27:00	1	55	62.5m	0	55
WT406-23/24	Wintering	VPB	27/03/2024	11:51:00	1	56	62.5m	0	56
WT1-24	Breeding	VPA	28/05/2024	10:15:00	1	10	6m	5	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT13-24	Breeding	VPA	28/05/2024	13:48:00	1	32	10m	32	0
WT15-24	Breeding	VPA	28/05/2024	15:01:00	1	72	10m	30	42
WT3-24	Breeding	VPA	28/05/2024	10:21:00	1	8	5m	8	0
WT22-24	Breeding	VP4	29/05/2024	11:57:00	1	120	22.5m	90	30
N/A	Breeding	VP1	31/05/2024	10:40:00	1	Unknown	0m	-	-
WT28-24	Breeding	VP2	31/05/2024	10:04:00	1	12	62.5m	12	0
WT29-24	Breeding	VP2	31/05/2024	10:16:00	1	204	100m	0	204
WT31-24	Breeding	VP1	31/05/2024	10:43:00	1	900	2.5m	900	0
WT32-24	Breeding	VP2	31/05/2024	10:47:00	1	10	2.5m	10	0
WT34-24	Breeding	VP1	31/05/2024	11:25:00	1	120	17.5m	120	0
WT35-24	Breeding	VP2	31/05/2024	12:10:00	1	6	15m	6	0
WT36-24	Breeding	VP3	31/05/2024	12:12:00	1	42	32.5m	42	0
WT37-24	Breeding	VP2	31/05/2024	12:52:00	1	9	62.5m	9	0
WT41-24	Breeding	VP1, VP2	31/05/2024	13:27:00	1	143	62.5m	120	23
WT42-24	Breeding	VP2	31/05/2024	13:38:00	1	14	62.5m	0	14
WT43-24	Breeding	VP2	31/05/2024	14:19:00	1	176	62.5m	0	176
WT45-24	Breeding	VP1	31/05/2024	14:35:00	1	Unknown	2.5m	Unknown	Unkown
WT48-24	Breeding	VP3	24/06/2024	08:59:00	1	154	2.5m	154	0
WT49-24	Breeding	VP3	24/06/2024	09:02:00	1	27	15m	24	3
WT55-24	Breeding	VPB, VP3	24/06/2024	10:22:00	1	102	40m	90	12
WT70-24	Breeding	VPA	27/06/2024	10:10:00	1	40	62.5m	35	5
WT71-24	Breeding	VPA	27/06/2024	10:15:00	2	20	15m	20	0
WT74-24	Breeding	VPA	27/06/2024	13:20:00	1	10	2.5m	10	0
WT75-24	Breeding	VPA	27/06/2024	13:39:00	1	90	62.5m	0	90
WT76-24	Breeding	VPA	27/06/2024	13:50:00	1	15	2.5m	15	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT77-24	Breeding	VPA	27/06/2024	13:51:00	1	60	62.5m	60	0
WT80-24	Breeding	VP1	24/07/2024	09:58:00	1	16	2.5m	14	2
WT84-24	Breeding	VP3	24/07/2024	10:46:00	1	30	25m	30	0
WT85-24	Breeding	VP3	24/07/2024	11:08:00	1	55	30m	45	10
WT92-24	Breeding	VP4	24/07/2024	12:07:00	1	65	62.5m	30	35
WT102-24	Breeding	VPA	29/07/2024	11:47:00	1	6	2.5m	6	0
WT98-24	Breeding	VPA	29/07/2024	09:24:00	1	60	7.5m	60	0
WT128-24	Breeding	VP4	23/08/2024	14:34:00	1	22	40m	0	22
WT133-24	Breeding	VP1	28/08/2024	09:00:00	1	60	2.5m	60	0
WT136-24	Breeding	VP1	28/08/2024	09:15:00	1	10	2.5m	10	0
WT161-24	Breeding	VP1	23/09/2024	14:07:00	1	30	10m	5	25
WT162-24	Breeding	VP2	23/09/2024	14:29:00	1	11	4m	11	0
WT170-24	Breeding	VP5, VP3	24/09/2024	09:46:00	1	39	20m	15	24
WT177-24	Breeding	VP3	24/09/2024	11:32:00	1	55	30m	0	55
WT183-24	Breeding	VP5	24/09/2024	12:34:00	1	74	2.5m	0	74

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00043	Winter	VP4	16/10/2025	14:27:00	1	47	0	0	0	0	47
F00046	Winter	VP4	16/10/2025	17:17:00	1	10	28	0	0	0	38

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00049	Winter	VP5	17/10/2025	10:58:00	1	0	0	0	258	0	258
F00050	Winter	VP5	17/10/2025	11:45:00	1	0	10	45	0	0	55
F00066	Winter	VP5	19/11/2025	10:36:00	1	29	20	0	0	0	49
F00074	Winter	VP5	19/11/2025	14:52:00	1	27	0	0	0	0	27
F00281	Winter	VP3	04/12/2025	12:40:00	1	13	0	0	0	0	13
F00302	Winter	VP5	14/01/2026	09:47:00	1	15	0	0	0	0	15
F00303	Winter	VP5	14/01/2026	11:12:00	1	10	25	0	0	0	35
F00321	Winter	VP1	27/01/2026	11:31:00	2	21	0	0	0	0	21
F00358	Winter	VP3	23/01/2026	12:23:00	1	0	22	0	0	0	22
F00372	Winter	VP5	09/02/2026	11:30:00	2	20	0	0	0	0	20
F00377	Winter	VP5	09/02/2026	15:40:00	1	18	0	0	0	0	18
F00392	Winter	VP4	11/02/2026	11:38:00	1	19	0	0	0	0	19
F00406	Winter	VP2	12/02/2026	09:40:00	1	0	21	0	0	0	21
F00413	Winter	VP2	12/02/2026	11:42:00	3	13	0	0	0	0	13
F00427	Winter	VP4	23/02/2026	12:58:00	1	26	0	0	0	0	26
F00428	Winter	VP4	23/02/2026	13:47:00	1	31	0	0	0	0	31
F00429	Winter	VP4	23/02/2026	14:07:00	1	21	0	0	0	0	21
F00432	Winter	VP4	23/02/2026	16:44:00	1	0	44	0	0	0	44
F00434	Winter	VP4	23/02/2026	17:15:00	1	0	0	0	48	0	48
F00450	Winter	VP5	24/02/2026	12:50:00	1	19	20	0	0	0	39
F00453	Winter	VP1	24/02/2026	13:10:00	1	0	29	0	0	0	29
F00460	Winter	VP1	24/02/2026	14:50:00	1	0	31	0	0	0	31
F00468	Winter	VP1	24/02/2026	17:44:00	1	0	0	27	0	0	27
F00483	Winter	VP2	25/02/2026	16:55:00	1	7	0	0	0	0	7
F00484	Winter	VP2	25/02/2026	16:56:00	1	30	0	0	0	0	30

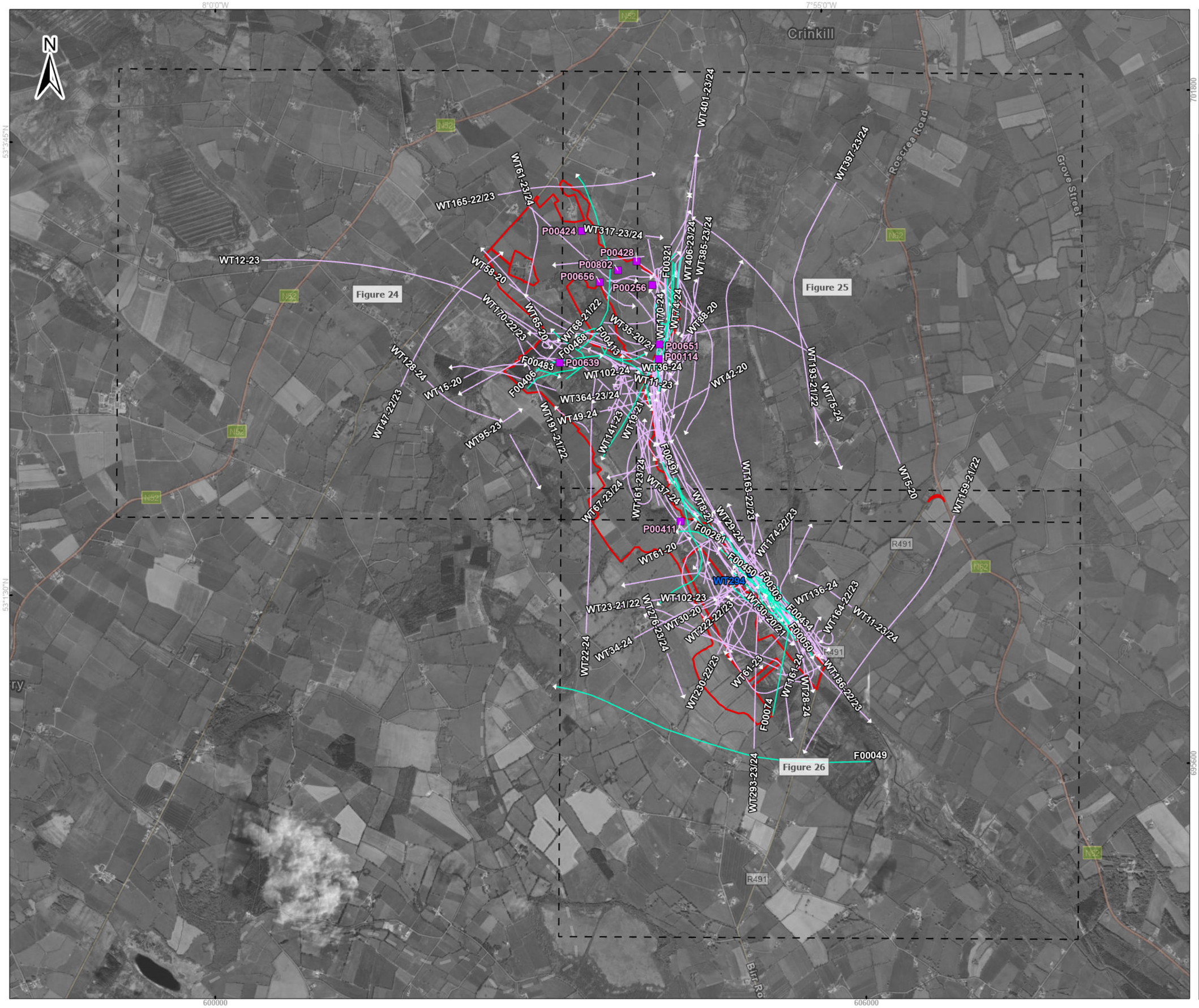
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00491	Winter	VP3	26/02/2026	13:44:00	1	0	15	0	0	0	15
F00500	Winter	VP3	26/02/2026	16:07:00	1	37	0	0	0	0	37
F00525	Winter	VP2	17/02/2026	09:37:00	2	0	0	44	32	0	76
F00537	Winter	VP2	17/02/2026	11:17:00	2	24	0	0	0	0	24
F00542	Winter	VP2	17/02/2026	12:42:00	1	0	16	0	0	0	16

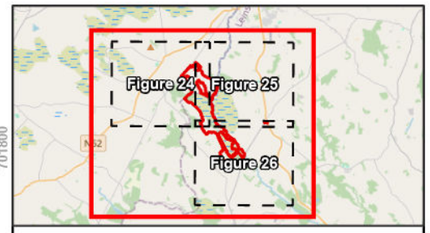
Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	1	-	-	-	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-
2022/2023	-	-	-	1	1	-	1	-	-	1	-	-	-	-	1	-	-	1	1	-	-	-	1	-
2020/2021	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
2023	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	-	-	1	-	1	-
2023/2024	-	-	-	1	1	-	1	1	-	1	-	-	-	-	1	1	1	1	1	-	2	1	1	-
2024	-	1	-	-	1	-	-	1	-	1	-	-	-	-	1	1	-	-	-	-	-	1	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00114	Winter	Transect	T6	14/10/2025	12:51:00	1	N/A	in flight
P00256	Winter	Transect	T2,5,6	24/11/2025	12:14:00	1	GA1	on ground
P00411	Winter	VP	VP3	04/12/2025	08:29:00	1	N/A	N/A

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00424	Winter	Transect	T2, T5, T6	05/12/2025	09:22:00	1	GA1	in flight
P00428	Winter	Transect	T2, T5, T6	05/12/2025	10:27:00	4	GS4	in flight
P00639	Winter	HH roost	HHVP1	11/02/2026	17:07:00	1	PB1	N/A
P00651	Winter	Transect	T1, T3, T4	11/02/2026	12:46:00	1	GA1	N/A
P00656	Winter	Transect	T1, T3, T4	11/02/2026	14:00:00	1	FW4	N/A
P00802	Winter	Transect	T6	13/03/2026	15:15:00	1	GA1	Foraging

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 10	15/10/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Site 13	15/10/2025	N/A	1	N/A	N/A
Winter	I-WeBS	New bridge Callows	26/11/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	01/12/2025	N/A	2	N/A	N/A
Winter	I-WeBS	R492 Bridge	01/12/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	01/12/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	01/12/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	01/12/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	16/01/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	2	N/A	N/A





Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Grey Heron

Flightlines - Ecology Ireland 2020 - 2024

- Grey Heron

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 23:
Grey Heron observations over the survey period (May 2020 – March 2026) Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-006.ApX-VP-H.-SUM-A_overview

Draft: A

8°0'0"W

53°3'45"N

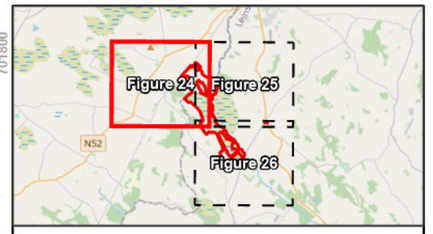
600000

701800

N52

WT165-22/23
WT55-24
WT61-23/24
WT12-23
WT58-20
WT1-24
WT157-22/23
WT98-24
WT76-24
WT110-22/23
WT65-20
WT68-21/22
WT375-23/24
WT143-23/24
WT18-23/24
WT102-24
WT128-24
WT15-20
WT85-24
WT364-23/24
WT47-22/23
WT191-21/22
WT49-24
WT141-23
WT95-23
WT84-24
WT67-23/24

P00424
P00802
P00656
P00639
F00468
F00542
F00483
F00484
F00406



Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Grey Heron

Flightlines - Ecology Ireland 2020 - 2024

- Grey Heron

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 24:
Grey Heron observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

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Map Ref: 11333-006.ApX-VP-H.-SUM-A

Draft: A

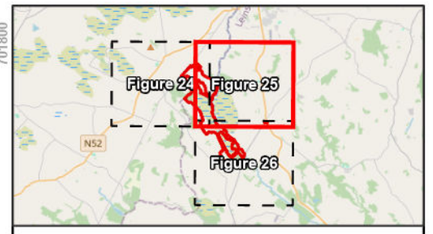
7°55'0"W

53°3'45"N

606000

N

WT401-23/24
WT397-23/24
Roscrea Road
Grove Street
WT252-22/23
WT406-23/24
WT317-23/24
P00424
WT1-24
WT15-24
P00428
P00802
WT157-22/23
P00656
P00256
F00321
F00460
WT1-24
WT2-23
WT86-23
WT385-23/24
WT98-24
WT76-24
WT109-22/23
WT92-24
WT170-24
WT88-20
WT35-20/21
P00651
F00468
F00413
P00114
WT18-23/24
WT102-24
WT36-23/24
WT128-20/21
WT92-22/23
WT11-23
WT42-20
WT364-23/24
WT150-20/21
WT193-21/22
WT75-24
WT49-24
WT141-23
WT101-23
WT155-22/23
WT361-23/24
WT84-24
WT12-21
F00491
F00500
WT161-23/24
WT71-24
WT67-23/24
WT37-24
WT5-20
N52
N62



Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Grey Heron

Flightlines - Ecology Ireland 2020 - 2024

- Grey Heron

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 25:
Grey Heron observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-006.ApX-VP-H.-SUM-A

Draft: A

7°55'0"W

53°1'30"N

N

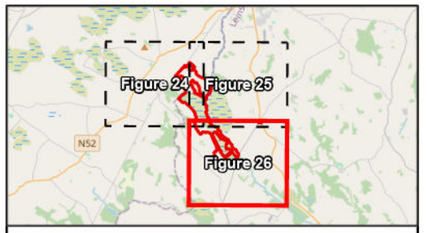
P00411

WT79-20 WT2-21 WT8-21 WT332-23/24 WT29-24 F00281 WT282-23/24 F00046 WT61-20 WT50-20 WT182-24 WT174-22/23 WT198-22/23 F00450 WT294 WT155-20/21 WT1-20 F00303 F00372 WT108-20/21 WT136-24 WT102-23 WT23-21/22 WT30-20 WT222-22/23 WT13-20 WT210-22/23 F00392 F00427 F00432 F00434 WT200-21/22 WT164-22/23 WT11-23/24 WT22-24 WT34-24 WT276-23/24 WT6-21 WT216-22/23 WT30-20/21 F00050 WT148-23/24 WT185-22/23 WT230-22/23 WT61-23 WT161-24 WT48-21 WT46-21 WT28-24 F00074 WT293-23/24 F00049

R491 R491 R491 N62 N62 N62

606000

695000



Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Grey Heron

Flightlines - Ecology Ireland 2020 - 2024

- Grey Heron

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 26:
Grey Heron observations over the survey period (May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

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Map Ref: 11333-006.ApX-VP-H.-SUM-A

Draft: A

Appendix 7-1 - VIII HEN HARRIER

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP87-20/21	Wintering	VP, 3	04/12/2020	12:44:00	1	50	2.5m	50	0
RP88-20/21	Wintering	VP, 2, VP, 1	04/12/2020	12:59:00	1	164	25m	120	44
RP4-22/23	Wintering	VP1, VP2	28/11/2022	11:19:00	1	489	100m	97	392
RP20-22/23	Wintering	VP4	30/11/2022	11:33:00	1	30	2.5m	0	30
RP52-22/23	Wintering	VPA	20/12/2022	14:48:00	1	77	15m	30	47
RP197-23	Breeding	VP1	27/07/2023	14:26:00	1	8	2.5m	0	8
RP199-23	Breeding	VP2, VP1	27/07/2023	14:37:00	1	86	5m	86	0
RP200-23	Breeding	VP2, VP1	27/07/2023	14:46:00	1	502	5m	502	0
RP201-23	Breeding	VP2	27/07/2023	15:11:00	1	685	2.5m	450	235
RP7-23/24	Wintering	VP3	24/10/2023	09:50:00	1	130	15m	130	0
RP76-23/24	Wintering	VP2	20/12/2023	12:46:00	1	5	35m	5	0
RP94-23/24	Wintering	VP1	25/01/2024	11:06:00	1	129	2.5m	60	69
RP140-23/24	Wintering	VP2, VP1	23/02/2024	12:41:00	1	20	2.5m	20	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00295	Winter	VP4	12/01/2026	11:26:00	1	15	7	0	0	0	22

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2022/2023	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00815	Winter	Incidental	VP5	24/02/2026	10:05:00	1	PB4	in-fligh

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 2	26/11/2025	N/A	1	N/A	N/A

Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Hen Harrier

Flightlines - Ecology Ireland 2020 - 2024

- Hen Harrier

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 27:
Hen Harrier observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-007.ApX-VP-HH-SUM-A

Draft: A

Appendix 7-1 - IX KESTREL

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP15-20	Breeding	VP1	28/04/2020	15:21:00	1	200	20m	200	0
RP16-20	Breeding	VP2	14/05/2020	09:19:00	1	50	20m	50	0
RP19-20	Breeding	VP3	14/05/2020	10:57:00	1	193	35m	193	0
RP21-20	Breeding	VP5	14/05/2020	11:35:00	1	25	20m	0	25
RP25-20	Breeding	VP5	14/05/2020	12:06:00	1	10	20m	0	10
RP26-20	Breeding	VP4	14/05/2020	12:19:00	1	25	175m	0	25
RP28-20	Breeding	VP5	14/05/2020	12:27:00	1	10	10m	0	10
RP33-20	Breeding	VP5	14/05/2020	12:57:00	1	35	60m	0	35
RP35-20	Breeding	VP5	14/05/2020	13:46:00	1	45	10m	0	45
RP39-20	Breeding	VP3	14/05/2020	14:20:00	1	45	17.5m	0	45
RP41-20	Breeding	VP5	14/05/2020	14:30:00	1	90	100m	0	90
RP44-20	Breeding	VP4	14/05/2020	15:14:00	1	50	37.5m	15	35
RP46-20	Breeding	VP5	04/06/2020	08:45:00	1	30	2.5m	0	30
RP47-20	Breeding	VP5	04/06/2020	08:50:00	1	30	15m	0	30
RP51-20	Breeding	VP5	04/06/2020	10:05:00	2	60	2.5m	0	60
RP53-20	Breeding	VP4	04/06/2020	11:09:00	1	300	42.5m	90	210
RP54-20	Breeding	VP4	04/06/2020	11:28:00	1	30	30m	0	30
RP55-20	Breeding	VP3	04/06/2020	11:35:00	1	120	12.5m	120	0
RP56-20	Breeding	VP5	04/06/2020	11:38:00	2	20	15m	0	20
RP57-20	Breeding	VP5	04/06/2020	12:15:00	2	10	15m	0	10
RP59-20	Breeding	VP5	04/06/2020	12:20:00	2	10	15m	0	10
RP60-20	Breeding	VP5	04/06/2020	12:34:00	2	10	15m	0	10
RP62-20	Breeding	VP5	04/06/2020	12:43:00	2	10	15m	0	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP64-20	Breeding	VP3	04/06/2020	12:54:00	1	55	20m	55	0
RP65-20	Breeding	VP5	04/06/2020	12:56:00	1	20	15m	0	20
RP69-20	Breeding	VP3	04/06/2020	13:56:00	1	130	15m	130	0
RP70-20	Breeding	VP5	04/06/2020	13:59:00	2	10	15m	0	10
RP71-20	Breeding	VP5	04/06/2020	14:10:00	2	10	15m	0	10
N/A	Breeding	VP5	10/07/2020	10:27:00	1	28	20m	0	28
N/A	Breeding	VP3	10/07/2020	14:37:00	3	2460	12.5m	2460	0
RP102-20	Breeding	VP5	10/07/2020	11:21:00	2	120	Unknown	0	120
RP103-20	Breeding	VP5	10/07/2020	11:36:00	1	116	17.5m	0	116
RP107-20	Breeding	VP2	10/07/2020	11:44:00	1	10	12.5m	10	0
RP108-20	Breeding	VP3	10/07/2020	11:45:00	1	1080	15m	1080	0
RP109-20	Breeding	VP4	10/07/2020	11:50:00	1	47	25m	0	47
RP111-20	Breeding	VP5	10/07/2020	11:54:00	1	25	120m	0	25
RP113-20	Breeding	VP4	10/07/2020	11:56:00	2	300	10m	0	300
RP117-20	Breeding	VP3	10/07/2020	12:16:00	1	600	15m	600	0
RP119-20	Breeding	VP5	10/07/2020	12:31:00	1	52	17.5m	0	52
RP121-20	Breeding	VP5	10/07/2020	12:36:00	1	120	25m	120	0
RP123-20	Breeding	VP5	10/07/2020	12:41:00	1	64	85m	0	64
RP124-20	Breeding	VP5	10/07/2020	13:01:00	1	158	22.5m	0	158
RP125-20	Breeding	VP5	10/07/2020	13:02:00	2	15	10m	0	15
RP128-20	Breeding	VP3	10/07/2020	13:13:00	1	300	15m	300	0
RP130-20	Breeding	VP3	10/07/2020	13:20:00	1	10	1m	10	0
RP131-20	Breeding	VP5	10/07/2020	13:21:00	1	99	25m	0	99
RP132-20	Breeding	VP5	10/07/2020	13:42:00	2	2100	5m	0	2100
RP75-20	Breeding	VP2	10/07/2020	08:53:00	1	480	77.5m	10	470

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP76-20	Breeding	VP5	10/07/2020	08:59:00	1	69	20m	0	69
RP77-20	Breeding	VP5	10/07/2020	09:13:00	1	45	8.5m	0	45
RP78-20	Breeding	VP5	10/07/2020	09:14:00	1	78	35m	0	78
RP79-20	Breeding	VP5	10/07/2020	09:17:00	1	70	25m	0	70
RP80-20	Breeding	VP3	10/07/2020	09:22:00	1	148	20m	70	78
RP81-20	Breeding	VP5	10/07/2020	09:24:00	1	1980	6m	0	1980
RP82-20	Breeding	VP3	10/07/2020	09:47:00	1	10	22.5m	0	10
RP84-20	Breeding	VP5	10/07/2020	10:00:00	1	68	35m	0	68
RP85-20	Breeding	VP5	10/07/2020	10:03:00	1	170	25m	0	170
RP92-20	Breeding	VP4	10/07/2020	10:49:00	1	300	10m	0	300
RP94-20	Breeding	VP5	10/07/2020	10:57:00	1	74	35m	0	74
RP97-20	Breeding	VP5	10/07/2020	11:08:00	1	105	55m	0	105
RP98-20	Breeding	VP1	10/07/2020	11:11:00	2	50	17.5m	25	25
RP137-20	Breeding	VP4	14/08/2020	09:04:00	1	10	15m	0	10
RP138-20	Breeding	VP4	14/08/2020	09:24:00	2	120	15m	0	120
RP139-20	Breeding	VP4	14/08/2020	09:55:00	2	180	15m	0	180
RP140-20	Breeding	VP4	14/08/2020	10:05:00	1	1200	2.5m	0	1200
RP141-20	Breeding	VP2	14/08/2020	10:11:00	1	166	60m	166	0
RP144-20	Breeding	VP3	14/08/2020	11:14:00	1	7	10m	7	0
RP145-20	Breeding	VP2	14/08/2020	11:20:00	1	69	20m	42	27
RP146-20	Breeding	VP1	14/08/2020	11:23:00	2	130	15m	70	60
RP147-20	Breeding	VP1	14/08/2020	11:33:00	2	14	0.5m	7	7
RP148-20	Breeding	VP5	14/08/2020	11:36:00	1	205	120m	0	205
RP150-20	Breeding	VP2	14/08/2020	11:48:00	1	83	30m	83	0
RP151-20	Breeding	VP2	14/08/2020	11:48:00	1	151	25m	136	15

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP152-20	Breeding	VP2	14/08/2020	11:49:00	1	15	20m	15	0
RP153-20	Breeding	VP2	14/08/2020	11:55:00	1	181	25m	122	59
RP154-20	Breeding	VP1	14/08/2020	11:56:00	3	420	30m	300	120
RP155-20	Breeding	VP2	14/08/2020	12:01:00	1	89	40m	0	89
RP157-20	Breeding	VP3	14/08/2020	12:11:00	1	8	22.5m	8	0
RP159-20	Breeding	VP1	14/08/2020	12:23:00	1	18	22.5m	9	9
RP161-20	Breeding	VP4	14/08/2020	13:24:00	1	60	15m	0	60
RP162-20	Breeding	VP4	14/08/2020	13:40:00	1	12	15m	0	12
RP167-20	Breeding	VP3	14/08/2020	15:16:00	1	14	7.5m	14	0
RP1-20/21	Wintering	VP, 4	08/10/2020	08:42:00	1	30	15m	15	15
RP12-20/21	Wintering	VP, 4	08/10/2020	11:05:00	1	30	15m	15	15
RP16-20/21	Wintering	VP, 3	08/10/2020	11:36:00	1	95	15m	0	95
RP17-20/21	Wintering	VP, 3	08/10/2020	11:42:00	1	100	17.5m	0	100
RP19-20/21	Wintering	VP, 3	08/10/2020	11:50:00	1	25	15m	0	25
RP2-20/21	Wintering	VP, 3	08/10/2020	08:56:00	1	200	30m	0	200
RP20-20/21	Wintering	VP, 4	08/10/2020	11:05:00	1	30	15m	30	0
RP21-20/21	Wintering	VP, 4	08/10/2020	11:52:00	1	30	15m	30	0
RP22-20/21	Wintering	VP, 3	08/10/2020	11:58:00	1	33	8m	33	0
RP23-20/21	Wintering	VP, 3	08/10/2020	12:00:00	1	75	10m	75	0
RP25-20/21	Wintering	VP, 4	08/10/2020	12:15:00	1	300	15m	300	0
RP26-20/21	Wintering	VP, 3	08/10/2020	12:21:00	1	80	20m	80	0
RP27-20/21	Wintering	VP, 3	08/10/2020	12:26:00	1	155	17.5m	145	10
RP3-20/21	Wintering	VP, 1	08/10/2020	09:08:00	1	46	10m	46	0
RP30-20/21	Wintering	VP, 3	08/10/2020	12:41:00	1	30	15m	30	0
RP33-20/21	Wintering	VP, 3	08/10/2020	13:08:00	1	95	17.5m	90	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP35-20/21	Wintering	VP, 3	08/10/2020	13:22:00	1	55	30m	0	55
RP36-20/21	Wintering	VP, 4	08/10/2020	13:23:00	1	60	15m	0	60
RP37-20/21	Wintering	VP, 3	08/10/2020	13:48:00	1	180	35m	180	0
RP38-20/21	Wintering	VP, 3	08/10/2020	13:59:00	1	15	1m	15	0
RP39-20/21	Wintering	VP, 3	08/10/2020	14:04:00	1	38	10m	0	38
RP44-20/21	Wintering	VP, 3	08/10/2020	14:38:00	1	155	22.5m	135	20
RP7-20/21	Wintering	VP, 3	08/10/2020	10:33:00	1	38	27.5m	0	38
RP8-20/21	Wintering	VP, 4	08/10/2020	10:40:00	1	30	15m	15	15
RP45-20/21	Wintering	VP, 3	05/11/2020	10:01:00	1	46	15m	46	0
RP47-20/21	Wintering	VP, 1	05/11/2020	11:07:00	1	16	17.5m	8	8
RP48-20/21	Wintering	VP, 1	05/11/2020	11:08:00	1	4	Unknown	4	0
RP50-20/21	Wintering	VP, 3	05/11/2020	11:44:00	1	720	10m	0	720
RP53-20/21	Wintering	VP, 5	05/11/2020	12:41:00	1	90	150m	0	90
RP54-20/21	Wintering	VP, 1	05/11/2020	12:44:00	1	18	35m	18	0
RP56-20/21	Wintering	VP, 3	05/11/2020	12:59:00	1	107	25m	0	107
RP67-20/21	Wintering	VP, 5	05/11/2020	14:51:00	1	15	15m	0	15
N/A	Wintering	VP, 1	04/12/2020	12:44:00	1	30	25m	0	30
N/A	Wintering	VP, 1	04/12/2020	12:44:00	1	180	15m	180	0
N/A	Wintering	VP, 1	04/12/2020	12:51:00	1	90	20m	0	90
N/A	Wintering	VP, 1	04/12/2020	12:54:00	1	10	17.5m	0	10
N/A	Wintering	VP, 1	04/12/2020	12:54:00	1	120	9m	120	0
RP72-20/21	Wintering	VP, 4	04/12/2020	09:45:00	1	70	20m	0	70
RP74-20/21	Wintering	VP, 5	04/12/2020	09:55:00	1	10	15m	0	10
RP78-20/21	Wintering	VP, 2	04/12/2020	11:25:00	1	6	25m	6	0
RP79-20/21	Wintering	VP, 1	04/12/2020	11:26:00	1	179	15m	29	150

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP81-20/21	Wintering	VP, 1	04/12/2020	11:33:00	1	272	11m	272	0
RP82-20/21	Wintering	VP, 2	04/12/2020	11:41:00	1	4	17.5m	4	0
RP83-20/21	Wintering	VP, 5	04/12/2020	11:50:00	1	60	15m	0	60
RP85-20/21	Wintering	VP, 2	04/12/2020	12:24:00	1	50	25m	50	0
RP86-20/21	Wintering	VP, 2	04/12/2020	12:28:00	1	20	22.5m	20	0
RP89-20/21	Wintering	VP, 2	04/12/2020	12:59:00	1	10	20m	10	0
RP90-20/21	Wintering	VP, 1	04/12/2020	13:10:00	1	98	30m	0	98
RP91-20/21	Wintering	VP, 1	04/12/2020	13:11:00	1	23	20m	10	13
RP92-20/21	Wintering	VP, 1	04/12/2020	13:15:00	1	200	15m	100	100
RP93-20/21	Wintering	VP, 4	04/12/2020	13:30:00	1	50	15m	0	50
RP94-20/21	Wintering	VP, 3	04/12/2020	13:50:00	1	20	25m	0	20
RP98-20/21	Wintering	VP, 1	04/12/2020	14:40:00	1	28	15m	28	0
RP104-20/21	Wintering	VP, 4	14/01/2021	11:30:00	1	Unknown	15m	Unknown	0
RP105-20/21	Wintering	VP, 2	14/01/2021	12:07:00	1	102	25m	0	102
RP107-20/21	Wintering	VP, 2	14/01/2021	13:12:00	1	40	30m	40	0
RP113-20/21	Wintering	VP, 2	14/01/2021	15:30:00	1	29	40m	0	29
RP114-20/21	Wintering	VP, 2	14/01/2021	15:30:00	1	264	55m	0	264
RP220-20/21a	Wintering	VP3	14/01/2021	14:45:00	1	200	12.5m	200	0
RP99-20/21	Wintering	VP, 2	14/01/2021	09:49:00	1	135	22.5m	75	60
RP115-20/21	Wintering	VP, 1	21/01/2021	13:46:00	1	40	20m	40	0
RP116-20/21	Wintering	VP, 4	09/02/2021	10:05:00	1	40	20m	0	40
RP119-20/21	Wintering	VP, 4	09/02/2021	10:58:00	1	45	17.5m	0	45
RP124-20/21	Wintering	VP, 4	09/02/2021	13:04:00	1	0	2m	0	Unknown
RP126-20/21	Wintering	VP, 3	09/02/2021	13:21:00	1	0	20m	Unknown	0
RP128-20/21	Wintering	VP, 4	09/02/2021	13:59:00	1	10	15m	0	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP130-20/21	Wintering	VP, 3	09/02/2021	14:25:00	1	0	20m	Unknown	0
RP131-20/21	Wintering	VP, 4	09/02/2021	14:30:00	1	75	30m	0	75
RP132-20/21	Wintering	VP, 4	09/02/2021	15:40:00	1	110	25m	0	110
RP220-20/21b	Wintering	VP1	09/02/2021	11:55:00	1	60	15m	60	0
RP225-20/21	Wintering	VP1	09/02/2021	14:25:00	1	280	15m	0	280
RP133-20/21	Wintering	VP, 2	08/03/2021	09:34:00	1	95	30m	0	95
RP138-20/21	Wintering	VP, 2	08/03/2021	10:12:00	1	240	Unknown	240	0
RP139-20/21	Wintering	VP, 1	08/03/2021	10:15:00	1	40	30m	30	10
RP143-20/21	Wintering	VP, 4	08/03/2021	10:46:00	1	362	10m	0	362
RP144-20/21	Wintering	VP, 4	08/03/2021	10:46:00	1	201	45m	0	201
RP145-20/21	Wintering	VP, 1	08/03/2021	10:52:00	2	25	2.5m	15	10
RP146-20/21	Wintering	VP, 2	08/03/2021	11:14:00	2	50	22.5m	0	50
RP148-20/21	Wintering	VP, 2	08/03/2021	11:21:00	2	170	175m	0	170
RP149-20/21	Wintering	VP, 2	08/03/2021	11:29:00	1	190	22.5m	0	190
RP151-20/21	Wintering	VP, 2	08/03/2021	11:48:00	2	95	80m	0	95
RP159-20/21	Wintering	VP, 2	08/03/2021	11:58:00	1	175	75m	0	175
RP161-20/21	Wintering	VP, 2	08/03/2021	12:18:00	1	480	85m	0	480
RP165-20/21	Wintering	VP, 2	08/03/2021	12:28:00	1	195	150m	0	195
RP169-20/21	Wintering	VP, 2	08/03/2021	12:44:00	1	325	65m	300	25
RP170-20/21	Wintering	VP, 3	08/03/2021	12:50:00	1	190	50m	190	0
RP171-20/21	Wintering	VP, 2	08/03/2021	12:54:00	1	165	90m	0	165
RP178-20/21	Wintering	VP, 2	08/03/2021	13:04:00	1	165	50m	0	165
RP189-20/21	Wintering	VP, 3	08/03/2021	13:39:00	1	63	35m	63	0
RP190-20/21	Wintering	VP, 4	08/03/2021	13:41:00	1	86	60m	86	0
RP194-20/21	Wintering	VP, 4	08/03/2021	13:51:00	1	66	30m	0	66

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP197-20/21	Wintering	VP, 4	08/03/2021	14:03:00	1	110	30m	0	110
RP200-20/21	Wintering	VP, 2	08/03/2021	14:17:00	1	110	65m	0	110
RP207-20/21	Wintering	VP, 4	08/03/2021	14:31:00	1	30	8.5m	0	30
RP1-21	Breeding	VP1	23/04/2021	13:01:00	1	53	11m	20	33
RP12-21	Breeding	VP3	23/04/2021	15:06:00	1	80	25m	50	30
RP13-21	Breeding	VP4	23/04/2021	09:30:00	1	30	30m	0	30
RP14-21	Breeding	VP4	23/04/2021	12:40:00	1	30	30m	0	30
RP15-21	Breeding	VP5	23/04/2021	09:00:00		0	0	0	0
RP16-21	Breeding	VP5	23/04/2021	10:14:00	1	30	17.5m	0	30
RP17-21	Breeding	VP5	23/04/2021	13:06:00	2	0	0	0	0
RP38-21	Breeding	VP4	14/05/2021	12:18:00	2	120	100	0	120
RP41-21	Breeding	VP5	14/05/2021	09:40:00	2	60	7m	0	60
RP45-21	Breeding	VP5	14/05/2021	13:05:00	1	23	12.5m	0	23
RP46-21	Breeding	VP1	17/05/2021	09:05:00	1	120	17.5m	120	0
RP50-21	Breeding	VP1	17/05/2021	10:40:00	1	15	17.5m	8	7
RP55-21	Breeding	VP1	17/05/2021	12:59:00		40	62.5m	35	5
RP58-21	Breeding	VP2	17/05/2021	13:09:00	1	23	25m	23	0
RP61-21	Breeding	VP3	11/06/2021	13:13:00	1	120	40m	120	0
RP63-21	Breeding	VP5	11/06/2021	08:45:00	2	40	17.5m	0	40
RP65-21	Breeding	VP5	11/06/2021	10:37:00	1	30	62.5m	0	30
RP123-21	Breeding	VP4	14/06/2021	11:31:00	1	90	10m	0	90
RP75-21	Breeding	VP1	16/07/2021	09:07:00	1	2	2.5m	0	2
RP77-21	Breeding	VP1, VP2	16/07/2021	12:03:00	1	180	25m	0	180
RP78-21	Breeding	VP1, VP2	16/07/2021	12:35:00	1	180	17.5m	180	0
RP84-21	Breeding	VP3	16/07/2021	12:55:00	1	540	45m	540	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP88-21	Breeding	VP5	16/07/2021	13:24:00	1	23	50m	0	23
RP125-21	Breeding	VP4	21/07/2021	12:07:00	1	60	10m	-	60
RP126-21	Breeding	VP4	21/07/2021	13:09:00	1	120	10m	-	120
RP127-21	Breeding	VP4	21/07/2021	13:33:00	1	125	7.5m		125
N/A	Breeding	VP1	18/08/2021	09:57:00	1	570	-		
N/A	Breeding	VP1	18/08/2021	10:23:00	1	660	-		
N/A	Breeding	VP1	18/08/2021	10:49:00	1	120	-		
RP103-21	Breeding	VP1	18/08/2021	13:40:00	1	88	60m	0	88
RP104-21	Breeding	VP1	18/08/2021	13:56:00	1	53	40m	0	53
RP105-21	Breeding	VP1	18/08/2021	14:03:00	1	224	50m	224	0
RP107-21	Breeding	VP2	18/08/2021	09:16:00	3	240	17.5m	60	180
RP109-21	Breeding	VP2	18/08/2021	13:15:00	1	2	17.5m	0	2
RP116-21	Breeding	VP5	18/08/2021	09:59:00	1	4	5m	0	4
RP118-21	Breeding	VP5	18/08/2021	12:03:00	1	43	17.5m	0	43
RP119-21	Breeding	VP5	18/08/2021	14:24:00	1	300	15m	0	300
RP120-21	Breeding	VP5	18/08/2021	14:41:00	1	8	2.5m	0	8
RP89-21	Breeding	VP1	18/08/2021	08:50:00	1	60	-	0	60
RP90-21	Breeding	VP1	18/08/2021	09:03:00	3	30	10m	15	15
RP91-21	Breeding	VP1	18/08/2021	09:22:00	1	120	-	0	120
RP92-21	Breeding	VP1	18/08/2021	09:36:00	1	60	-	0	60
RP94-21	Breeding	VP1	18/08/2021	11:09:00	1	54	25m	0	54
RP95-21	Breeding	VP1	18/08/2021	11:56:00	1	40	30m	0	40
RP96-21	Breeding	VP1	18/08/2021	12:03:00	1	1680	-	0	1680
RP98-21	Breeding	VP1	18/08/2021	12:48:00	1	30	1.5m	0	30
RP99-21	Breeding	VP1	18/08/2021	13:08:00	1	1440	-	0	1440

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP2-21/22	Wintering	VP3	18/11/2021	12:42:00	1	15	5m	15	0
RP4-21/22	Wintering	VP4	18/11/2021	14:28:00	1	66	5m	0	66
RP5-21/22	Wintering	VP4	18/11/2021	14:42:00	1	53	5m	0	53
N/A	Wintering	VP5	23/11/2021	10:29:00	1	540	10m	0	540
RP16-21/22	Wintering	VP4	02/12/2021	09:43:00	1	210	10m	0	210
RP24-21/22	Wintering	VP1	02/12/2021	11:25:00	1	34	25m	15	19
RP26-21/22	Wintering	VP1	02/12/2021	11:32:00	1	2	25m	2	0
RP27-21/22	Wintering	VP1, VP1	02/12/2021	11:42:00	1	252	5m	120	132
RP34-21/22	Wintering	VP4	02/12/2021	12:38:00	1	210	10m	0	210
RP37-21/22	Wintering	VP1	02/12/2021	12:45:00	1	120	5m	120	0
RP38-21/22	Wintering	VP3	02/12/2021	12:53:00	1	60	5m	0	60
RP39-21/22	Wintering	VP4	02/12/2021	13:02:00	1	300	10m	0	300
RP40-21/22	Wintering	VP3	02/12/2021	13:05:00	1	120	5m	120	0
RP41-21/22	Wintering	VP4	02/12/2021	13:32:00	1	300	10m	0	300
RP42-21/22	Wintering	VP4	02/12/2021	14:08:00	1	300	10m	0	300
RP43-21/22	Wintering	VP4	02/12/2021	14:18:00	1	180	30m	0	180
RP44-21/22	Wintering	VP1	02/12/2021	14:27:00	1	60	25m	0	60
RP46-21/22	Wintering	VP4	06/12/2021	09:41:00	1	5	10m	0	5
RP49-21/22	Wintering	VP4	06/12/2021	10:58:00	1	20	15m	0	20
RP53-21/22	Wintering	VP5	06/12/2021	12:14:00	1	177	15m	0	177
RP54-21/22	Wintering	VP5	06/12/2021	12:43:00	1	129	40m	0	129
RP55-21/22	Wintering	VP4	06/12/2021	13:00:00	1	10	20m	0	10
RP56-21/22	Wintering	VP5	06/12/2021	13:12:00	1	71	10m	0	71
RP58-21/22	Wintering	VP5	06/12/2021	13:22:00	1	63	20m	0	63
N/A	Wintering	VP3	07/12/2021	13:32:00	1	60	20m	0	60

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP59-21/22	Wintering	VP3	07/12/2021	10:10:00	1	180	10m	0	180
RP60-21/22	Wintering	VP3	07/12/2021	11:50:00	1	600	30m	0	600
RP61-21/22	Wintering	VP3	07/12/2021	13:44:00	1	180	35m	0	180
RP62-21/22	Wintering	VP3	07/12/2021	14:25:00	1	60	15m	0	60
RP63-21/22	Wintering	VP2	10/12/2021	12:20:00	1	2	30m	2	0
RP65-21/22	Wintering	VP2	10/12/2021	12:35:00	1	6	20m	6	0
RP71-21/22	Wintering	VP4	14/01/2022	10:43:00	1	120	5m	0	120
RP72-21/22	Wintering	VP4	14/01/2022	10:53:00	1	91	5m	25	66
RP78-21/22	Wintering	VP3	14/01/2022	14:37:00	1	120	5m	120	0
RP80-21/22	Wintering	VP2	17/01/2022	10:53:00	1	5	15m	5	0
RP84-21/22	Wintering	VP1	17/01/2022	14:43:00	1	6	30m	0	6
RP108-21/22	Wintering	VP3	10/02/2022	13:35:00	1	58	5m	58	0
RP109-21/22	Wintering	VP3	10/02/2022	13:40:00	1	125	5m	0	125
RP113-21/22	Wintering	VP3	10/02/2022	14:10:00	1	183	25m	0	183
RP86-21/22	Wintering	VP3	10/02/2022	09:45:00	1	72	25m	0	72
RP88-21/22	Wintering	VP3	10/02/2022	10:29:00	1	8	25m	0	8
RP95-21/22	Wintering	VP4	10/02/2022	11:28:00	1	43	25m	0	43
RP98-21/22	Wintering	VP4	10/02/2022	12:15:00	1	121	25m	1	120
RP123-21/22	Wintering	VP1	11/02/2022	09:55:00	1	347	5m	47	300
RP124-21/22	Wintering	VP5	11/02/2022	10:08:00	1	17	10m	0	17
RP133-21/22	Wintering	VP5	11/02/2022	12:38:00	1	61	10m	0	61
RP134-21/22	Wintering	VP2	11/02/2022	12:39:00	1	15	5m	15	0
RP138-21/22	Wintering	VP1	11/02/2022	13:06:00	1	36	25m	36	0
RP139-21/22	Wintering	VP1	11/02/2022	13:14:00	1	198	25m	0	198
RP143-21/22	Wintering	VP5	11/02/2022	14:12:00	1	15	5m	0	15

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP144-21/22	Wintering	VP5	11/02/2022	14:13:00	1	80	5m	0	80
RP153-21/22	Wintering	VP5	14/03/2022	10:43:00	2	240	5m	0	240
RP162-21/22	Wintering	VP5	14/03/2022	12:01:00	1	72	25m	0	72
RP166-21/22	Wintering	VP2	14/03/2022	12:12:00	1	15	60m	0	15
RP170-21/22	Wintering	VP5	14/03/2022	12:19:00	1	73	25m	0	73
RP181-21/22	Wintering	VP4	14/03/2022	13:20:00	1	8	10m	0	8
RP184-21/22	Wintering	VP2	14/03/2022	13:33:00	1	18	25m	18	0
RP185-21/22	Wintering	VP3	14/03/2022	13:37:00	1	60	5m	60	0
RP186-21/22	Wintering	VP5	14/03/2022	13:37:00	1	80	25m	0	80
RP187-21/22	Wintering	VP3	14/03/2022	13:41:00	2	35	5m	35	0
RP190-21/22	Wintering	VP3	14/03/2022	13:52:00	1	240	5m	240	0
RP197-21/22	Wintering	VP2	14/03/2022	14:14:00	1	60	50m	0	60
RP201-21/22	Wintering	VP2	14/03/2022	14:34:00	1	42	40m	0	42
RP12-22/23	Wintering	VP3, VPA	30/11/2022	09:14:00	1	180	62.5m	180	0
RP15-22/23	Wintering	VP4	30/11/2022	09:42:00	1	20	15m	0	20
RP16-22/23	Wintering	VP4	30/11/2022	10:06:00	1	10	15m	0	10
RP27-22/23	Wintering	VPB	30/11/2022	14:18:00	1	5	10m	5	0
RP29-22/23	Wintering	VP4	20/12/2022	08:51:00	1	8	15m	0	8
RP30-22/23	Wintering	VPB, VP3	20/12/2022	09:20:00	1	39	62.5m	26	13
RP31-22/23	Wintering	VP3	20/12/2022	09:33:00	1	120	15m	0	120
RP35-22/23	Wintering	VP4	20/12/2022	09:58:00	1	24	15m	0	24
RP38-22/23	Wintering	VP4	20/12/2022	10:33:00	1	8	15m	0	8
RP42-22/23	Wintering	VP3	20/12/2022	10:55:00	1	60	15m	55	5
RP45-22/23	Wintering	VP3	20/12/2022	11:08:00	1	180	2.5m	150	30
RP49-22/23	Wintering	VP3	20/12/2022	13:20:00	1	60	2.5m	60	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP50-22/23	Wintering	VP3	20/12/2022	14:28:00	1	30	2.5m	30	0
RP58-22/23	Wintering	VP2	21/12/2022	12:04:00	1	14	17.5m	9	5
RP63-22/23	Wintering	VP5	21/12/2022	13:40:00	1	8	7.5m	2	6
RP64-22/23	Wintering	VP2, VP1	21/12/2022	13:41:00	1	84	45m	24	60
RP66-22/23	Wintering	VP2	21/12/2022	14:03:00	1	34	30m	34	0
RP67-22/23	Wintering	VP2, VP1	21/12/2022	14:17:00	1	99	15m	99	0
RP157-22/23	Wintering	VP2	25/01/2023	10:45:00	1	10	30m	10	
RP160-22/23	Wintering	VP1	25/01/2023	12:41:00	1	100	5m	30	70
RP159-22/23	Wintering	VP4	27/01/2023	12:44:00	1	15	40m		15
RP76-22/23	Wintering	VP5	20/02/2023	10:04:00	1	45	10m	0	45
RP78-22/23	Wintering	VP2	20/02/2023	10:49:00	1	61	62.5m	61	0
RP86-22/23	Wintering	VP1	20/02/2023	12:43:00	1	160	30m	60	100
RP91-22/23	Wintering	VPA	20/02/2023	13:03:00	1	84	80m	0	84
RP93-22/23	Wintering	VP5	20/02/2023	13:45:00	1	52	10m	0	52
RP94-22/23	Wintering	VP2	20/02/2023	13:49:00	1	76	15m	76	0
RP95-22/23	Wintering	VPA	20/02/2023	14:03:00	1	18	5m	18	0
RP106-22/23	Wintering	VPA	27/03/2023	10:29:00	1	320	62.5m	320	0
RP118-22/23	Wintering	VPB	27/03/2023	11:20:00	1	30	15m	30	0
RP121-22/23	Wintering	VP5	27/03/2023	11:34:00	1	30	40m	0	30
RP126-22/23	Wintering	VPA	27/03/2023	11:48:00	2	130	62.5m	130	0
RP128-22/23	Wintering	VP5	27/03/2023	11:58:00	1	367	65m	0	367
RP130-22/23	Wintering	VPA	27/03/2023	12:04:00	1	118	15m	118	0
RP132-22/23	Wintering	VP5	27/03/2023	12:06:00	1	285	75m	0	285
RP134-22/23	Wintering	VP5	27/03/2023	12:09:00	1	105	30m	0	105
RP139-22/23	Wintering	VP1	27/03/2023	12:40:00	1	36	15m	36	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP140-22/23	Wintering	VPA	27/03/2023	12:45:00	1	88	15m	0	88
RP141-22/23	Wintering	VP5	27/03/2023	12:50:00	1	44	15m	0	44
RP142-22/23	Wintering	VP3	27/03/2023	13:00:00	1	80	45m	80	0
RP148-22/23	Wintering	VP1	27/03/2023	13:45:00	1	46	2.5m	40	6
RP154-22/23	Wintering	VP1	27/03/2023	14:18:00	1	70	15m	0	70
RP22-23	Breeding	VPB	01/05/2023	13:43:00	1	420	62.5m	0	420
RP24-23	Breeding	VP4, VPB	01/05/2023	14:00:00	1	64	25m	0	64
RP263-23	Breeding	VP5	01/05/2023	11:09:00	1	60	15m	0	60
RP264-23	Breeding	VP5	01/05/2023	12:20:00	1	45	15m	0	45
RP266-23	Breeding	VP5	01/05/2023	13:13:00	1	55	10m	0	55
RP27-23	Breeding	VPB	01/05/2023	14:15:00	1	85	15m	85	0
RP4-23	Breeding	VPB	01/05/2023	10:38:00	1	56	62.5m	3	53
RP6-23	Breeding	VPB	01/05/2023	11:22:00	1	26	15m	26	0
RP32-23	Breeding	VP3	02/05/2023	08:58:00	1	1260	2.5m	900	360
RP33-23	Breeding	VPA	02/05/2023	09:04:00	1	94	62.5m	94	0
RP34-23	Breeding	VP1	02/05/2023	09:44:00	1	100	15m	50	50
RP38-23	Breeding	VP3	02/05/2023	10:44:00	1	720	15m	360	360
RP40-23	Breeding	VP3	02/05/2023	11:05:00	1	360	15m	340	20
RP42-23	Breeding	VP3, VPA	02/05/2023	11:26:00	1	58	15m	20	38
RP46-23	Breeding	VP3	02/05/2023	12:23:00	2	555	15m	360	195
RP47-23	Breeding	VP1	02/05/2023	12:30:00	1	5	18m	0	5
RP48-23	Breeding	VPA	02/05/2023	12:34:00	1	103	62.5m	10	93
RP53-23	Breeding	VP3	02/05/2023	13:17:00	1	840	15m	840	0
RP54-23	Breeding	VP3	02/05/2023	13:35:00	1	124	15m	100	24
RP55-23	Breeding	VP3	02/05/2023	13:39:00	1	360	62.5m	360	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP58-23	Breeding	VP3, NLA	02/05/2023	14:00:00	1	176	15m	160	16
RP61-23	Breeding	VPA, VP3	02/05/2023	14:16:00	1	420	62.5m	300	120
RP62-23	Breeding	VP2	03/05/2023	10:40:00	1	10	12m	10	0
RP63-23	Breeding	VP2	03/05/2023	13:45:00	1	22	15m	20	2
RP64-23	Breeding	VP2	03/05/2023	14:18:00	1	4	15m	3	1
RP67-23	Breeding	VPA	30/05/2023	11:57:00	1	73	15m	73	0
RP73-23	Breeding	VP2	30/05/2023	12:57:00	1	165	15m	123	42
RP75-23	Breeding	VPA	30/05/2023	13:07:00	1	40	10m	40	0
RP78-23	Breeding	VPA	30/05/2023	13:17:00	1	36	15m	29	7
RP102-23	Breeding	VP2	23/06/2023	12:43:00	1	16	15m	0	16
RP103-23	Breeding	VP2	23/06/2023	13:08:00	1	154	15m	154	0
RP104-23	Breeding	VP1	23/06/2023	13:13:00	1	30	15m	10	20
RP105-23	Breeding	VP2	23/06/2023	13:22:00	1	120	15m	60	60
RP109-23	Breeding	VP1	23/06/2023	14:16:00	1	50	15m	0	50
RP113-23	Breeding	VP2	23/06/2023	14:46:00	1	44	15m	0	44
RP85-23	Breeding	VP1	23/06/2023	08:42:00	1	10	15m	8	2
RP91-23	Breeding	VP2	23/06/2023	11:03:00	1	108	15m	0	108
RP92-23	Breeding	VP1	23/06/2023	11:13:00	1	100	15m	75	25
RP94-23	Breeding	VP2	23/06/2023	11:15:00	1	14	15m	8	6
RP116-23	Breeding	VP5	27/06/2023	09:15:00	1	5	10m	0	5
RP118-23	Breeding	VP5	27/06/2023	09:28:00	1	10	5m	0	10
RP121-23	Breeding	VP5	27/06/2023	09:44:00	1	18	15m	0	18
RP122-23	Breeding	VP5	27/06/2023	10:14:00	1	4	10m	0	4
RP125-23	Breeding	VP5	27/06/2023	10:24:00	2	200	50m	0	200
RP127-23	Breeding	VP5	27/06/2023	11:24:00	1	10	7.5m	0	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP129-23	Breeding	VP5	27/06/2023	11:50:00	1	15	40m	0	15
RP130-23	Breeding	VP4	27/06/2023	11:52:00	1	60	15m	0	60
RP133-23	Breeding	VP5	27/06/2023	12:01:00	1	45	20m	0	45
RP135-23	Breeding	VP5	27/06/2023	12:19:00	1	10	10m	0	10
RP137-23	Breeding	VP5	27/06/2023	12:48:00	2	10	50m	0	10
RP140-23	Breeding	VP4	27/06/2023	13:04:00	1	40	62.5m	40	0
RP141-23	Breeding	VP5	27/06/2023	13:13:00	1	25	20m	0	25
RP144-23	Breeding	VP3	27/06/2023	14:02:00	1	184	15m	0	184
RP145-23	Breeding	VP3	27/06/2023	14:20:00	1	43	15m	0	43
RP146-23	Breeding	VPA	27/06/2023	14:22:00	1	15	25m	15	0
RP150-23	Breeding	VPA	20/07/2023	08:49:00	1	43	15m	0	43
RP152-23	Breeding	VPA	20/07/2023	09:51:00	1	40	15m	0	40
RP158-23	Breeding	VPA	20/07/2023	11:34:00	1	35	15m	35	0
RP161-23	Breeding	VPA	20/07/2023	11:53:00	1	25	15m	0	25
RP163-23	Breeding	VP4	20/07/2023	12:26:00	1	10	20m	0	10
RP164-23	Breeding	VP4	20/07/2023	12:34:00	1	213	40m	0	213
RP166-23	Breeding	VPA	20/07/2023	13:11:00	1	270	62.5m	270	0
RP168-23	Breeding	VP4	20/07/2023	13:20:00	1	168	40m	0	168
N/A	Breeding	VP2	27/07/2023	11:02:00	1	0	15m	-	-
RP171-23	Breeding	VP2	27/07/2023	08:42:00	1	25	12.5m	0	25
RP178-23	Breeding	VP1	27/07/2023	10:39:00	1	525	15m	25	500
RP179-23	Breeding	VPB	27/07/2023	10:45:00	1	360	15m	0	360
RP180-23	Breeding	VP1	27/07/2023	10:58:00	1	360	15m	120	240
RP182-23	Breeding	VP2	27/07/2023	11:09:00	1	5	5m	5	0
RP188-23	Breeding	VP1	27/07/2023	12:49:00	1	40	15m	30	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP189-23	Breeding	VPB	27/07/2023	12:50:00	1	300	15m	0	300
RP191-23	Breeding	VP1	27/07/2023	13:04:00	1	39	15m	12	27
RP192-23	Breeding	VP1, VP2	27/07/2023	13:10:00	1	1660	15m	700	960
RP195-23	Breeding	VP2	27/07/2023	13:30:00	1	70	30m	0	70
RP196-23	Breeding	VP1, VP2	27/07/2023	14:00:00	1	350	15m	330	20
RP202-23	Breeding	VPA	28/08/2023	10:03:00	1	42	60m	21	21
RP209-23	Breeding	VP5	28/08/2023	11:44:00	1	33	15m	0	33
RP211-23	Breeding	VPB	28/08/2023	12:25:00	1	8	35m	7	1
RP212-23	Breeding	VP4	28/08/2023	12:40:00	1	60	-	0	60
RP214-23	Breeding	VP3	28/08/2023	13:44:00	1	180	15m	90	90
RP220-23	Breeding	VPB	26/09/2023	09:16:00	1	96	15m	56	40
RP221-23	Breeding	VP4	26/09/2023	09:36:00	1	40	50m	0	40
RP222-23	Breeding	VP3	26/09/2023	09:41:00	2	46	10m	46	0
RP223-23	Breeding	VP5	26/09/2023	10:17:00	1	20	10m	0	20
RP224-23	Breeding	VPB	26/09/2023	10:32:00	1	25	15m	25	0
RP225-23	Breeding	VP2	26/09/2023	10:34:00	1	245	62.5m	125	120
RP226-23	Breeding	VPB	26/09/2023	10:57:00	1	25	62.5m	0	25
RP230-23	Breeding	VP3	26/09/2023	11:04:00	1	14	6m	14	0
RP231-23	Breeding	VPB, VPA	26/09/2023	11:11:00	1	44	15m	40	4
RP232-23	Breeding	VPA	26/09/2023	11:15:00	1	20	15m	20	0
RP237-23	Breeding	VP5	26/09/2023	11:25:00	1	161	50m	0	161
RP240-23	Breeding	VPB	26/09/2023	11:45:00	1	28	2.5m	26	2
RP242-23	Breeding	VP5	26/09/2023	11:52:00	1	85	40m	0	85
RP256-23	Breeding	VP4	26/09/2023	12:37:00	1	720	30m	0	720

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP257-23	Breeding	VP5	26/09/2023	12:38:00	1	96	50m	0	96
RP260-23	Breeding	VPB	26/09/2023	14:23:00	1	28	15m	16	12
RP13-23/24	Wintering	VP4	24/10/2023	12:25:00	1	22	15m	22	0
RP14-23/24	Wintering	VP4	24/10/2023	13:12:00	1	8	15m	8	0
RP15-23/24	Wintering	VP4	24/10/2023	13:22:00	1	39	15m	39	0
RP22-23/24	Wintering	VP5	24/10/2023	10:28:00	1	10	10m	0	10
RP23-23/24	Wintering	VP5	24/10/2023	12:09:00	1	7	8m	0	7
RP35-23/24	Wintering	VPA	24/10/2023	14:27:00	1	156	40m	0	156
RP36-23/24	Wintering	VPB	24/10/2023	09:10:00	1	20	10m	19	1
RP8-23/24	Wintering	VP3	24/10/2023	10:26:00	1	30	35m	0	30
N/A	Wintering	VP4	27/11/2023	13:27:00	1	44	15m	-	-
RP43-23/24	Wintering	VP1, VP2	27/11/2023	11:26:00	1	205	45m	0	205
RP44-23/24	Wintering	VP1	27/11/2023	13:35:00	1	45	30m	20	25
RP47-23/24	Wintering	VP2	27/11/2023	11:46:00	1	30	15m	30	0
RP48-23/24	Wintering	VP2	27/11/2023	12:01:00	1	204	62.5m	204	0
RP49-23/24	Wintering	VP2	27/11/2023	12:52:00	1	56	62.5m	0	56
RP51-23/24	Wintering	VP2	27/11/2023	13:44:00	1	34	62.5m	0	34
RP52-23/24	Wintering	VP2	27/11/2023	13:51:00	1	134	62.5m	34	100
RP53-23/24	Wintering	VP2	27/11/2023	13:57:00	1	52	62.5m	52	0
RP54-23/24	Wintering	VP2	27/11/2023	14:06:00	1	240	62.5m	40	200
RP59-23/24	Wintering	VP4	27/11/2023	11:20:00	1	47	15m	0	47
RP61-23/24	Wintering	VP4	27/11/2023	11:46:00	1	129	15m	0	129
RP63-23/24	Wintering	VP4	27/11/2023	12:09:00	1	129	62.5m	129	9
RP64-23/24	Wintering	VP4	27/11/2023	12:31:00	1	382	62.5m	182	200
RP66-23/24	Wintering	VP4	27/11/2023	12:09:00	1	240	15m	0	240

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP69-23/24	Wintering	VPA	27/11/2023	11:52:00	1	67	35m	0	67
RP70-23/24	Wintering	VPB	27/11/2023	11:03:00	1	20	15m	20	0
RP72-23/24	Wintering	VPB	29/11/2023	12:26:00	1	14	3m	2	12
RP74-23/24	Wintering	VP2	20/12/2023	09:02:00	1	8	35m	8	0
RP80-23/24	Wintering	VP5	20/12/2023	12:28:00	1	35	10m	0	35
RP87-23/24	Wintering	VPA	20/12/2023	12:15:00		83	62.5m	0	83
RP89-23/24	Wintering	VPB	20/12/2023	12:50:00	1	45	15m	20	25
RP104-23/24	Wintering	VP2	25/01/2024	12:46:00	1	40	2.5m	40	0
RP108-23/24	Wintering	VP2	25/01/2024	13:43:00	1	100	62.5m	0	100
RP122-23/24	Wintering	VP3	25/01/2024	13:19:00	1	82	62.5m	80	2
RP123-23/24	Wintering	VP3	25/01/2024	13:31:00	1	256	62.5m	256	0
RP127-23/24	Wintering	VP3	25/01/2024	14:27:00	1	80	62.5m	80	0
RP129-23/24	Wintering	VP4	25/01/2024	08:55:00	1	6	35m	0	6
RP132-23/24	Wintering	VPB	29/01/2024	13:40:00	1	10	10m	0	10
RP135-23/24	Wintering	VPA	02/02/2024	14:20:00	1	25	15m	25	0
RP137-23/24	Wintering	VP1, VP2	23/02/2024	11:37:00	1	105	62.5m	5	100
RP142-23/24	Wintering	VP1	23/02/2024	13:10:00	1	38	15m	0	38
RP146-23/24	Wintering	VP1	23/02/2024	14:41:00	1	66	15m	33	33
RP148-23/24	Wintering	VP2	23/02/2024	10:47:00	1	18	15m	2	16
RP169-23/24	Wintering	VPA	26/02/2024	10:57:00	1	120	62.5m	0	120
RP172-23/24	Wintering	VPA	26/02/2024	12:05:00	1	50	63.5m	50	0
RP179-23/24	Wintering	VPA	26/02/2024	14:51:00	1	33	62.5m	25	8
RP188-23/24	Wintering	VPB	26/02/2024	13:09:00	1	100	15m	50	50
RP191-23/24	Wintering	VP1	21/03/2024	08:24:00	1	600	2.5m	0	600
RP202-23/24	Wintering	VP1	21/03/2024	10:21:00	1	15	30m	15	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP210-23/24	Wintering	VP3	21/03/2024	11:45:00	1	32	62.5m	0	32
N/A	Wintering	VPB	27/03/2024	13:22:00	1	18	15m	-	-
RP222-23/24	Wintering	VP4	27/03/2024	11:53:00	1	12	35m	0	12
RP228-23/24	Wintering	VP5	27/03/2024	13:05:00	1	25	62.5m	0	25
RP229-23/24	Wintering	VP5	27/03/2024	13:06:00	1	65	50m	25	40
RP231-23/24	Wintering	VP5	27/03/2024	14:44:00	1	90	32.5m	0	90
RP238-23/24	Wintering	VPA	27/03/2024	13:55:00	1	40	15m	40	0
RP244-23/24	Wintering	VPB	27/03/2024	10:15:00	1	74	15m	70	4
RP245-23/24	Wintering	VPB	27/03/2024	10:27:00	2	50	15m	45	5
RP249-23/24	Wintering	VPB	27/03/2024	11:00:00	1	20	15m	0	20
RP255-23/24	Wintering	VPB	27/03/2024	12:48:00	2	220	2.5m	220	0
RP1-24	Breeding	VPB	28/05/2024	10:29:00	1	35	15m	20	15
RP5-24	Breeding	VP4	29/05/2024	10:42:00	1	180	17.5m	120	60
RP19-24	Breeding	VP2	31/05/2024	09:40:00	1	18	62.5m	0	18
RP22-24	Breeding	VP5	31/05/2024	10:19:00	1	120	15m	0	120
RP24-24	Breeding	VP2	31/05/2024	10:40:00	1	255	62.5m	0	255
RP33-24	Breeding	VP1, VP2	31/05/2024	11:54:00	1	128	2.5m	128	0
RP34-24	Breeding	VP5	31/05/2024	12:10:00	1	40	10m	0	40
RP40-24	Breeding	VP2	31/05/2024	13:11:00	1	600	62.5m	540	60
RP42-24	Breeding	VP2, VP1	31/05/2024	13:33:00	1	19	17.5m	0	19
RP43-24	Breeding	VP5	31/05/2024	14:06:00	1	45	12.5m	0	45
RP49-24	Breeding	VP5	24/06/2024	08:53:00	1	120	62.5m	0	120
RP50-24	Breeding	VP5	24/06/2024	09:11:00	1	240	62.5m	0	240
RP54-24	Breeding	VP5	24/06/2024	09:40:00	1	40	62.5m	0	40
RP56-24	Breeding	VP3	24/06/2024	09:44:00	1	106	62.5m	60	46

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP58-24	Breeding	VP5	24/06/2024	09:59:00	1	70	62.5m	0	70
RP60-24	Breeding	VP3	24/06/2024	10:49:00	1	60	62.5m	60	0
RP62-24	Breeding	VP3	24/06/2024	11:15:00	1	360	62.5m	360	0
RP63-24	Breeding	VPB	24/06/2024	11:28:00	1	25	35m	15	10
RP65-24	Breeding	VP5	24/06/2024	11:43:00	1	60	15m	0	60
RP70-24	Breeding	VP5	24/06/2024	11:55:00	1	30	15m	0	30
RP74-24	Breeding	VP3	24/06/2024	12:10:00	1	50	62.5m	50	0
RP78-24	Breeding	VPB	24/06/2024	12:21:00	1	50	45m	0	50
RP79-24	Breeding	VP3	24/06/2024	12:28:00	1	74	62.5m	0	74
RP82-24	Breeding	VP5	24/06/2024	12:34:00	1	20	15m	0	20
RP83-24	Breeding	VPB	24/06/2024	12:40:00	1	12	35m	0	12
RP84-24	Breeding	VP1	24/06/2024	12:42:00	1	40	27.5m	40	0
RP86-24	Breeding	VP3	24/06/2024	12:58:00	1	Unknown	62.5m	Unknown	Unkown
RP93-24	Breeding	VP1	24/06/2024	14:05:00	1	35	15m	35	0
RP95-24	Breeding	VP3	24/06/2024	14:24:00	1	50	62.5m	0	50
RP96-24	Breeding	VP1	24/06/2024	14:25:00	1	30	7.5m	30	0
RP102-24	Breeding	VP4	26/06/2024	09:39:00	1	50	21m	0	50
RP105-24	Breeding	VP4	26/06/2024	12:30:00	1	25	30m	0	25
RP107-24	Breeding	VP4	26/06/2024	14:46:00	1	45	40m	0	45
RP109-24	Breeding	VPA	27/06/2024	09:18:00	1	60	15m	10	50
RP110-24	Breeding	VPA	27/06/2024	09:28:00	1	120	15m	30	90
RP112-24	Breeding	VPA	27/06/2024	10:00:00	1	30	2.5m	0	30
RP115-24	Breeding	VP5	24/07/2024	09:33:00	1	60	5m	0	60
RP116-24	Breeding	VP5	24/07/2024	09:45:00	1	30	5m	0	30
RP117-24	Breeding	VP5	24/07/2024	10:14:00	1	30	4m	0	30

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP118-24	Breeding	VP5	24/07/2024	11:08:00	1	30	4m	0	30
RP120-24	Breeding	VP4	24/07/2024	11:29:00	1	24	62.5m	24	0
RP121-24	Breeding	VP4	24/07/2024	11:37:00	1	195	15m	0	195
RP124-24	Breeding	VP4	24/07/2024	13:12:00	1	200	62.5m	60	140
RP125-24	Breeding	VP2	24/07/2024	13:15:00	1	40	15m	40	0
RP127-24	Breeding	VP4	24/07/2024	13:18:00	1	360	15m	0	360
RP130-24	Breeding	VP4	24/07/2024	14:15:00	1	28	62.5m	0	28
RP131-24	Breeding	VP4	24/07/2024	14:19:00	1	28	62.5m	0	60
N/A	Breeding	VPB	29/07/2024	12:50:00	1	-	15m	-	-
RP133-24	Breeding	VPB	29/07/2024	11:10:00	1	20	15m	20	0
RP134-24	Breeding	VPB	29/07/2024	11:13:00	1	120	15m	120	0
RP135-24	Breeding	VPB	29/07/2024	11:20:00	1	150	15m	100	50
RP136-24	Breeding	VPB	29/07/2024	12:11:00	1	20	15m	0	20
RP140-24	Breeding	VPA	29/07/2024	13:59:00	1	25	35m	25	0
RP142-24	Breeding	VPA	29/07/2024	14:30:00	1	240	45m	0	240
RP144-24	Breeding	VPA	29/07/2024	15:01:00	1	50	17.5m	0	50
RP145-24	Breeding	VPA	23/08/2024	09:05:00	1	20	2.5m	20	0
RP146-24	Breeding	VP4	23/08/2024	10:05:00	1	8	30m	0	8
RP148-24	Breeding	VPA	23/08/2024	12:00:00	1	25	2.5m	25	0
RP150-24	Breeding	VPA	23/08/2024	12:30:00	1	120	15m	120	0
RP151-24	Breeding	VPA	23/08/2024	12:32:00	1	80	15m	80	0
RP155-24	Breeding	VPA	23/08/2024	13:34:00	2	20	15m	20	0
RP156-24	Breeding	VPA	23/08/2024	14:10:00	1	20	2.5m	0	20
RP158-24	Breeding	VP5	28/08/2024	09:27:00	1	100	15m	0	100
RP160-24	Breeding	VPB	28/08/2024	11:12:00	1	180	15m	180	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP161-24	Breeding	VPB	28/08/2024	11:15:00	1	1920	15m	1920	0
RP162-24	Breeding	VP3	28/08/2024	11:40:00	3	40	17.5m	40	0
RP163-24	Breeding	VPB	28/08/2024	11:58:00	1	48	15m	0	48
RP164-24	Breeding	VP5	28/08/2024	12:12:00	1	54	15m	0	54
RP167-24	Breeding	VP3	28/08/2024	12:53:00	1	25	22.5m	25	0
RP170-24	Breeding	VP1	28/08/2024	13:02:00	1	10	2.5m	10	0
RP171-24	Breeding	VP5	28/08/2024	13:10:00	1	16	15m	0	16
RP172-24	Breeding	VP3	28/08/2024	13:18:00	2	65	15m	65	0
RP173-24	Breeding	VPB	28/08/2024	13:20:00	1	840	12.5m	840	0
RP175-24	Breeding	VP5	28/08/2024	13:36:00	1	34	15m	0	34
RP178-24	Breeding	VP2	28/08/2024	14:03:00	1	15	40m	15	0
RP180-24	Breeding	VP3	28/08/2024	14:06:00	1	40	22.5m	40	0
RP181-24	Breeding	VP5	28/08/2024	14:11:00	1	32	15m	0	32
RP183-24	Breeding	VP5	28/08/2024	14:15:00	1	106	27.5m	0	106
RP187-24	Breeding	VP1	23/09/2024	12:53:00	1	420	12.5m	300	120
RP188-24	Breeding	VP1	23/09/2024	13:05:00	1	60	7.5m	10	50
RP191-24	Breeding	VP2	23/09/2024	13:39:00	1	13	40m	13	0
RP194-24	Breeding	VP2	23/09/2024	14:14:00	1	140	35m	140	0
RP195-24	Breeding	VP2	23/09/2024	14:15:00	1	60	40m	60	0
N/A	Breeding	VP4	24/09/2024	14:20:00	1	-	62.5m	-	-
RP196-24	Breeding	VP5	24/09/2024	08:51:00	1	36	15m	0	36
RP197-24	Breeding	VP4	24/09/2024	08:55:00	1	20	15m	0	20
RP198-24	Breeding	VP4	24/09/2024	09:00:00	1	35	2.5m	0	35
RP200-24	Breeding	VP4	24/09/2024	09:21:00	1	60	62.5m	55	5
RP201-24	Breeding	VP5	24/09/2024	09:28:00	1	32	15m	32	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP207-24	Breeding	VP5	24/09/2024	11:01:00	1	43	15m	0	43
RP209-24	Breeding	VP3	24/09/2024	11:30:00	1	25	30m	20	5
RP211-24	Breeding	VP5	24/09/2024	12:15:00	1	18	62.5m	0	18
RP212-24	Breeding	VP3	24/09/2024	12:31:00	1	340	1m	340	0
RP213-24	Breeding	VP4	24/09/2024	12:44:00	1	35	15m	0	35
RP214-24	Breeding	VP3	24/09/2024	13:05:00	1	260	2m	260	0
RP215-24	Breeding	VP5	24/09/2024	13:12:00	1	104	62.5m	0	104
RP218-24	Breeding	VP3	24/09/2024	13:35:00	1	65	40m	65	0
RP219-24	Breeding	VP5	24/09/2024	13:50:00	1	52	62.5m	0	52
RP223-24	Breeding	VPA	27/09/2024	11:41:00	1	660	40m	0	660
RP225-24	Breeding	VPA	27/09/2024	12:49:00	1	25	37.5m	25	0
RP226-24	Breeding	VPA	27/09/2024	13:04:00	1	720	26m	360	360
RP228-24	Breeding	VPB	28/09/2024	14:02:00	1	20	2.5m	10	10

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00010	Winter	VP1	28/10/2025	13:33:00	1	5	32	120	0	0	157
F00027	Winter	VP2	30/10/2025	08:37:00	1	31	0	0	0	0	31
F00051	Winter	VP5	17/10/2025	11:58:00	1	0	25	13	0	0	38
F00061	Winter	VP4	21/11/2025	11:10:00	1	33	0	0	0	0	33

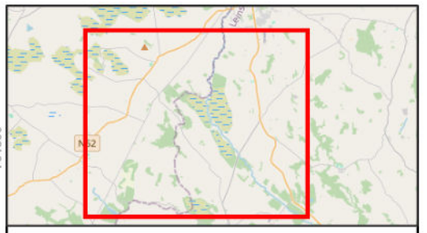
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00148	Winter	VP3	28/11/2025	13:03:00	1	0	122	284	0	0	406
F00150	Winter	VP3	28/11/2025	13:09:00	1	0	85	0	0	0	85
F00153	Winter	VP3	28/11/2025	13:42:00	1	0	23	218	0	0	241
F00154	Winter	VP3	28/11/2025	13:46:00	1	0	0	192	0	0	192
F00157	Winter	VP3	28/11/2025	13:54:00	1	0	0	64	0	0	64
F00165	Winter	VP5	08/12/2025	11:44:00	1	0	0	18	200	0	218
F00167	Winter	VP5	08/12/2025	13:58:00	1	8	60	60	60	0	188
F00171	Winter	VP5	08/12/2025	16:02:00	1	13	120	0	0	0	133
F00222	Winter	VP1	02/12/2025	15:48:00	1	0	0	244	0	0	244
F00251	Winter	VP2	03/12/2025	12:29:00	1	0	0	553	0	0	553
F00254	Winter	VP2	03/12/2025	12:54:00	1	0	0	254	0	0	254
F00255	Winter	VP2	03/12/2025	13:12:00	1	0	0	63	0	0	63
F00260	Winter	VP2	03/12/2025	13:51:00	1	0	0	23	0	0	23
F00263	Winter	VP2	03/12/2025	14:15:00	1	0	0	618	0	0	618
F00286	Winter	VP3	04/12/2025	13:53:00	1	0	0	28	0	0	28
F00333	Winter	VP2	21/01/2026	12:04:00	1	0	0	74	0	0	74
F00334	Winter	VP2	21/01/2026	12:13:00	1	0	101	48	0	0	149
F00335	Winter	VP2	21/01/2026	12:21:00	1	0	53	118	0	0	171
F00336	Winter	VP2	21/01/2026	12:30:00	1	0	0	91	0	0	91
F00340	Winter	VP2	21/01/2026	14:11:00	1	0	23	21	0	0	44
F00382	Winter	VP4	11/02/2026	08:18:00	1	10	25	0	0	0	35
F00395	Winter	VP1	10/02/2026	13:16:00	1	0	35	0	0	0	35
F00402	Winter	VP1	10/02/2026	17:34:00	1	0	0	106	0	0	106
F00418	Winter	VP3	13/02/2026	09:10:00	1	0	34	0	0	0	34
F00452	Winter	VP1	24/02/2026	12:47:00	1	0	0	25	0	0	25

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00469	Winter	VP1	24/02/2026	17:57:00	1	0	137	0	0	0	137
F00470	Winter	VP1	24/02/2026	18:09:00	1	11	45	33	0	0	89
F00471	Winter	VP2	25/02/2026	12:53:00	1	0	61	0	0	0	61
F00475	Winter	VP2	25/02/2026	13:37:00	1	0	23	0	0	0	23
F00480	Winter	VP2	25/02/2026	16:24:00	1	0	0	70	0	0	70
F00481	Winter	VP2	25/02/2026	16:33:00	1	12	0	0	0	0	12
F00482	Winter	VP2	25/02/2026	16:38:00	1	0	64	0	0	0	64
F00495	Winter	VP3	26/02/2026	14:26:00	1	0	0	137	0	0	137
F00498	Winter	VP3	26/02/2026	14:55:00	1	0	54	89	12	0	155
F00501	Winter	VP3	26/02/2026	16:26:00	1	34	43	307	84	0	468
F00505	Winter	VP3	26/02/2026	17:12:00	1	0	104	0	0	0	104
F00538	Winter	VP2	17/02/2026	11:45:00	1	0	29	0	0	0	29

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	1	1	1	-	1	-	-	1	-	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-
2022/2023	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-
2020/2021	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	1	-	1	-	-	-	1	-	-	1	-	-	-	-	-	1	-	-	1	-	1	1	-	-
2023/2024	-	-	-	1	-	1	1	-	1	-	1	-	-	1	-	-	-	-	1	-	-	-	-	1
2024	1	-	1	-	1	-	1	-	1	-	-	1	-	-	-	1	-	-	1	-	1	-	1	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00265	Winter	Transect	T2,5,6	24/11/2025	12:54:00	1	PB1	in flight
P00273	Winter	Transect	T2,5,6	24/11/2025	14:21:00	1	WS1	in flight
P00348	Winter	Transect	T1	11/12/2025	09:10:00	1	WD4	in flight
P00355	Winter	HH roost	HHVP2	10/12/2025	16:08:00	1	GA1	in flight
P00480	Winter	HH roost	HHVP2	03/12/2025	15:20:00	1	PB1	N/A
P00646	Winter	Transect	T1, T3, T4	11/02/2026	12:33:00	1	GS4	N/A
P00664	Winter	Transect	T1, T3, T4	11/02/2026	14:57:00	1	PB1	N/A
P00721	Winter	Transect	T3	09/03/2026	12:02:00	1	PB4	N/A
P00803	Winter	Transect	T2	13/03/2026	16:11:00	1	PB1	Hunting
P00803	Winter	Transect	T2	13/03/2026	16:11:00	1	PB1	Hunting

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	1	N/A	N/A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Kestrel

Flightlines - Ecology Ireland 2020 - 2024

Species

- Kestrel

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 28:
Kestrel observations
over the survey period
(May 2020 – March 2026)
Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-008.ApX-VP-K-SUM-A_overview

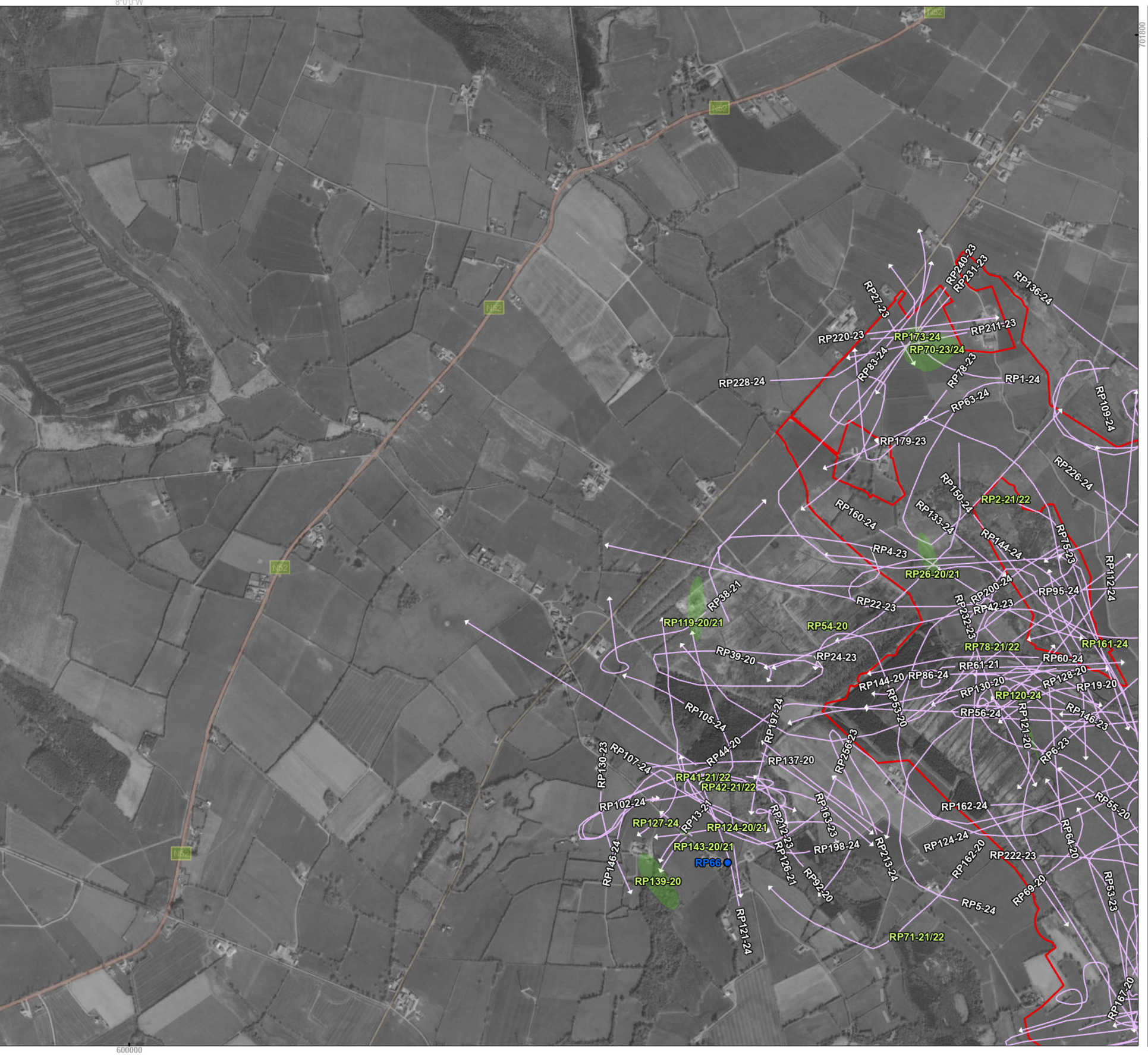
Draft: A

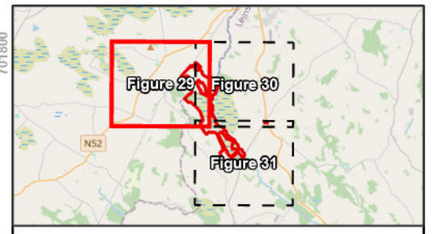
8°0'0"W

53°3'45"N

600000

701800





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Kestrel

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 29:
Kestrel observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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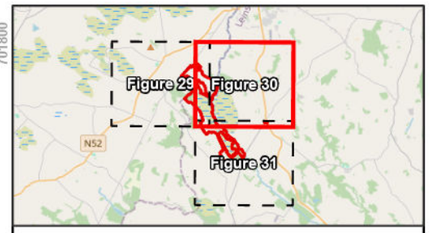
Map Ref: 11333-008.ApX.BBS-VP-K-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Kestrel

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 30:
Kestrel observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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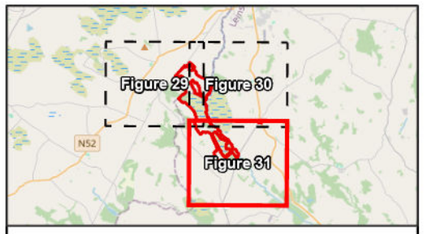
Map Ref: 11333-008.ApX.BBS-VP-K-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Kestrel

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 31:
Kestrel observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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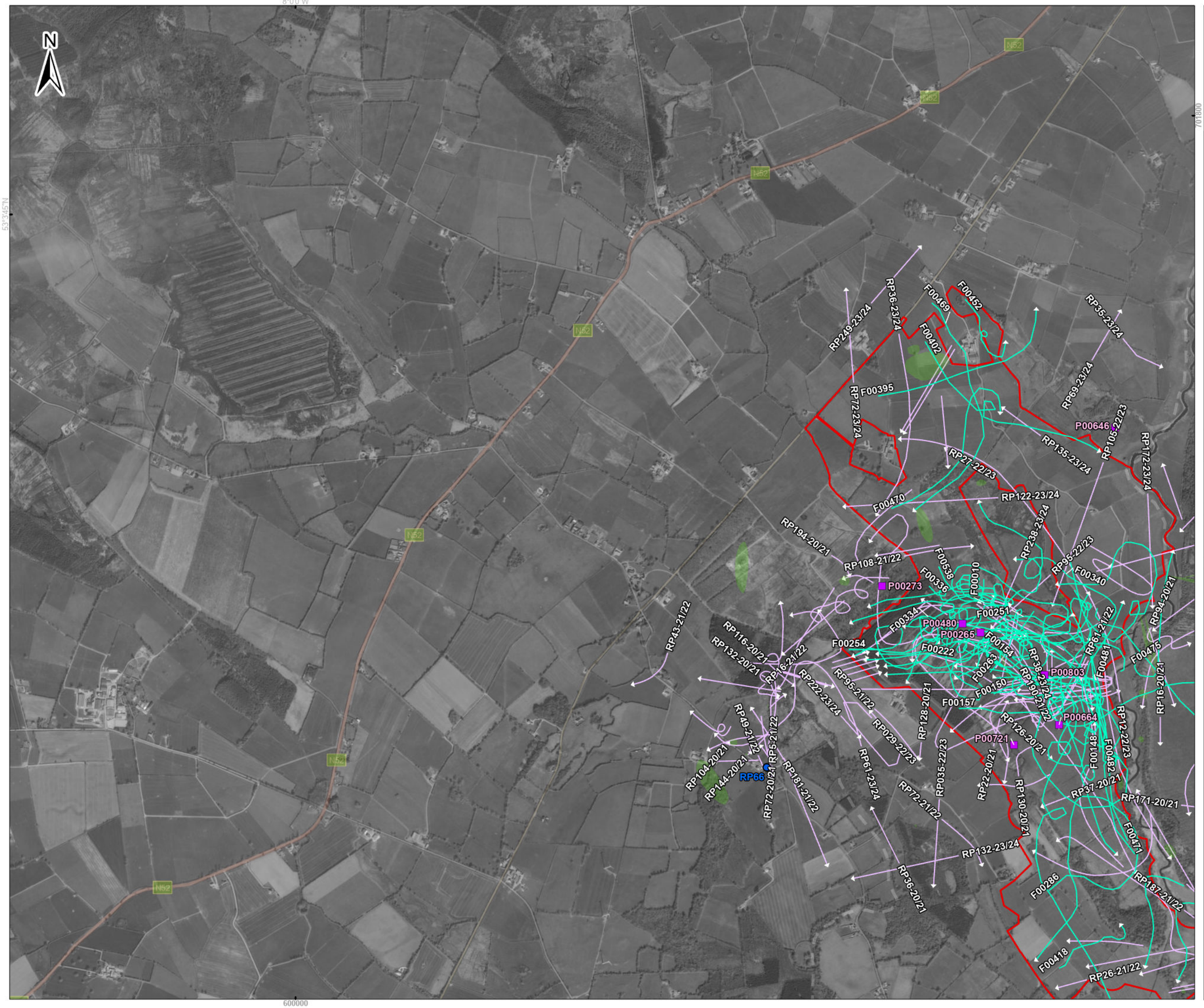
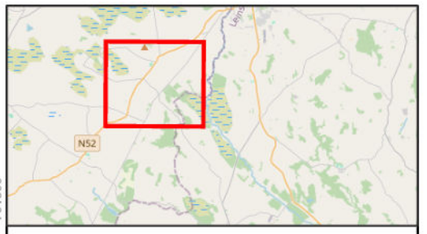
Map Ref: 11333-008.ApX.BBS-VP-K-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Kestrel

Flightlines - Ecology Ireland 2020 - 2024

- Kestrel

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 32:
Kestrel observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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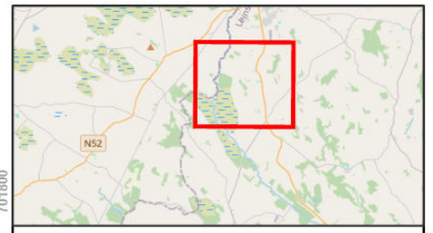
Map Ref: 11333-008.ApX.WBS-VP-K-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Kestrel

Flightlines - Ecology Ireland 2020 - 2024

- Kestrel

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 33:
Kestrel observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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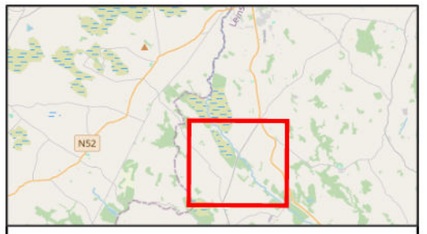
Map Ref: 11333-008.ApX.WBS-VP-K-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Kestrel

Flightlines - Ecology Ireland 2020 - 2024

- Kestrel

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 34:
Kestrel observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-008.ApX.WBS-VP-K-SUM-A

Draft: A

Appendix 7-1 - X LAPWING

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Wintering	VP, 1	05/11/2020	10:08:00	1	14	80m	4	10
N/A	Wintering	VP, 1	05/11/2020	10:25:00	50	60	100m	10	50
WD10-20/21	Wintering	VP, 2	05/11/2020	10:39:00	39	20	62.5m	20	0
WD11-20/21	Wintering	VP, 2	05/11/2020	11:14:00	10	60	62.5m	30	30
WD12-20/21	Wintering	VP, 1	05/11/2020	11:17:00	22	35	125m	35	0
WD13-20/21	Wintering	VP, 1	05/11/2020	11:19:00	3	17	75m	17	0
WD14-20/21	Wintering	VP, 5	05/11/2020	11:51:00	7	130	200m	0	130
WD15-20/21	Wintering	VP, 5	05/11/2020	11:57:00	30	120	175m	0	120
WD16-20/21	Wintering	VP, 3, VP, 1	05/11/2020	12:22:00	21	222	115m	122	100
WD17-20/21	Wintering	VP, 5	05/11/2020	12:49:00	60	175	150m	0	175
WD18-20/21	Wintering	VP, 1	05/11/2020	12:51:00	40	40	50m	40	0
WD19-20/21	Wintering	VP, 5, VP, 3	05/11/2020	13:09:00	13	230	162.5m	190	40
WD6-20/21	Wintering	VP, 2	05/11/2020	09:10:00	20	20	62.5m	20	0
WD7-20/21	Wintering	VP, 1, VP, 3, VP, 5	05/11/2020	10:09:00	9	155	127.5m	145	10
WD9-20/21	Wintering	VP, 3	05/11/2020	10:24:00	71	306	40m	122	184
WD24-20/21	Wintering	VP, 1	04/12/2020	10:27:00	11	40	20m	0	40
WD25-20/21	Wintering	VP, 5	04/12/2020	10:47:00	20	30	15m	20	10
WD27-20/21	Wintering	VP, 4	04/12/2020	11:15:00	Unknown	Unknown	0m	Unknown	Unknown
WD32-20/21	Wintering	VP, 2	14/01/2021	09:51:00	18	145	40m	0	145
WD34-20/21	Wintering	VP, 2	14/01/2021	15:12:00	9	124	17.5m	0	124
WD37-20/21	Wintering	VP, 2	09/02/2021	09:30:00	12	70	100m	50	20

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD1-21/22	Wintering	VP3	18/11/2021	11:03:00	70	120	25m	0	120
N/A	Wintering	VP3	02/12/2021	10:06:00	10	35	5m	0	35
WD6-21/22	Wintering	VP3	14/01/2022	09:22:00	13	25	25m	20	5
WD10-21/22	Wintering	VP3	10/02/2022	09:32:00	15	228	25m	0	228
WD11-21/22	Wintering	VP3	10/02/2022	11:55:00	12	53	25m	0	53
WD12-21/22	Wintering	VP2	11/02/2022	12:49:00	20	10	5m	0	10
WD2-22/23	Wintering	VP1, VP5, VP2	28/11/2022	10:47:00	97	240	45m	70	170
WD5-22/23	Wintering	VP2, VP1	28/11/2022	14:36:00	60	50	25m	50	0
WD6-22/23	Wintering	VPA	30/11/2022	10:03:00	200	156	62.5m	0	156
WD10-22/23	Wintering	VP4	20/12/2022	09:36:00	22	82	62.5m	0	82
WD11-22/23	Wintering	VP3	20/12/2022	10:21:00	3	40	62.5m	40	0
WD12-22/23	Wintering	VP4	20/12/2022	10:28:00	4	26	15m	26	0
WD14-22/23	Wintering	VPB, VP3	20/12/2022	13:08:00	6	72	2.5m	22	50
WD15-22/23	Wintering	VPB	20/12/2022	14:00:00	2	58	15m	8	50
WD20-22/23	Wintering	VP2	21/12/2022	11:05:00	1	45	65m	0	45
WD46-22/23	Wintering	VPA	27/01/2023	10:10:00	3	60	2.5m		60
WD48-22/23	Wintering	VP3	27/01/2023	14:18:00	120	471	60m		471
WD21-22/23	Wintering	VPA, VPB	20/02/2023	09:33:00	25	33	5m	33	0
WD22-22/23	Wintering	VPA, VP3	20/02/2023	09:40:00	60	1700	200m	0	1700
WD23-22/23	Wintering	VP3	20/02/2023	10:09:00	65	79	62.5m	0	79
WD24-22/23	Wintering	VPA	20/02/2023	12:15:00	80	20	110m	20	0
WD25-22/23	Wintering	VPA	20/02/2023	12:34:00	35	99	20m	0	99
WD26-22/23	Wintering	VP4	20/02/2023	12:43:00	40	180	25m	10	170

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD27-22/23	Wintering	VPA	20/02/2023	12:50:00	40	60	12.5m	35	25
WD28-22/23	Wintering	VP5	20/02/2023	12:51:00	1	72	90m	60	12
WD29-22/23	Wintering	VPB	20/02/2023	13:17:00	100	35	20m	10	25
WD30-22/23	Wintering	VPA	20/02/2023	14:10:00	115	277	40m	77	200
WD31-22/23	Wintering	VP4	20/02/2023	14:16:00	100	120	25m	10	110
WD40-22/23	Wintering	VPA	27/03/2023	10:59:00	3	58	62.5m	29	29
WD2-23	Breeding	VPA	20/07/2023	09:08:00	4	180	2.5m	180	0
WD11-23/24	Wintering	VP4	24/10/2023	14:34:00	16	155	62.5m	0	155
WD14-23/24	Wintering	VPA	24/10/2023	10:40:00	14	180	45m	10	170
WD15-23/24	Wintering	VPA	24/10/2023	10:43:00	19	56	60m	0	56
WD16-23/24	Wintering	VPA	24/10/2023	14:11:00	55	654	75m	0	654
WD9-23/24	Wintering	VP3, VP5	24/10/2023	10:39:00	14	45	60m	45	0
WD25-23/24	Wintering	VP4, VPA	27/11/2023	11:02:00	95	36	62.5m	14	120
WD27-23/24	Wintering	VP5	27/11/2023	10:59:00	10	25	15m	25	0
WD31-23/24	Wintering	VPA	20/12/2023	09:52:00	100	160	62.5m	0	160
WD49-23/24	Wintering	VPA	26/02/2024	09:48:00	45	240	62.5m	0	240
WD50-23/24	Wintering	VPA	26/02/2024	10:03:00	16	360	15m	180	180

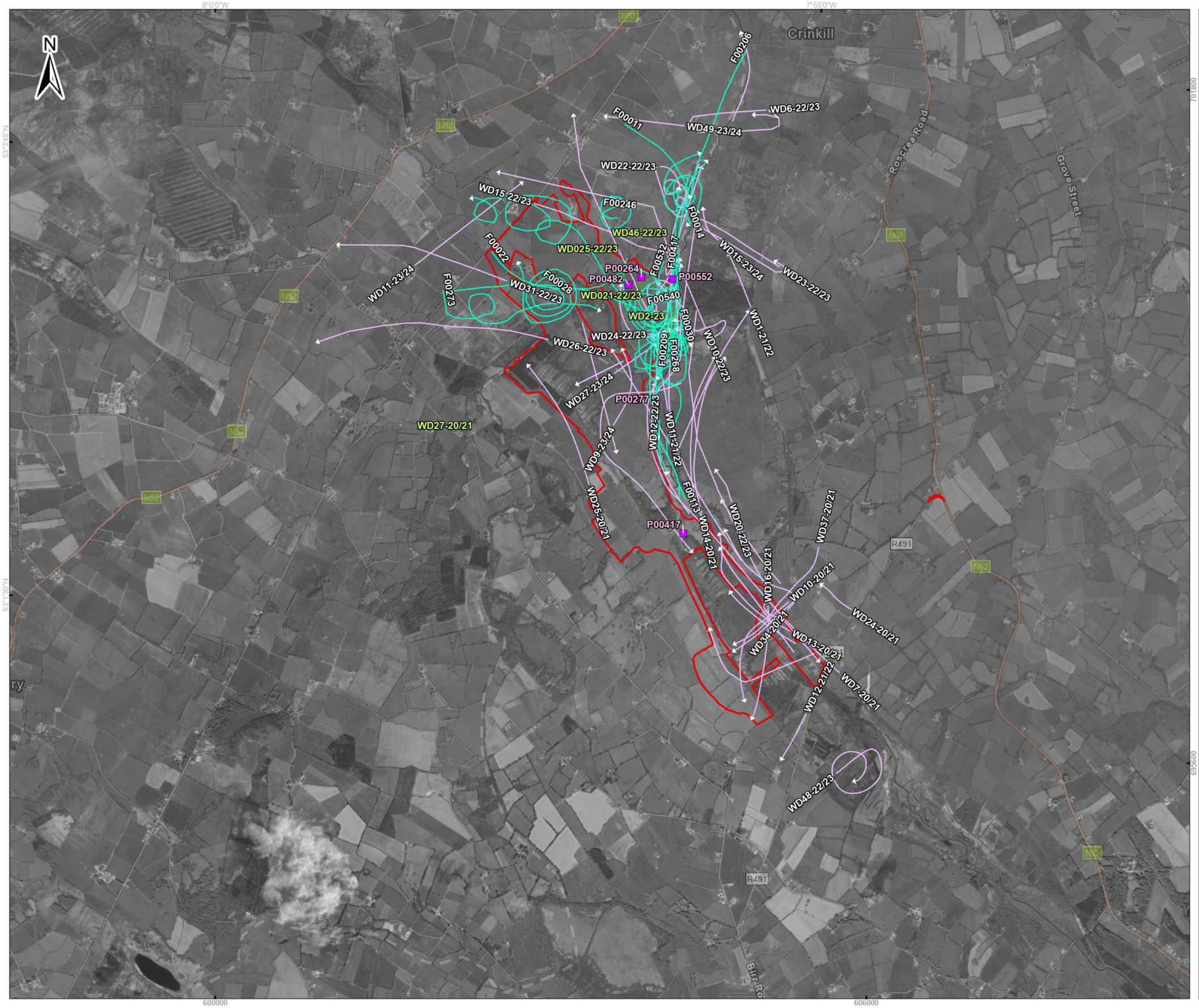
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00011	Winter	VP1	28/10/2025	13:52:00	14	8	20	120	0	0	148
F00014	Winter	VP1	28/10/2025	14:33:00	50	0	15	60	60	0	135
F00022	Winter	VP1	28/10/2025	16:15:00	60	8	10	60	0	0	78
F00028	Winter	VP2	30/10/2025	08:54:00	18	0	0	0	0	183	183
F00030	Winter	VP2	30/10/2025	09:10:00	18	0	0	0	120	60	180
F00085	Winter	VP1	27/11/2025	09:14:00	32	0	0	20	0	0	20
F00093	Winter	VP1	27/11/2025	12:33:00	109	109	184	301	0	0	594
F00113	Winter	VP2	25/11/2025	13:02:00	66	0	13	29	0	0	42
F00152	Winter	VP3	28/11/2025	13:41:00	107	0	9	89	0	0	98
F00206	Winter	VP1	02/12/2025	13:05:00	12	0	25	0	0	0	25
F00209	Winter	VP1	02/12/2025	13:17:00	28	0	0	65	0	0	65
F00216	Winter	VP1	02/12/2025	14:45:00	26	4	39	0	0	0	43
F00231	Winter	VP2	03/12/2025	08:45:00	27	0	0	46	0	0	46
F00246	Winter	VP2	03/12/2025	10:45:00	32	0	0	69	0	0	69
F00262	Winter	VP2	03/12/2025	14:03:00	72	0	0	67	124	0	191
F00268	Winter	VP3	04/12/2025	09:19:00	66	0	3	47	0	0	50
F00273	Winter	VP3	04/12/2025	10:28:00	120	0	0	0	0	92	92
F00277	Winter	VP3	04/12/2025	11:56:00	74	0	0	93	0	0	93
F00417	Winter	VP2	12/02/2026	13:47:00	6	0	18	0	0	0	18
F00532	Winter	VP2	17/02/2026	10:48:00	29	0	0	62	0	0	62
F00540	Winter	VP2	17/02/2026	12:22:00	1	4	23	35	0	0	62

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2022/2023	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	2	-	-	-
2020/2021	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023/2024	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00264	Winter	Transect	T2,5,6	24/11/2025	12:35:00	145	GA1	on ground
P00277	Winter	HH roost	HHVP1	24/11/2025	15:58:00	12	FW2	in flight
P00417	Winter	VP	VP3	04/12/2025	10:28:00	5	N/A	N/A
P00482	Winter	HH roost	HHVP2	03/12/2025	15:55:00	67	GA1	N/A
P00552	Winter	Transect	T2. T5, T6	22/01/2026	13:02:00	4	GA1	on ground

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	46	N/A	N/A
Winter	I-WeBS	All Saints Bog SPA	26/11/2025	N/A	1000	N/A	N/A
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	35	N/A	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	157	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	26/11/2025	N/A	5	N/A	N/A
Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	15	N/A	N/A
Winter	I-WeBS	Dovesgrove Callows	01/12/2025	N/A	71	N/A	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	1100	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	172	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	09/02/2026	N/A	71	N/A	N/A
Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	2300	N/A	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	310	N/A	N/A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Lapwing

Flightlines - Ecology Ireland 2020 - 2024

- Lapwing

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community,

Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 35:
Lapwing observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-009.ApX-VP-L.-SUM-A

Draft: A

Appendix 7-1 - XI LESSER BLACK-BACKED GULL

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT53-20	Breeding	VP4	04/06/2020	11:05:00	1	12	45m	0	12
WT73-20	Breeding	VP1	04/06/2020	14:15:00	1	90	17.5m	90	0
WT80-20	Breeding	VP4	10/07/2020	09:30:00	2	9	20m	9	0
WT81-20	Breeding	VP4	10/07/2020	09:40:00	2	300	100m	300	0
WT82-20	Breeding	VP4	10/07/2020	09:45:00	10	11	22.5m	11	0
WT83-20	Breeding	VP4	10/07/2020	09:52:00	2	125	80m	60	65
WT84-20	Breeding	VP4	10/07/2020	09:59:00	10	10	17.5m	8	2
WT89-20	Breeding	VP4	10/07/2020	11:28:00	9	120	35m	120	0
WT90-20	Breeding	VP5	10/07/2020	11:29:00	4	30	80m	0	30
WT91-20	Breeding	VP2	10/07/2020	11:30:00	5	120	150m	0	120
WT93-20	Breeding	VP2	10/07/2020	12:55:00	1	210	47.5m	0	210
WT94-20	Breeding	VP2, VP5	10/07/2020	12:55:00	1	460	65m	120	340
WT95-20	Breeding	VP3	10/07/2020	13:13:00	1	60	75m	60	0
WT95-20	Breeding	VP3	10/07/2020	13:13:00	1	60	75m	60	0
WT97-20	Breeding	VP2	10/07/2020	13:38:00	2	80	62.5m	0	80
WT100-20	Breeding	VP5	14/08/2020	13:01:00	1	50	150m	0	50
WT1-20/21	Wintering	VP, 4	08/10/2020	08:55:00	1	60	15m	30	30
WT10-20/21	Wintering	VP, 4	08/10/2020	09:25:00	20	60	5m	0	60
WT11-20/21	Wintering	VP, 4	08/10/2020	09:26:00	10	60	5m	0	60
WT13-20/21	Wintering	VP, 4	08/10/2020	09:40:00	13	60	5m	0	60
WT17-20/21	Wintering	VP, 4	08/10/2020	09:52:00	20	60	5m	0	60
WT18-20/21	Wintering	VP, 1	08/10/2020	10:01:00	1	5	3m	5	0
WT19-20/21	Wintering	VP, 4	08/10/2020	10:04:00	16	60	5m	0	60

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT3-20/21	Wintering	VP, 4	08/10/2020	09:05:00	200	120	0m	120	0
WT31-20/21	Wintering	VP, 4	08/10/2020	14:30:00	10	30	62.5m	0	30
WT4-20/21	Wintering	VP, 4	08/10/2020	09:07:00	200	120	15m	120	0
WT5-20/21	Wintering	VP, 3	08/10/2020	09:08:00	45	240	150m	240	0
WT6-20/21	Wintering	VP, 3	08/10/2020	09:12:00	26	360	200m	0	360
WT8-20/21	Wintering	VP, 4	08/10/2020	09:15:00	5	60	5m	0	60
WT41-20/21	Wintering	VP, 3	05/11/2020	11:25:00	16	178	45m	178	0
WT42-20/21	Wintering	VP, 4	05/11/2020	11:49:00	3	25	40m	0	25
WT57-20/21b	Wintering	VP, 3	05/11/2020	13:58:00	2	140	55m	0	140
WT66-20/21	Wintering	VP, 3	05/11/2020	14:58:00	19	116	70m	116	0
WT3-21	Breeding	VP2	23/04/2021	10:25:00	2	108	90m	0	108
WT29-21	Breeding	VP1	17/05/2021	13:59:00	10	45	100m+	0	45
WT35-21	Breeding	VP3	11/06/2021	10:53:00	5	70	30m	70	0
WT38-21	Breeding	VP5	11/06/2021	10:54:00	5	45	62.5m	0	45
WT56-21	Breeding	VP4	18/08/2021	11:25:00	1	15	62.5m	15	0
WT57-21	Breeding	VP4	18/08/2021	11:30:00	6	20	62.5m	20	0
WT58-21	Breeding	VP4	18/08/2021	14:20:00	25	20	16.5m	0	20
WT60-21	Breeding	VP3	18/08/2021	11:44:00	8	55	25m	25	30
WT7-21/22	Wintering	VP3	18/11/2021	10:28:00	2	323	25m	300	23
WT78-21/22	Wintering	VP5	06/12/2021	14:15:00	1	56	40m	0	56
WT202-21/22	Wintering	VP2, VP3, VP5	14/03/2022	11:36:00	6	1235	25m	1125	110
WT169-22/23	Wintering	VPA	20/02/2023	12:00:00	2	102	25m	102	0
WT205-22/23	Wintering	VPA	27/03/2023	10:15:00	3	191	62.5m	0	191

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT206-22/23	Wintering	VPA, VPB	27/03/2023	10:27:00	2	100	62.5m	80	20
WT208-22/23	Wintering	VPA	27/03/2023	10:36:00	9	520	62.5m	260	260
WT209-22/23	Wintering	VP4	27/03/2023	10:40:00	13	74	20m	20	54
WT212-22/23	Wintering	VPB	27/03/2023	10:47:00	9	80	62.5m	40	40
WT213-22/23	Wintering	VPA	27/03/2023	10:53:00	5	310	62.5m	150	160
WT221-22/23	Wintering	VPA	27/03/2023	11:28:00	7	330	62.5m	0	330
WT226-22/23	Wintering	VPA	27/03/2023	12:31:00	80	600	62.5m	0	600
WT17-23	Breeding	VP1	30/05/2023	14:29:00	1	26	45m	26	0
WT23-23	Breeding	VP2	23/06/2023	11:31:00	4	135	62.5m	0	135
WT26-23	Breeding	VP2	23/06/2023	13:03:00	1	40	62.5m	0	40
WT30-23	Breeding	VPA	27/06/2023	12:44:00	2	83	25m	60	23
N/A	Breeding	VPA	20/07/2023	14:07:00	11	0	25	0	0
WT39-23	Breeding	VPA	20/07/2023	09:20:00	7	69	15m	34	35
WT42-23	Breeding	VPA	20/07/2023	09:42:00	4	68	15m	34	34
WT52-23	Breeding	VPA	20/07/2023	11:45:00	1	102	15m	52	50
WT53-23	Breeding	VPA	20/07/2023	12:10:00	4	160	15m	82	78
WT55-23	Breeding	VPA	20/07/2023	12:46:00	1	110	15m	110	0
WT56-23	Breeding	VPA	20/07/2023	12:52:00	1	44	15m	22	22
WT103-23	Breeding	VP4	28/08/2023	11:01:00	3	251	100m	21	230
WT104-23	Breeding	VPB	28/08/2023	11:05:00	3	22	115m	22	0
WT105-23	Breeding	VP4, VPB	28/08/2023	11:41:00	3	237	100m	237	0
WT111-23	Breeding	VP4	28/08/2023	13:12:00	17	90	55m	0	90
WT112-23	Breeding	VPA	28/08/2023	13:17:00	1	62	75m	40	22
WT114-23	Breeding	VPB	28/08/2023	13:21:00	1	10	35m	8	2

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT115-23	Breeding	VPA	28/08/2023	13:30:00	1	126	150m	126	0
WT116-23	Breeding	VPB	28/08/2023	13:31:00	7	10	35m	8	2
WT117-23	Breeding	VP3, VP4, #14	28/08/2023	13:35:00	1	97	15m	7	90
WT120-23	Breeding	VP4	28/08/2023	14:11:00	14	136	35m	26	110
WT121-23	Breeding	VP3	28/08/2023	14:13:00	31	60	15m	15	45
WT123-23	Breeding	VP2	28/08/2023	14:18:00	3	18	40m	6	12
WT124-23	Breeding	VP4	28/08/2023	14:54:00	3	29	20m	0	29
WT78-23	Breeding	VP4	28/08/2023	09:41:00	1	57	60m	0	57
WT80-23	Breeding	VP4	28/08/2023	09:44:00	1	32	40m	32	0
WT84-23	Breeding	VPA	28/08/2023	08:19:00	2	122	125m	102	20
WT87-23	Breeding	VPB	28/08/2023	08:32:00	8	12	35m	12	0
WT88-23	Breeding	VPB	28/08/2023	09:26:00	11	10	10m	10	0
WT89-23	Breeding	VPB	28/08/2023	09:55:00	32	7	55m	7	0
WT92-23	Breeding	VP3	28/08/2023	09:20:00	3	60	62.5m	60	0
WT98-23	Breeding	VP4	28/08/2023	10:40:00	24	20	30m	12	8
WT99-23	Breeding	VPA	28/08/2023	10:42:00	5	92	10m	0	92
WT125-23	Breeding	VPB	26/09/2023	08:58:00	1	52	15m	0	52
WT128-23	Breeding	VPB	26/09/2023	09:02:00	4	54	15m	0	54
WT135-23	Breeding	VPB	26/09/2023	09:27:00	5	130	62.5m	60	70
WT136-23	Breeding	VP4	26/09/2023	09:27:00	1	12	60m	12	0
WT138-23	Breeding	VPA	26/09/2023	10:26:00	2	15	62.5m	0	15
WT140-23	Breeding	VPB, VP4	26/09/2023	12:39:00	1	310	62.5m	30	280
WT143-23	Breeding	VPB	26/09/2023	13:40:00	2	68	15m	0	68
WT144-23	Breeding	VPA	26/09/2023	13:46:00	3	120	15m	60	60

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT25-23/24	Wintering	VP4	24/10/2023	09:02:00	1	56	62.5m	30	26
WT26-23/24	Wintering	VP4	24/10/2023	09:30:00	12	58	62.5m	0	58
WT27-23/24	Wintering	VP4	24/10/2023	09:38:00	5	42	62.5m	0	42
WT28-23/24	Wintering	VP4	24/10/2023	09:40:00	2	56	62.5m	50	6
WT29-23/24	Wintering	VP4	24/10/2023	09:52:00	1	82	62.5m	2	80
WT30-23/24	Wintering	VP4	24/10/2023	10:00:00	1	42	62.5m	2	40
WT32-23/24	Wintering	VP4, VPB	24/10/2023	10:24:00	14	100	62.5m	50	50
WT33-23/24	Wintering	VP4	24/10/2023	10:34:00	1	54	62.5m	0	54
WT34-23/24	Wintering	VP4	24/10/2023	10:49:00	1	66	62.5m	20	46
WT37-23/24	Wintering	VP4	24/10/2023	12:16:00	1	64	62.5m	0	64
WT39-23/24	Wintering	VP4	24/10/2023	13:03:00	15	144	62.5m	0	144
WT53-23/24	Wintering	VPA	24/10/2023	11:21:00	7	129	35m	125	4
WT54-23/24	Wintering	VPA	24/10/2023	11:40:00	24	120	25m	120	0
WT56-23/24	Wintering	VPA	24/10/2023	13:13:00	11	120	15m	40	80
WT59-23/24	Wintering	VPB	24/10/2023	08:21:00	42	115	35m	55	60
WT60-23/24	Wintering	VPB	24/10/2023	08:34:00	2	85	75m	45	40
WT267-23/24	Wintering	VPA	02/02/2024	11:35:00	2	20	15m	14	6
WT268-23/24	Wintering	VPA	02/02/2024	12:05:00	2	130	15m	130	0
WT278-23/24	Wintering	VP1	23/02/2024	09:06:00	12	84	62.5m	0	84
WT286-23/24	Wintering	VP1, VP2	23/02/2024	10:37:00	1	120	62.5m	35	95
WT302-23/24	Wintering	VP5	26/02/2024	11:46:00	14	21	35m	0	21
WT314-23/24	Wintering	VPA	26/02/2024	11:48:00	4	112	62.5m	50	62
WT320-23/24	Wintering	VPB	26/02/2024	11:53:00	14	25	62.5m	0	25
WT330-23/24	Wintering	VP1	21/03/2024	12:00:00	6	94	62.5m	30	64
WT344-23/24	Wintering	VP3	21/03/2024	08:50:00	6	130	62.5m	100	30

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT353-23/24	Wintering	VP3	21/03/2024	09:51:00	6	100	62.5m	80	20
WT356-23/24	Wintering	VP3	21/03/2024	10:38:00	35	600	62.5m	550	50
WT359-23/24	Wintering	VP3	21/03/2024	10:54:00	3	50	62.5m	40	10
WT368-23/24	Wintering	VP3	21/03/2024	12:52:00	4	75	62.5m	75	0
WT372-23/24	Wintering	VP3	21/03/2024	10:38:00	35	600	62.5m	100	500
WT374-23/24	Wintering	VP3	21/03/2024	14:28:00	4	42	62.5m	0	42
WT391-23/24	Wintering	VPA	27/03/2024	10:41:00	20	180	15m	20	160
WT398-23/24	Wintering	VPA	27/03/2024	14:28:00	2	100	62.5m	100	0
WT403-23/24	Wintering	VPB	27/03/2024	10:12:00	4	145	62.5m	5	140
WT404-23/24	Wintering	VPB	27/03/2024	10:25:00	50	320	62.5m	170	50
WT408-23/24	Wintering	VPB	27/03/2024	14:14:00	1	120	62.5m	80	40
WT14-24	Breeding	VPB	28/05/2024	14:46:00	11	1500	5m	1500	0
WT16-24	Breeding	VPA	28/05/2024	15:02:00	13	45	5m	45	0
WT5-24	Breeding	VPB	28/05/2024	10:46:00	3	40	27.5m	40	0
WT18-24	Breeding	VP4	29/05/2024	09:19:00	10	120	62.5m	30	90
WT19-24	Breeding	VP4	29/05/2024	09:32:00	1	120	62.5m	30	90
WT23-24	Breeding	VP4	29/05/2024	13:08:00	1	240	25m	40	200
WT24-24	Breeding	VP4	29/05/2024	13:35:00	1	180	62.5m	0	180
WT25-24	Breeding	VP4	29/05/2024	14:30:00	1	0	87.5m	Unknown	Unkown
WT26-24	Breeding	VP4	29/05/2024	14:49:00	1	180	50m	60	120
WT57-24	Breeding	VP3	24/06/2024	10:34:00	1	55	62.5m	25	30
WT60-24	Breeding	VP5	24/06/2024	12:04:00	1	40	15m	40	0
WT61-24	Breeding	VPB	24/06/2024	12:11:00	1	6	5m	6	0
WT66-24	Breeding	VPB	24/06/2024	13:13:00	2	7	7.5m	7	0
WT67-24	Breeding	VPB	24/06/2024	13:41:00	3	11	21m	6	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT69-24	Breeding	VP4	26/06/2024	14:11:00	3	8	37.5m	8	0
WT83-24	Breeding	VP2	24/07/2024	10:42:00	1	40	62.5m	0	40
WT95-24	Breeding	VP1	24/07/2024	13:44:00	1	180	62.5m	60	120
WT103-24	Breeding	VPB	29/07/2024	12:30:00	20	40	62.5m	0	40
WT104-24	Breeding	VPB	29/07/2024	13:05:00	25	280	100m	0	280
WT105-24	Breeding	VPA	29/07/2024	13:56:00	40	150	45m	0	150
WT106-24	Breeding	VPB	29/07/2024	14:06:00	30	30	100m	0	30
WT107-24	Breeding	VPA	29/07/2024	15:02:00	4	480	200m	240	240
WT97-24	Breeding	VPB	29/07/2024	08:58:00	1	20	15m	10	10
WT108-24	Breeding	VPA	23/08/2024	09:00:00	50	600	2.5m	0	600
WT109-24	Breeding	VPA	23/08/2024	09:15:00	5	30	15m	10	20
WT110-24	Breeding	VPA	23/08/2024	09:23:00	25	40	15m	20	20
WT111-24	Breeding	VPA	23/08/2024	09:44:00	10	25	15m	0	25
WT113-24	Breeding	VPA	23/08/2024	09:55:00	4	30	15m	20	10
WT114-24	Breeding	VP4	23/08/2024	10:56:00	2	180	65m	180	0
WT116-24	Breeding	VPA	23/08/2024	11:15:00	4	60	15m	50	10
WT117-24	Breeding	VP4	23/08/2024	11:50:00	3	120	35m	0	120
WT118-24	Breeding	VPA	23/08/2024	12:23:00	20	60	62.5m	0	60
WT119-24	Breeding	VPA	23/08/2024	12:43:00	12	60	15m	20	40
WT120-24	Breeding	VPA	23/08/2024	12:59:00	6	40	15m	20	20
WT121-24	Breeding	VP4	23/08/2024	13:08:00	2	12	12m	0	12
WT122-24	Breeding	VPA	23/08/2024	13:11:00	15	45	15m	20	25
WT123-24	Breeding	VP4	23/08/2024	13:16:00	1	16	20m	0	16
WT124-24	Breeding	VP4	23/08/2024	13:18:00	13	130	77.5m	120	10
WT125-24	Breeding	VP4	23/08/2024	13:20:00	4	25	35m	0	25

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT126-24	Breeding	VP4	23/08/2024	13:29:00	1	55	40m	10	45
WT127-24	Breeding	VPA	23/08/2024	14:05:00	10	180	15m	60	120
WT129-24	Breeding	VP4	23/08/2024	15:05:00	2	20	35m	0	20
WT131-24	Breeding	VPB	28/08/2024	08:36:00	2	70	12.5m	0	70
WT137-24	Breeding	VPB	28/08/2024	09:58:00	2	72	15m	42	30
WT139-24	Breeding	VP5	28/08/2024	11:31:00	23	330	62.5m	0	330
WT140-24	Breeding	VP1	28/08/2024	11:34:00	12	40	62.5m	0	40
WT146-24	Breeding	VPB	28/08/2024	12:08:00	1	83	15m	20	63
WT147-24	Breeding	VPB	28/08/2024	13:14:00	2	134	50m	30	104
WT149-24	Breeding	VPB	28/08/2024	13:51:00	2	300	62.5m	100	200
WT150-24	Breeding	VPB	28/08/2024	14:00:00	1	300	100m	180	120
WT168-24	Breeding	VP4	24/09/2024	09:15:00	1	120	62.5m	120	0
WT171-24	Breeding	VP4	24/09/2024	10:06:00	1	30	62.5m	0	30
WT174-24	Breeding	VP5, VP4	24/09/2024	10:48:00	8	426	100m	280	146
WT189-24	Breeding	VPA	27/09/2024	09:32:00	2	75	27.5m	75	0
WT190-24	Breeding	VPA	27/09/2024	09:45:00	15	120	Unknown	0	120
WT192-24	Breeding	VPA	27/09/2024	13:17:00	4	40	35m	5	35
WT196-24	Breeding	VPB	28/09/2024	08:45:00	1	20	15m	15	5
WT198-24	Breeding	VPB	28/09/2024	09:10:00	4	30	62.5m	0	30
WT199-24	Breeding	VPB	28/09/2024	09:34:00	12	50	15m	30	20
WT200-24	Breeding	VPB	28/09/2024	10:04:00	100	100	15m	40	60
WT202-24	Breeding	VPB	28/09/2024	11:56:00	20	25	15m	0	25
WT206-24	Breeding	VPB	28/09/2024	12:33:00	7	25	2.5m	20	5
WT207-24	Breeding	VPB	28/09/2024	12:45:00	10	20	2.5m	15	5
WT208-24	Breeding	VPB	28/09/2024	13:14:00	4	40	62.5m	0	40

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT209-24	Breeding	VPB	28/09/2024	13:30:00	30	4	15m	4	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00002	Winter	VP1	28/10/2025	11:01:00	33	37	10	0	0	0	47
F00003	Winter	VP1	28/10/2025	11:04:00	4	20	0	0	0	0	20
F00004	Winter	VP1	28/10/2025	11:18:00	25	10	42	0	0	0	52
F00005	Winter	VP1	28/10/2025	11:27:00	17	30	102	30	0	0	162
F00007	Winter	VP1	28/10/2025	12:15:00	4	5	42	0	0	0	47
F00012	Winter	VP1	28/10/2025	13:54:00	3	35	20	0	0	0	55
F00020	Winter	VP1	28/10/2025	15:11:00	1	45	0	0	0	0	45
F00029	Winter	VP2	30/10/2025	08:55:00	1	10	25	0	0	0	35
F00035	Winter	VP3	29/10/2025	11:24:00	2	0	24	0	0	0	24
F00036	Winter	VP3	29/10/2025	12:03:00	4	0	18	20	0	0	38
F00053	Winter	VP4	21/11/2025	08:35:00	2	33	0	0	0	0	33
F00055	Winter	VP4	21/11/2025	08:57:00	6	21	0	0	0	0	21
F00058	Winter	VP4	21/11/2025	10:55:00	29	0	61	0	0	0	61
F00059	Winter	VP4	21/11/2025	10:58:00	32	0	75	0	0	0	75
F00062	Winter	VP4	21/11/2025	11:18:00	60	22	0	0	0	0	22
F00063	Winter	VP4	21/11/2025	11:33:00	60	0	45	0	0	0	45

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00064	Winter	VP4	21/11/2025	12:18:00	22	10	25	0	0	0	35
F00073	Winter	VP5	19/11/2025	12:43:00	2	55	0	0	0	0	55
F00077	Winter	VP5	19/11/2025	15:10:00	1	31	0	0	0	0	31
F00089	Winter	VP1	27/11/2025	10:27:00	3	0	0	32	0	0	32
F00090	Winter	VP1	27/11/2025	11:51:00	1	0	14	0	0	0	14
F00102	Winter	VP1	27/11/2025	13:06:00	2	0	0	48	0	0	48
F00104	Winter	VP1	27/11/2025	13:55:00	19	0	63	33	0	0	96
F00120	Winter	VP2	25/11/2025	15:44:00	43	0	0	0	168	0	168
F00128	Winter	VP2	25/11/2025	16:13:00	72	0	0	0	0	85	85
F00155	Winter	VP3	28/11/2025	13:46:00	251	0	0	285	0	0	285
F00159	Winter	VP3	28/11/2025	13:57:00	39	0	0	0	0	158	158
F00197	Winter	VP1	02/12/2025	12:30:00	3	0	0	0	62	0	62
F00207	Winter	VP1	02/12/2025	13:05:00	3	0	0	49	0	0	49
F00238	Winter	VP2	03/12/2025	09:41:00	4	0	0	0	0	83	83
F00245	Winter	VP2	03/12/2025	10:10:00	1	0	0	137	0	0	137
F00314	Winter	VP1	27/01/2026	09:14:00	73	0	32	49	0	0	81
F00316	Winter	VP1	27/01/2026	10:05:00	1	0	24	0	0	0	24
F00329	Winter	VP1	27/01/2026	13:07:00	67	0	0	33	56	0	89
F00378	Winter	VP5	09/02/2026	15:57:00	2	0	62	0	0	0	62
F00410	Winter	VP2	12/02/2026	10:52:00	1	0	49	0	0	0	49
F00485	Winter	VP2	25/02/2026	17:07:00	47	0	0	43	0	0	43

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	-	-	-
2022/2023	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	3
2023	1	2	-	-	2	-	-	-	-	-	-	1			2	-	-	-	-	-	-	-	6	-
2023/2024		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
2024	2	-	-	5	2	3	4	-	-	-	-	3	-	-	-	1	-	-	-	2	-	-	1	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00123	Winter	Transect	T5	14/10/2025	14:02:00	18	GA1	in flight
P00124	Winter	Transect	T5	14/10/2025	14:19:00	127	GA1	on ground
P00258	Winter	Transect	T2,5,6	24/11/2025	12:16:00	231	GA1	in flight
P00263	Winter	Transect	T2,5,6	24/11/2025	12:31:00	2	FW2	on water
P00544	Winter	Transect	T2. T5, T6	22/01/2026	12:13:00	18	GA1	in flight
P00546	Winter	Transect	T2. T5, T6	22/01/2026	12:45:00	43	GA1	in flight

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Dovegrove Callows	26/11/2025	N/A	6	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	79	N/A	N/A

8°0'0"W

7°55'0"W

53°3'45"N

53°1'30"N

701800

695600

600000

606000

Crinkill

Roscrea Road

Grove Street

Figure 37

Figure 38

Figure 39

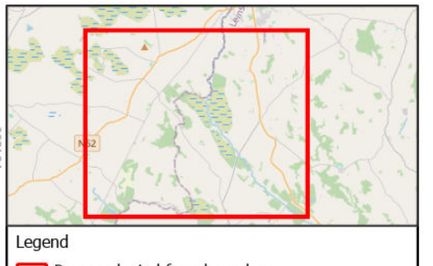
Figure 40

N52

R491

Birr Ro

ry



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Lesser Black-backed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Lesser Black-backed Gull

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 36:
Lesser Black-backed Gull observations over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-010.ApX-VP-LB-SUM-A_overview

Draft: A

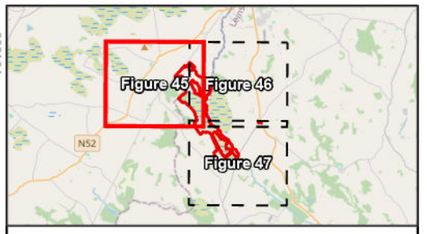
8°0'0"W

53°3'45"N

600000

701800

N52



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Lesser Black-backed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Lesser Black-backed Gull

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title: Appendix 7-I, Figure 37:
Lesser Black-backed Gull observations over the survey period
(May 2020 – March 2026)
- Sheet 1 of 4 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-010.ApX-VP-LB-SUM-A

Draft: A

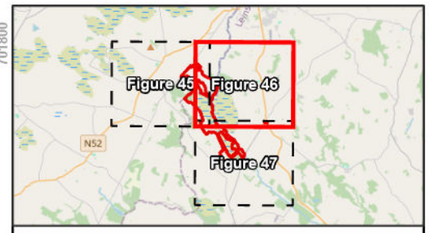
7°55'0"W

53°3'45"N

606000

N

WT125-23
WT226-22/23
WT221-22/23
WT138-23
WT128-23
WT205-22/23
F00207
F00128
WT30-23
P00258
WT52-23
F00003
WT61-24
WT202-24
WT200-24
WT192-24
F00329
F00314
F00245
F00005
WT149-24
WT108-24
P00544
WT104-23
WT198-24
WT23-24
P00263
WT31-20/21
WT206-22/23
WT155-23
WT109-24
WT110-24
WT391-23/24
WT84-20
WT141-20/21
WT82-20
WT190-24
WT5-20/21
WT66-20/21
WT112-23
WT408-23/24
WT372-23/24
P00546
WT57-24
F00104
WT53-23/24
WT26-24
WT80-23
F00036
WT189-24
WT56-23
WT314-23/24
F00102
WT16-24
F00035
WT57-21
WT29-23/24
WT60-21
WT92-23
F00090
WT359-23/24
WT123-24
WT55-20
WT398-23/24
WT122-24
F00485
F00197
WT3-21
WT374-23/24
WT100-20
WT83-24
WT302-23/24
WT24-24
WT78-21/22
WT127-24
F00120
WT90-20
WT208-24
WT25-24
WT118-24
Roscrea Road
Grove Street
N62



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Lesser Black-backed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Lesser Black-backed Gull

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 38:
Lesser Black-backed Gull observations over the survey period
(May 2020 – March 2026)
- Sheet 2 of 4 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-010.ApX-VP-LB-SUM-A

Draft: A

8°0'0"W

53°13'0"N

600000

635600

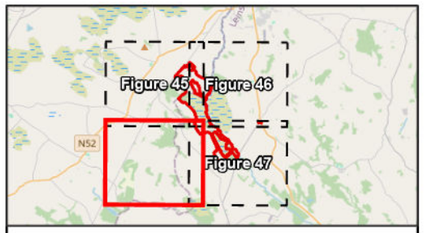
N52

N

WT38-21

WT103-24

WT104-24



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Lesser Black-backed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Lesser Black-backed Gull

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title: Appendix 7-I, Figure 39:
Lesser Black-backed Gull observations over the survey period
(May 2020 – March 2026)
- Sheet 3 of 4 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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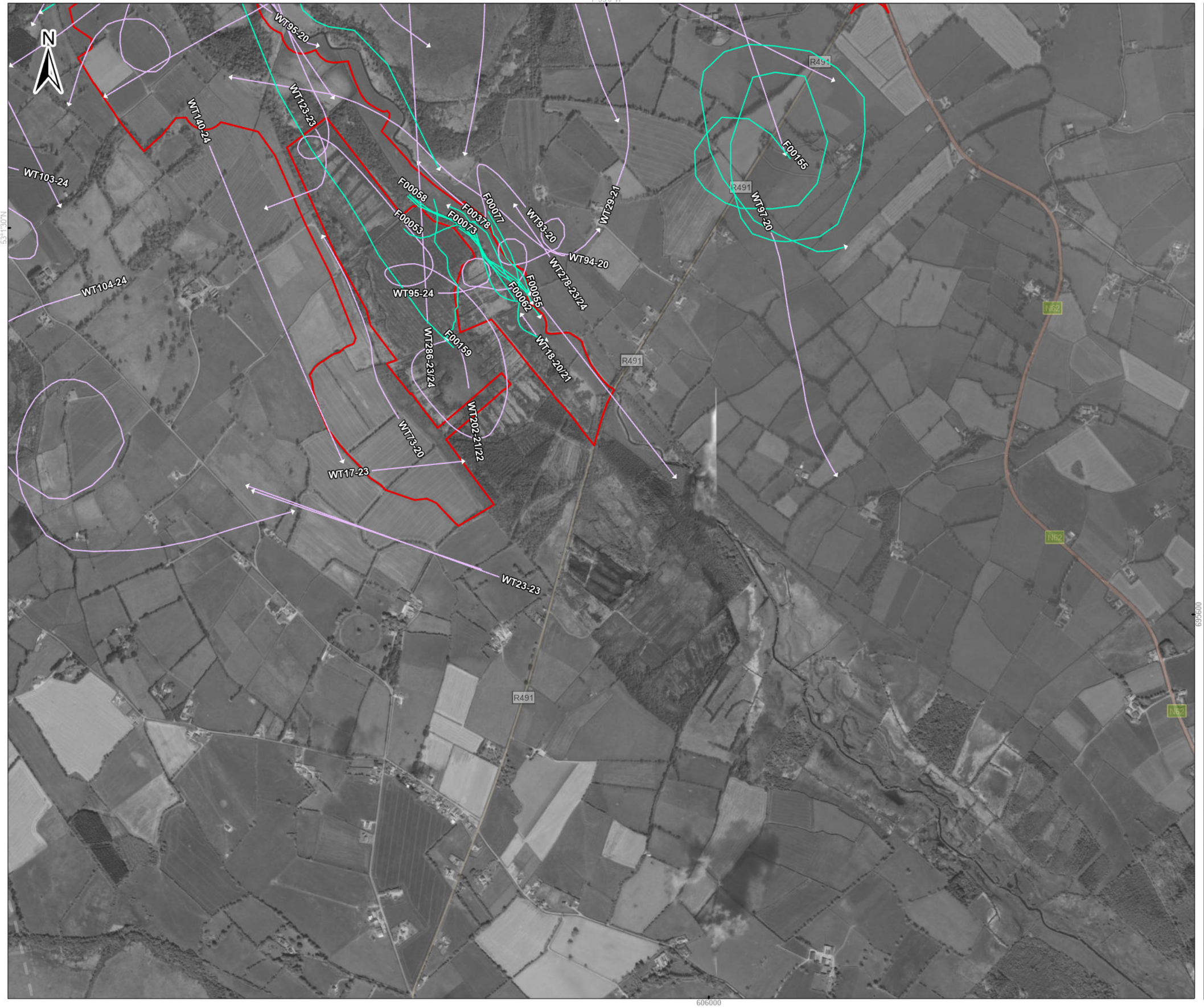
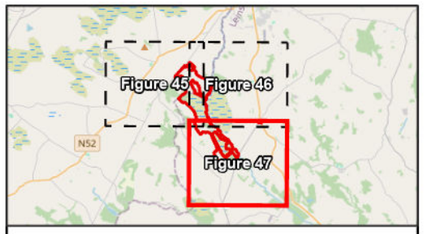
Map Ref: 11333-010.ApX-VP-LB-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Lesser Black-backed Gull

Flightlines - Ecology Ireland 2020 - 2024

- Lesser Black-backed Gull

0 250 500
Meters

Spatial Reference
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EPSG: 2157

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Client: RWE

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Ballincor Wind Farm

Title: Appendix 7-I, Figure 40:
Lesser Black-backed Gull observations over the survey period
(May 2020 – March 2026)
- Sheet 4 of 4 -

Scale @ A3: 1:14,000

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Map Ref: 11333-010.ApX-VP-LB-SUM-A

Draft: A

Appendix 7-1 - XII LITTLE EGRET

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Wintering	VP, 1	05/11/2020	09:48:00	3	20	15m	0	20
WT43-20/21	Wintering	VP, 1	05/11/2020	12:03:00	1	4	5m	4	0
WT58-20/21	Wintering	VP, 1	05/11/2020	14:00:00	3	15	Unknown	5	10
WT48-21/22	Wintering	VP2	02/12/2021	09:27:00	1	3	5m	2	1
WT59-21/22	Wintering	VP5	02/12/2021	12:15:00	1	5400	10m	5400	0
WT81-21/22	Wintering	VP3	07/12/2021	12:15:00	1	30	0m	30	0
WT135-21/22	Wintering	VP1, VP2	17/01/2022	12:54:00	1	13	5m	13	0
WT136-21/22	Wintering	VP1	17/01/2022	13:10:00	1	3	5m	3	0
WT11-22/23	Wintering	VP1	28/11/2022	14:46:00	3	42	7.5m	0	42
WT6-22/23	Wintering	VP2, VP5, VP1	28/11/2022	11:06:00	2	50	5m	15	35
WT17-22/23	Wintering	VP1	30/11/2022	09:51:00	2	5	5m	0	5
WT29-22/23	Wintering	VP3	30/11/2022	10:26:00	1	7	15m	7	0
WT31-22/23	Wintering	VPA	30/11/2022	10:28:00	2	22	2.5m	22	0
WT32-22/23	Wintering	VPB	30/11/2022	10:28:00	1	6	10m	3	3
WT46-22/23	Wintering	VPB	30/11/2022	11:43:00	4	15	10m	0	15
WT55-22/23	Wintering	VPA	30/11/2022	12:48:00	1	33	2.5m	33	0
WT56-22/23	Wintering	VPA	30/11/2022	12:48:00	7	3600	-	3600	0
WT62-22/23	Wintering	VPB	30/11/2022	13:17:00	4	60	10m	60	0
WT65-22/23	Wintering	VPB	30/11/2022	13:57:00	4	45	10m	0	45
WT120-22/23	Wintering	VPA	20/12/2022	14:35:00	1	10	5m	0	10
WT122-22/23	Wintering	VPB	20/12/2022	14:36:00	1	4	2.5m	0	4
WT91-22/23	Wintering	VPB	20/12/2022	11:01:00	1	15	15m	0	15

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT262-22/23	Wintering	VP2	25/01/2023	09:23:00	1	5	10		5
WT263-22/23	Wintering	VP2	25/01/2023	10:59:00	4	600	0m		600
WT264-22/23	Wintering	VP2	25/01/2023	12:20:00	8	240	0m		240
WT269-22/23	Wintering	VP2	25/01/2023	13:34:00	2	5	20m		5
WT286-22/23	Wintering	VP1	25/01/2023	11:44:00	1	65	7.5m	0	65
WT243-22/23	Wintering	VPA	27/01/2023	10:10:00	2	2100	2.5m	2100	
WT245-22/23	Wintering	VPA	27/01/2023	10:45:00	1	92	2.5m	46	46
WT246-22/23	Wintering	VPA	27/01/2023	10:47:00	1	10680	2.5m		10680
WT248-22/23	Wintering	VPA	27/01/2023	13:26:00	1	12	2.5m	12	
WT249-22/23	Wintering	VPA	27/01/2023	13:54:00	1	16	2.5m		16
WT250-22/23	Wintering	VPA	27/01/2023	14:46:00	1	91	25m	46	45
WT251-22/23	Wintering	VPA	27/01/2023	14:48:00	1	1620	2.5m		1620
WT260-22/23	Wintering	VPB	27/01/2023	11:09:00	1	26	5m		26
WT261-22/23	Wintering	VPB	27/01/2023	14:40:00	1	42	10m	42	0
WT181-22/23	Wintering	VPA	27/03/2023	08:41:00	3	21600	2.5m	21600	0
WT194-22/23	Wintering	VP5	27/03/2023	09:45:00	4	25	12.5m	25	0
WT196-22/23	Wintering	VPB	27/03/2023	09:50:00	4	0	-	-	-
WT225-22/23	Wintering	VPB	27/03/2023	12:30:00	1	15	15m	15	0
WT228-22/23	Wintering	VP3	27/03/2023	12:59:00	6	10	20m	10	0
WT47-23	Breeding	VPA	20/07/2023	10:30:00	1	180	2.5m	180	0
WT59-23	Breeding	VP1, VP2	27/07/2023	09:30:00	1	209	15m	52	157
WT62-23	Breeding	VPB	27/07/2023	10:01:00	1	76	15m	70	6
WT65-23	Breeding	VPB	27/07/2023	10:51:00	1	170	15m	30	140
WT68-23	Breeding	VP2	27/07/2023	11:08:00	1	40	40m	0	40
WT71-23	Breeding	VP1	27/07/2023	11:09:00	1	33	15m	0	33

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT73-23	Breeding	VP2	27/07/2023	11:18:00	1	120	95m	0	120
WT106-23	Breeding	VPA	28/08/2023	11:50:00	1	30	10m	30	0
WT79-23	Breeding	VP5	28/08/2023	09:42:00	1	38	15m	0	38
WT82-23	Breeding	VP3	28/08/2023	09:48:00	1	10	12.5m	6	4
WT85-23	Breeding	VPA	28/08/2023	08:52:00	1	70	10m	70	0
WT96-23	Breeding	VPA	28/08/2023	10:35:00	2	66	10m	0	66
WT42-23/24	Wintering	VP5	24/10/2023	09:12:00	4	-	-	-	-
WT46-23/24	Wintering	VPA	24/10/2023	09:19:00	2	15	10m	15	0
WT5-23/24	Wintering	VP1	24/10/2023	14:39:00	1	46	55m	23	23
WT57-23/24	Wintering	VPA	24/10/2023	13:14:00	1	23	10m	23	0
WT9-23/24	Wintering	VP2	24/10/2023	12:00:00	4	30	15m	30	0
WT146-23/24	Wintering	VP1	20/12/2023	10:09:00	1	6	10m	0	6
WT182-23/24	Wintering	VPB	20/12/2023	10:10:00	1	13	15m	6	7
WT185-23/24	Wintering	VPB	20/12/2023	12:26:00	2	70	15m	20	50
WT186-23/24	Wintering	VPB	20/12/2023	12:34:00	2	195	15m	195	0
WT187-23/24	Wintering	VPB	20/12/2023	13:51:00	2	45	15m	15	30
WT193-23/24	Wintering	VP1	25/01/2024	09:35:00	2	56	15m	56	0
WT194-23/24	Wintering	VP1	25/01/2024	09:50:00	2	93	15m		
WT197-23/24	Wintering	VP1	25/01/2024	10:06:00	1	82	2.5m	0	82
WT198-23/24	Wintering	VP1	25/01/2024	11:28:00	1	63	15m	43	20
WT199-23/24	Wintering	VP1	25/01/2024	12:58:00	1	17	2.5m	17	0
WT205-23/24	Wintering	VP2	25/01/2024	11:10:00	1	20	15m	20	0
WT208-23/24	Wintering	VP2	25/01/2024	12:52:00	1	30	2.5m	0	30
WT210-23/24	Wintering	VP2	25/01/2024	14:00:00	5	120	-	0	120
WT214-23/24	Wintering	VP3	25/01/2024	09:24:00	2	28	15m	20	8

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT215-23/24	Wintering	VP3	25/01/2024	09:45:00	1	16	15m	12	4
WT219-23/24	Wintering	VP3	25/01/2024	11:06:00	1	18	15m	15	3
WT221-23/24	Wintering	VP3	25/01/2024	12:32:00	2	12	2.5m	10	2
WT222-23/24	Wintering	VP3	25/01/2024	12:47:00	1	42	15m	40	12
WT224-23/24	Wintering	VP3	25/01/2024	13:10:00	4	84	62.5m	70	14
WT228-23/24	Wintering	VP3	25/01/2024	14:49:00	3	100	15m	75	25
WT234-23/24	Wintering	VP5	29/01/2024	11:22:00	1	82	15m	0	82
WT235-23/24	Wintering	VP5	29/01/2024	12:20:00	2	26	15m	0	26
WT236-23/24	Wintering	VP5	29/01/2024	12:42:00	1	32	15m	0	32
WT242-23/24	Wintering	VP5	29/01/2024	14:21:00	3	34	15m	0	34
WT246-23/24	Wintering	VP5	29/01/2024	14:58:00	2	255	62.5m	10	245
WT250-23/24	Wintering	VPB	29/01/2024	13:22:00	2	5	10m	1	4
WT252-23/24	Wintering	VPB, VP5	29/01/2024	13:50:00	11	8	10m	8	0
WT256-23/24	Wintering	VPA	02/02/2024	09:10:00	10	2000	-	2000	0
WT257-23/24	Wintering	VPA	02/02/2024	09:15:00	1	20	62.5m	0	20
WT258-23/24	Wintering	VPA	02/02/2024	09:30:00	2	30	15m	0	30
WT260-23/24	Wintering	VPA	02/02/2024	09:47:00	1	30	62.5m	20	10
WT272-23/24	Wintering	VPA	02/02/2024	13:10:00	2	30	2.5m	20	30
WT274-23/24	Wintering	VP1	23/02/2024	08:47:00	2	58	15m	0	58
WT288-23/24	Wintering	VP1	23/02/2024	11:11:00	1	10	2.5m	0	10
WT289-23/24	Wintering	VP1	23/02/2024	12:30:00	2	22	2.5m	0	22
WT295-23/24	Wintering	VP2	23/02/2024	12:19:00	1	2	2.5m	0	2
WT301-23/24	Wintering	VP5	26/02/2024	09:59:00	8	9	10m	0	9
WT303-23/24	Wintering	VPA	26/02/2024	08:54:00	18	21600	2.5m	21600	0
WT316-23/24	Wintering	VPB	26/02/2024	09:16:00	2	25	15m	13	12

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT318-23/24	Wintering	VPB	26/02/2024	10:02:00	1	20	15m	20	0
WT323-23/24	Wintering	VPB	26/02/2024	13:31:00	10	200	2.5m	0	200
WT337-23/24	Wintering	VP1	21/03/2024	09:55:00	5	10	20m	8	2
WT341-23/24	Wintering	VP1	21/03/2024	11:01:00	2	5	27.5m	5	0
WT349-23/24	Wintering	VP3	21/03/2024	09:18:00	6	66	62.5m	33	33
WT355-23/24	Wintering	VP3	21/03/2024	09:56:00	3	47	62.5m	47	
WT358-23/24	Wintering	VP3	21/03/2024	10:40:00	30	30	62.5m	30	0
WT365-23/24	Wintering	VP3	21/03/2024	11:58:00	11	38	62.5m	35	3
WT376-23/24	Wintering	VP5	27/03/2024	09:43:00	14	10	12.5m	6	4
WT378-23/24	Wintering	VP5, VPB	27/03/2024	11:57:00	6	5	3.5m	3	2
WT381-23/24	Wintering	VP5	27/03/2024	14:42:00	4	4	5m	1	3
WT384-23/24	Wintering	VPA	27/03/2024	09:28:00	18	3600	2.5m	3600	0
WT386-23/24	Wintering	VPA	27/03/2024	09:38:00	40	40	2.5m	0	40
WT389-23/24	Wintering	VPA	27/03/2024	10:20:00	40	14000	2.5m	0	14000
WT395-23/24	Wintering	VPA	27/03/2024	14:05:00	10	50	15m	0	50
WT396-23/24	Wintering	VPA	27/03/2024	14:10:00	14	25	15m	0	25
WT399-23/24	Wintering	VPB	27/03/2024	08:41:00	18	92	62.5m	30	62
WT10-24	Breeding	VPA	28/05/2024	12:46:00	1	30	12.5m	30	0
WT12-24	Breeding	VPA	28/05/2024	13:46:00	2	52	25m	50	2
WT4-24	Breeding	VPA	28/05/2024	10:44:00	2	16	4m	0	16
WT8-24	Breeding	VPB	28/05/2024	11:42:00	1	60	30m	0	60
WT9-24	Breeding	VPB	28/05/2024	11:56:00	1	40	30m	40	0
WT20-24	Breeding	VP4	29/05/2024	09:59:00	1	120	37.5m	60	60
WT21-24	Breeding	VP4	29/05/2024	11:23:00	1	60	17.5m	60	0
WT27-24	Breeding	VP3	31/05/2024	09:41:00	1	18	25m	0	18

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT30-24	Breeding	VP2	31/05/2024	10:41:00	1	57	62.5m	0	57
WT33-24	Breeding	VP5	31/05/2024	11:20:00	1	25	20m	0	25
WT47-24	Breeding	VP5	24/06/2024	08:44:00	1	40	15m	0	40
WT52-24	Breeding	VP1	24/06/2024	09:36:00	1	40	32.5m	40	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00045	Winter	VP4	16/10/2025	16:10:00	2	5	20	0	0	0	25
F00087	Winter	VP1	27/11/2025	09:38:00	1	19	0	0	0	0	19
F00095	Winter	VP1	27/11/2025	12:34:00	1	10	0	0	0	0	10
F00111	Winter	VP2	25/11/2025	12:49:00	1	0	7	0	0	0	7
F00129	Winter	VP3	28/11/2025	08:49:00	2	9	0	0	0	0	9
F00131	Winter	VP3	28/11/2025	08:50:00	1	5	0	0	0	0	5
F00149	Winter	VP3	28/11/2025	13:03:00	1	18	0	0	0	0	18
F00151	Winter	VP3	28/11/2025	13:10:00	1	8	0	0	0	0	8
F00168	Winter	VP5	08/12/2025	14:18:00	2	48	0	0	0	0	48
F00172	Winter	VP4	10/12/2025	08:20:00	1	15	0	0	0	0	15
F00175	Winter	VP4	10/12/2025	09:04:00	2	25	0	0	0	0	25
F00177	Winter	VP4	10/12/2025	09:55:00	15	15	0	0	0	0	15
F00179	Winter	VP4	10/12/2025	11:42:00	2	0	45	0	0	0	45

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00180	Winter	VP4	10/12/2025	11:45:00	2	32	0	0	0	0	32
F00187	Winter	VP1	02/12/2025	11:35:00	2	0	12	0	0	0	12
F00192	Winter	VP1	02/12/2025	12:01:00	2	7	15	19	0	0	41
F00200	Winter	VP1	02/12/2025	12:37:00	2	12	0	0	0	0	12
F00208	Winter	VP1	02/12/2025	13:14:00	1	46	0	0	0	0	46
F00210	Winter	VP1	02/12/2025	13:25:00	2	12	0	0	0	0	12
F00211	Winter	VP1	02/12/2025	13:40:00	1	12	0	0	0	0	12
F00215	Winter	VP1	02/12/2025	14:35:00	1	0	21	0	0	0	21
F00217	Winter	VP1	02/12/2025	14:50:00	2	13	0	0	0	0	13
F00223	Winter	VP1	02/12/2025	16:10:00	1	5	0	0	0	0	5
F00225	Winter	VP1	02/12/2025	16:17:00	1	19	0	0	0	0	19
F00227	Winter	VP1	02/12/2025	16:27:00	1	45	0	0	0	0	45
F00229	Winter	VP1	02/12/2025	16:47:00	1	15	0	0	0	0	15
F00249	Winter	VP2	03/12/2025	11:35:00	1	15	0	0	0	0	15
F00264	Winter	VP3	04/12/2025	08:28:00	2	6	0	0	0	0	6
F00266	Winter	VP3	04/12/2025	08:48:00	1	9	0	0	0	0	9
F00267	Winter	VP3	04/12/2025	08:48:00	1	10	0	0	0	0	10
F00282	Winter	VP3	04/12/2025	13:41:00	1	8	0	0	0	0	8
F00283	Winter	VP3	04/12/2025	13:42:00	1	10	0	0	0	0	10
F00284	Winter	VP3	04/12/2025	13:44:00	1	7	0	0	0	0	7
F00285	Winter	VP3	04/12/2025	13:51:00	2	12	0	0	0	0	12
F00299	Winter	VP5	14/01/2026	08:44:00	2	28	0	0	0	0	28
F00305	Winter	VP1	27/01/2026	08:24:00	2	14	0	0	0	0	14
F00310	Winter	VP1	27/01/2026	08:57:00	1	5	5	0	0	0	10
F00315	Winter	VP1	27/01/2026	09:56:00	1	12	0	0	0	0	12

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00324	Winter	VP1	27/01/2026	12:06:00	2	33	0	0	0	0	33
F00326	Winter	VP1	27/01/2026	12:44:00	2	23	0	0	0	0	23
F00330	Winter	VP1	27/01/2026	13:09:00	1	8	0	0	0	0	8
F00332	Winter	VP1	27/01/2026	13:23:00	1	20	0	0	0	0	20
F00353	Winter	VP3	23/01/2026	12:08:00	1	9	0	0	0	0	9
F00362	Winter	VP3	23/01/2026	15:06:00	1	0	34	0	0	0	34
F00363	Winter	VP3	23/01/2026	15:08:00	1	6	0	0	0	0	6
F00367	Winter	VP3	23/01/2026	15:46:00	1	0	46	0	0	0	46
F00368	Winter	VP3	23/01/2026	16:55:00	1	0	39	0	0	0	39
F00373	Winter	VP5	09/02/2026	11:33:00	4	28	0	0	0	0	28
F00374	Winter	VP5	09/02/2026	12:15:00	2	15	0	0	0	0	15
F00375	Winter	VP5	09/02/2026	12:53:00	2	15	0	0	0	0	15
F00380	Winter	VP4	11/02/2026	07:42:00	6	28	0	0	0	0	28
F00384	Winter	VP4	11/02/2026	08:28:00	2	15	0	0	0	0	15
F00385	Winter	VP4	11/02/2026	08:42:00	1	33	0	0	0	0	33
F00390	Winter	VP4	11/02/2026	11:03:00	1	31	0	0	0	0	31
F00393	Winter	VP4	11/02/2026	11:52:00	2	30	0	0	0	0	30
F00398	Winter	VP1	10/02/2026	15:37:00	3	22	0	0	0	0	22
F00401	Winter	VP1	10/02/2026	17:23:00	1	31	0	0	0	0	31
F00424	Winter	VP3	13/02/2026	13:06:00	1	0	13	0	0	0	13
F00425	Winter	VP3	13/02/2026	13:32:00	1	0	10	0	0	0	10
F00426	Winter	VP4	23/02/2026	12:22:00	1	18	0	0	0	0	18
F00430	Winter	VP4	23/02/2026	15:23:00	1	13	0	0	0	0	13
F00435	Winter	VP4	23/02/2026	17:54:00	1	13	0	0	0	0	13
F00436	Winter	VP5	24/02/2026	07:37:00	3	38	0	0	0	0	38

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00462	Winter	VP1	24/02/2026	15:06:00	1	27	0	0	0	0	27
F00464	Winter	VP1	24/02/2026	15:15:00	1	22	0	0	0	0	22
F00479	Winter	VP2	25/02/2026	15:12:00	1	4	21	0	0	0	25
F00507	Winter	VP3	26/02/2026	17:39:00	5	12	0	0	0	0	12
F00544	Winter	VP2	17/02/2026	13:14:00	1	12	16	0	0	0	28

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2022/2023	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-
2023/2024	-	2	-	1	-	1	-	1	-	-	-	-	-	-	-	1	-	1	-	1	-	1	-	1
2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00178	Winter	Transect	T1	20/11/2025	13:59:00	1	FW2	on wetland
P00221	Winter	VP	VP1	27/11/2025	10:32:00	1	N/A	N/A
P00255	Winter	Transect	T2,5,6	24/11/2025	12:14:00	1	GA1	on ground
P00349	Winter	Transect	T1	11/12/2025	09:27:00	2	PB4	on ground
P00351	Winter	Transect	T3	11/12/2025	11:00:00	2	GS4	on ground
P00413	Winter	VP	VP3	04/12/2025	08:32:00	4	N/A	N/A

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00429	Winter	Transect	T2, T5, T6	05/12/2025	10:33:00	1	GA1	on ground
P00436	Winter	Transect	T2, T5, T6	05/12/2025	10:50:00	1	GA1	on ground
P00550	Winter	Transect	T2. T5, T6	22/01/2026	12:57:00	1	GA1	in flight
P00555	Winter	Transect	T2. T5, T6	22/01/2026	13:08:00	3	GA1	on water
P00557	Winter	Transect	T2. T5, T6	22/01/2026	13:16:00	1	GA1	on water
P00561	Winter	Transect	T2. T5, T6	22/01/2026	13:47:00	2	GA1	in flight
P00565	Winter	Transect	T2. T5, T6	22/01/2026	14:23:00	1	PB4	on ground
P00610	Winter	Transect	T1, T3, T4	10/02/2026	08:00:00	2	GA1	N/A
P00649	Winter	Transect	T1, T3, T4	11/02/2026	12:43:00	2	FW2	N/A
P00653	Winter	Transect	T1, T3, T4	11/02/2026	12:49:00	6	FW2	N/A
P00725	Winter	Transect	T1	09/03/2026	14:45:00	27	GA1	N/A
P00789	Winter	Transect	T6	13/03/2026	14:30:00	3	GS4	Foraging
P00792	Winter	Transect	T6	13/03/2026	14:49:00	10	FW2	Foraging
P00801	Winter	Transect	T6	13/03/2026	15:10:00	1	FW2	Foraging
P00809	Winter	HH roost	HHVP1	13/03/2026	18:12:00	6	FW2	Flying
P00811	Winter	HH roost	HHVP1	13/03/2026	18:47:00	4	FW2	Flying
P00813	Winter	Incidental	VP5	09/02/2026	10:45:00	4	FW4	Foraging

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	1	N/A	N/A
Winter	I-WeBS	New bridge Callows	26/11/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	2	N/A	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	R492 Bridge	01/12/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	01/12/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	01/12/2025	N/A	1	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	16/01/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Glassdery More Bridge	16/01/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	09/02/2026	N/A	2	N/A	N/A
Winter	I-WeBS	R492 bridge	09/02/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Riverstown bridge	09/02/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Glasderry More Bridge	12/03/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	12/03/2026	N/A	5	N/A	N/A

8°0'0"W

7°55'0"W

53°3'45"N

53°1'30"N

701800

695600

600000

606000

N52

R491

Crinkill

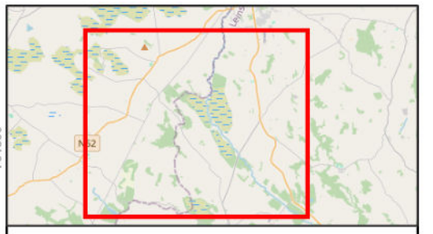
Roscrea Road

Grove Street

BBS Figure 42
WBS Figure 45

BBS Figure 43
WBS Figure 46

BBS Figure 44
WBS Figure 47



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Little Egret

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 41:
Little Egret observations over the survey period (May 2020 – March 2026) Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-011.ApX-VP-ET-SUM-A_overview

Draft: A

8°0'0"W

53°3'45"N

701800

600000

N52

WT225-22/23

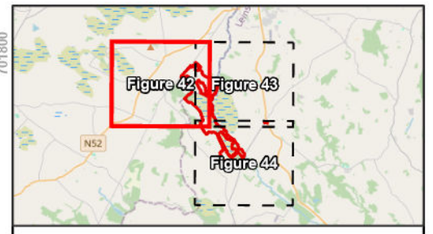
WT249-22/23

WT243-22/23

WT141-23/24

WT29-22/23

WT81-21/22



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 42:
Little Egret observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-011.ApX.BBS-VP-ET-SUM-A

Draft: A

7°55'0"W

53°3'45"N

606000

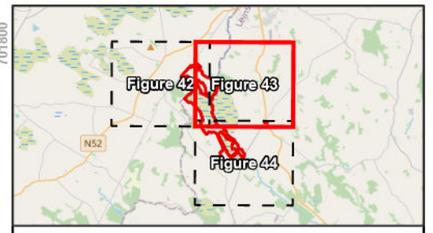
N

Roscrea Road

Grove Street

N52

WT18-24
WT225-22/23
WT250-23/24
WT246-22/23
WT251-22/23
WT249-22/23
WT120-22/23
WT46-22/23
WT260-22/23
WT57-23/24
WT9-24
WT106-23
WT243-22/23
WT46-23/24
WT122-22/23
WT378-23/24
WT056-22/23
WT55-22/23
WT47-23
WT62-23
WT248-22/23
WT303-23/24
WT42
WT122-23/24
WT29-22/23
WT256-23/24
WT116-23/24
WT103-23/24
WT62-22/23
WT384-23/24
WT323
WT196-22/23
WT228-22/23
WT395-23/24
WT389-23/24
WT71-23/24
WT349-23/24
WT79-23
WT20-24
WT68-23/24
WT396-23/24
WT355-23/24
WT81-21/22
WT215-23/24
WT242-23/24
WT59-21/22
WT31-23/24



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 43:
Little Egret observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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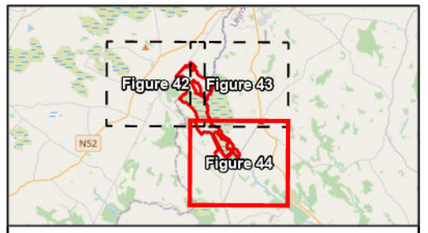
Map Ref: 11333-011.ApX.BBS-VP-ET-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020-2024

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 44:
Little Egret observations over the survey period (May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-011.ApX.BBS-VP-ET-SUM-A

Draft: A

8°0'0"W

53°3'45"N

N52

WT225-22/23

WT251-22/23

WT246-22/23

WT249-22/23

P00789

F00398

F00326

F00211

P00649

P00255

P00429

WT243-22/23

WT056-22/23

F00095

WT303-23/24

WT031-22/23

P00550

P00561

F00200

P00792

P00555

WT181-22/23

WT47-23

F00330

F00223

WT384-23/24

P00653

P00436

P00221

P00801

WT256-23/24

WT323

P00557

F00111

P00565

F00208

F00479

F00315

P00811

F00301

P00809

F00229

WT355-23/24

WT215-23/24

F00544

WT59-21/22

F00424

F00425

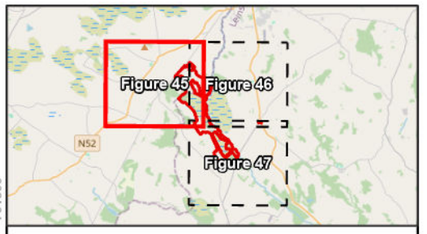
P00413

P00351

F00362

600000

700000



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Little Egret

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 45:
Little Egret observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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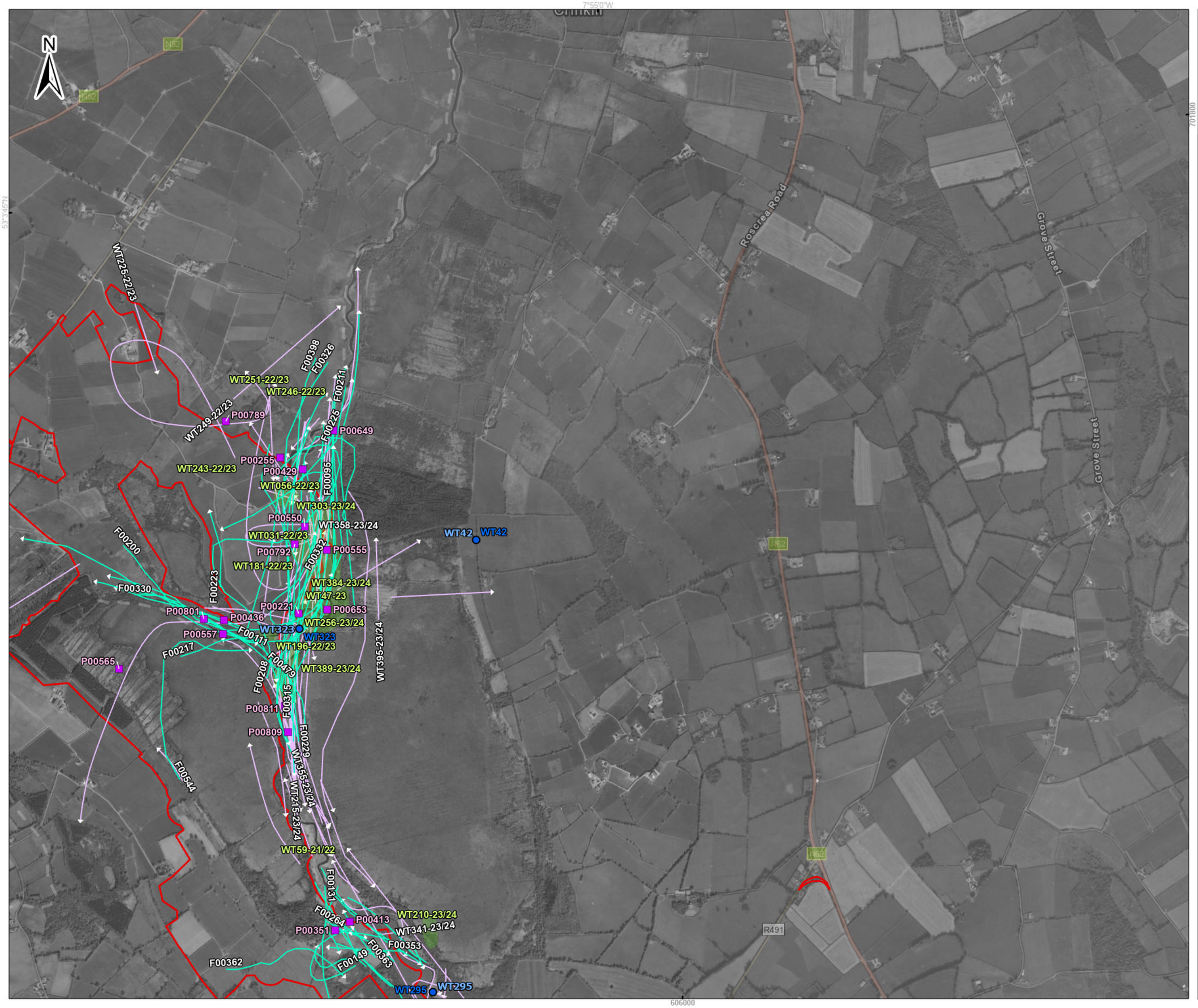
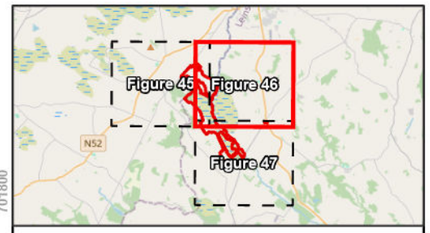
Map Ref: 11333-011.ApX.WBS-VP-ET-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Little Egret

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 46:
Little Egret observations over the survey period (May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-011.ApX.WBS-VP-ET-SUM-A

Draft: A

7°55'0"W

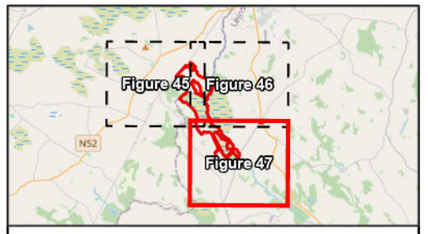
53°1'30"N

606000

695600

N

WT59-21/22
F00131
F00264
P00413
P00351
WT210-23/24
WT341-23/24
F00353
F00362
F00149
F00363
WT295
WT295
F00751
P00178
P00610
WT93
WT48-21/22
F00179
F00426
F00384
F00172
WT197
WT17-22/23
WT205-23/24
P00813
P00349
P00725
F00380
WT147-23/24
WT286-22/23
WT146-23/24
R491
N62



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020-2024

Flightlines - TOBIN 2025/26

- Little Egret

Flightlines - Ecology Ireland 2020 - 2024

- Little Egret

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 47:
Little Egret observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-011.ApX.WBS-VP-ET-SUM-A

Draft: A

Appendix 7-1 - XIII MALLARD

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT4-20	Breeding	VP1	28/04/2020	12:11:00	1	40	12.5m	40	0
WT6-20	Breeding	VP2	28/04/2020	13:45:00	1	7	3.5m	7	0
WT12-20	Breeding	VP3	14/05/2020	09:14:00	8	15	25m	0	15
WT16-20	Breeding	VP3	14/05/2020	09:56:00	2	48	20m	48	0
WT37-20	Breeding	VP3	14/05/2020	13:18:00	1	30	30m	30	0
WT38-20	Breeding	VP4	14/05/2020	13:19:00	1	60	75m	0	60
WT77-20	Breeding	VP4	10/07/2020	08:40:00	18	10	15m	0	10
WT101-20	Breeding	VP3	14/08/2020	13:11:00	5	7	15m	7	0
WT132-20/21	Wintering	VP, 3	08/03/2021	11:18:00	4	17	17.5m	17	0
WT133-20/21	Wintering	VP, 4	08/03/2021	11:20:00	2	37	20m	0	37
WT1-21	Breeding	VP2	23/04/2021	09:51:00	1	32	40m	32	0
WT11-21	Breeding	VP3	23/04/2021	13:26:00	4	97	75m	97	0
WT13-21	Breeding	VP5	23/04/2021	09:00:00	1	10	17.5m	0	10
WT4-21	Breeding	VP2	23/04/2021	10:31:00	3	54	45m	54	0
WT9-21	Breeding	VP3, VP2	23/04/2021	09:41:00	2	73	52.5m	73	0
WT20-21	Breeding	VP3	14/05/2021	08:55:00	1	25	17.5m	25	0
WT21-21	Breeding	VP3	14/05/2021	09:30:00	3	20	17.5m	20	0
WT22-21	Breeding	VP3	14/05/2021	09:54:00	2	15	17.5m	15	0
WT23-21	Breeding	VP3	14/05/2021	14:30:00	1	15	17.5m	10	5
WT27-21	Breeding	VP1	17/05/2021	12:05:00	2	10	17.5m	5	5
WT28-21	Breeding	VP1	17/05/2021	12:07:00	2	15	17.5m	10	5
WT30-21	Breeding	VP2	17/05/2021	09:15:00	1	10	30m	10	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT31-21	Breeding	VP2	17/05/2021	12:06:00	2	33	20m	33	0
WT17-21/22	Wintering	VP1	23/11/2021	10:59:00	4	24	5m	20	4
WT18-21/22	Wintering	VP1, VP2	23/11/2021	10:59:00	1	20	5m	20	0
WT51-21/22	Wintering	VP3	02/12/2021	09:55:00	3	10	5m	10	0
WT168-21/22	Wintering	VP5	11/02/2022	11:29:00	3	15	10m	0	15
N/A	Wintering	VP2	14/03/2022	10:29:00	1	58	20m	58	0
WT192-21/22	Wintering	VP3	14/03/2022	09:10:00	2	25	5m	25	0
WT195-21/22	Wintering	VP3	14/03/2022	09:45:00	2	20	0m	20	0
WT196-21/22	Wintering	VP1, VP2	14/03/2022	09:59:00	2	25	20m	20	5
WT197-21/22	Wintering	VP3	14/03/2022	10:10:00	3	10	0m	10	0
WT198-21/22	Wintering	VP1	14/03/2022	10:22:00	1	20	20m	17	3
WT201-21/22	Wintering	VP4	14/03/2022	11:35:00	2	12	20m	0	12
WT204-21/22	Wintering	VP5	14/03/2022	13:12:00	4	49	5m	0	49
WT33-22/23	Wintering	VPA	30/11/2022	10:35:00	3	38	2.5m	38	0
WT95-22/23	Wintering	VP3	20/12/2022	11:26:00	5	60	62.5m	30	30
WT289-22/23	Wintering	VP1	25/01/2023	13:18:00	1	60	20m	60	0
WT153-22/23	Wintering	VP3	20/02/2023	09:09:00	3	106	15m	81	25
WT184-22/23	Wintering	VPA	27/03/2023	08:55:00	6	104	62.5m	5	99
WT187-22/23	Wintering	VP5	27/03/2023	09:00:00	5	90	65m	0	90
WT189-22/23	Wintering	VP1	27/03/2023	09:04:00	5	40	62.5m	30	10
WT190-22/23	Wintering	VPA	27/03/2023	09:08:00	5	49	62.5m	49	0
WT193-22/23	Wintering	VPA	27/03/2023	09:41:00	5	18000	2.5m	18000	0
WT199-22/23	Wintering	VP3	27/03/2023	09:57:00	5	45	30m	45	0
WT200-22/23	Wintering	VPA	27/03/2023	09:59:00	4	45	15m	45	0
WT202-22/23	Wintering	VP3	27/03/2023	10:02:00	6	10	25m	10	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT203-22/23	Wintering	VPA	27/03/2023	10:07:00	1	26	15m	26	0
WT204-22/23	Wintering	VPB	27/03/2023	10:14:00	4	10	15m	10	0
WT217-22/23	Wintering	VPA, VPB	27/03/2023	11:15:00	3	62	62.5m	25	37
WT218-22/23	Wintering	VPA	27/03/2023	11:21:00	5	79	62.5m	55	24
WT219-22/23	Wintering	VPB	27/03/2023	11:25:00	2	30	15m	15	15
WT220-22/23	Wintering	VP5	27/03/2023	11:25:00	2	20	17.5m	20	0
WT232-22/23	Wintering	VPA	27/03/2023	14:18:00	5	116	62.5m	76	40
WT234-22/23	Wintering	VPA, VPB	27/03/2023	14:34:00	5	96	62.5m	0	96
WT236-22/23	Wintering	VP3	27/03/2023	14:52:00	2	20	25m	20	0
WT237-22/23	Wintering	VP3	27/03/2023	15:12:00	1	15	16m	15	0
WT3-23	Breeding	VPB	01/05/2023	10:15:00	1	32	15m	0	32
WT10-23	Breeding	VPA	02/05/2023	12:10:00	2	16	15m	16	0
WT14-23	Breeding	VPA	02/05/2023	13:49:00	2	27	2.5m	20	7
WT8-23	Breeding	VP3	02/05/2023	11:23:00	2	13	2.5m	13	0
WT19-23	Breeding	VP2, VP1	23/06/2023	09:42:00	3	28	15m	28	0
WT20-23	Breeding	VP2	23/06/2023	09:46:00	2	34	15m	34	0
WT21-23	Breeding	VP2	23/06/2023	10:21:00	1	16	15m	0	16
WT28-23	Breeding	VP3	27/06/2023	10:08:00	2	41	15m	10	31
WT31-23	Breeding	VPA, VP3	27/06/2023	13:47:00	2	49	10m	0	49
WT34-23	Breeding	VPA	20/07/2023	08:46:00	15	28	2.5m	14	14
WT36-23	Breeding	VPA	20/07/2023	09:13:00	6	55	15m	55	0
WT38-23	Breeding	VPA	20/07/2023	09:17:00	60	140	15m	140	0
WT40-23	Breeding	VP5	20/07/2023	09:22:00	2	25	15m	0	25

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT43-23	Breeding	VPA	20/07/2023	09:45:00	1	46	62.5m	23	23
WT46-23	Breeding	VPA	20/07/2023	10:25:00	4	56	15m	28	28
WT48-23	Breeding	VPA	20/07/2023	10:41:00	3	39	15m	20	19
WT49-23	Breeding	VP5	20/07/2023	11:09:00	50	25	15m	23	2
WT50-23	Breeding	VP5	20/07/2023	11:12:00	22	40	62.5m	15	25
WT51-23	Breeding	VP5	20/07/2023	11:13:00	2	15	15m	0	15
WT54-23	Breeding	VPA	20/07/2023	12:35:00	13	51	15m	31	20
WT57-23	Breeding	VPA	20/07/2023	13:54:00	1	37	15m	37	0
WT66-23	Breeding	VPB	27/07/2023	11:03:00	20	180	62.5m	30	150
WT67-23	Breeding	VPB	27/07/2023	11:06:00	10	180	62.5m	140	40
WT69-23	Breeding	VP3	27/07/2023	11:08:00	16	95	40m	80	15
WT70-23	Breeding	VP3	27/07/2023	11:08:00	11	100	25m	50	50
WT74-23	Breeding	VP3	27/07/2023	11:37:00	41	110	30m	100	10
WT75-23	Breeding	VPB	27/07/2023	11:51:00	1	55	15m	30	25
WT76-23	Breeding	VPB	27/07/2023	14:11:00	1	24	62.5m	20	4
WT107-23	Breeding	VP3	28/08/2023	12:31:00	3	15	12.5m	8	7
WT108-23	Breeding	VPA	28/08/2023	12:32:00	3	109	10m	25	84
WT83-23	Breeding	VPA	28/08/2023	09:53:00	3	32	10m	17	15
WT126-23	Breeding	VP1	26/09/2023	09:00:00	1	20	15m	0	20
WT127-23	Breeding	VPA	26/09/2023	09:01:00	8	1200	0m	1200	0
WT145-23	Breeding	VP2, VPA	26/09/2023	13:59:00	21	160	15m	100	60
WT146-23	Breeding	VPB	26/09/2023	14:04:00	12	240	15m	0	240
WT1-23/24	Wintering	VP1	24/10/2023	10:00:00	1	10	15m	5	5
WT12-23/24	Wintering	VP3	24/10/2023	09:00:00	3	30	40m	30	0
WT19-23/24	Wintering	VP3	24/10/2023	12:02:00	3	30	50m	30	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT21-23/24	Wintering	VP3	24/10/2023	14:02:00	7	10	20m	2	8
WT23-23/24	Wintering	VP3	24/10/2023	14:44:00	4	25	50m	25	0
WT24-23/24	Wintering	VP3	24/10/2023	14:45:00	4	35	50m	33	2
WT31-23/24	Wintering	VP4	24/10/2023	10:08:00	9	18	15m	8	10
WT35-23/24	Wintering	VP4	24/10/2023	11:00:00	4	70	62.5m	30	40
WT43-23/24	Wintering	VPA	24/10/2023	09:00:00	2	45	7.5m	45	0
WT44-23/24	Wintering	VPA	24/10/2023	09:10:00	3	37	30m	37	0
WT45-23/24	Wintering	VPA	24/10/2023	09:16:00	2	32	10m	32	0
WT49-23/24	Wintering	VPA	24/10/2023	09:44:00	7	291	12.5m	291	0
WT50-23/24	Wintering	VPA	24/10/2023	10:08:00	9	63	15m	43	20
WT52-23/24	Wintering	VPA	24/10/2023	11:03:00	3	84	30m	80	4
WT55-23/24	Wintering	VPA	24/10/2023	12:11:00	3	91	15m	91	0
WT7-23/24	Wintering	VP2	24/10/2023	09:25:00	15	20	15m	0	20
WT169-23/24	Wintering	VPA	20/12/2023	09:12:00	2	3600	15m	3600	0
WT170-23/24	Wintering	VPA	20/12/2023	10:02:00	2	39	62.5m	10	29
WT200-23/24	Wintering	VP1	25/01/2024	13:09:00	1	38	15m	19	19
WT201-23/24	Wintering	VP1, VP3	25/01/2024	13:50:00	30	300	15m	0	300
WT207-23/24	Wintering	VP2	25/01/2024	12:35:00	1	20	15m	20	0
WT229-23/24	Wintering	VP4	25/01/2024	08:59:00	2	7	35m	2	5
WT233-23/24	Wintering	VP5	29/01/2024	09:34:00	2	18	15m	10	8
WT238-23/24	Wintering	VP5	29/01/2024	13:49:00	4	36	62.5m	18	18
WT247-23/24	Wintering	VPB	29/01/2024	09:05:00	4	4	35m	3	1
WT259-23/24	Wintering	VPA	02/02/2024	09:40:00	2	20	15m	20	0
WT275-23/24	Wintering	VP1	23/02/2024	08:51:00	2	80	62.5m	80	0
WT277-23/24	Wintering	VP1, VP2	23/02/2024	09:00:00	3	300	62.5m	240	60

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT279-23/24	Wintering	VP1	23/02/2024	09:09:00	2	38	62.5m	0	38
WT280-23/24	Wintering	VP1	23/02/2024	09:26:00	2	102	15m	102	0
WT287-23/24	Wintering	VP1	23/02/2024	10:52:00	4	50	15m	0	50
WT290-23/24	Wintering	VP2	23/02/2024	08:29:00	2	5	15m	5	0
WT296-23/24	Wintering	VP2	23/02/2024	13:48:00	3	15	15m	15	0
WT297-23/24	Wintering	VP3	26/02/2024	09:05:00	1	33	10m	30	3
WT298-23/24	Wintering	VP3	26/02/2024	10:09:00	3	38	20m	20	18
WT304-23/24	Wintering	VPA	26/02/2024	08:54:00	3	21600	2.5m	21600	0
WT306-23/24	Wintering	VPA	26/02/2024	09:14:00	3	50	15m	50	0
WT307-23/24	Wintering	VPA	26/02/2024	09:25:00	4	32	15m	32	0
WT321-23/24	Wintering	VPB	26/02/2024	12:00:00	3	10	2.5m	10	0
WT322-23/24	Wintering	VPB	26/02/2024	12:10:00	1	50	15m	10	0
WT324-23/24	Wintering	VP1	21/03/2024	08:29:00	2	26	15m	8	18
WT325-23/24	Wintering	VP1	21/03/2024	09:09:00	2	70	15m	10	60
WT326-23/24	Wintering	VP1	21/03/2024	09:09:00	1	60	15m	30	30
WT334-23/24	Wintering	VP1	21/03/2024	09:15:00	1	10	20m	10	0
WT335-23/24	Wintering	VP1	21/03/2024	09:29:00	1	20	27.5m	14	6
WT339-23/24	Wintering	VP1	21/03/2024	10:38:00	2	9	35m	7	2
WT340-23/24	Wintering	VP1	21/03/2024	10:49:00	1	7	4.5m	7	0
WT342-23/24	Wintering	VP1	21/03/2024	13:17:00	1	26	37.5m	18	8
WT343-23/24	Wintering	VP1	21/03/2024	14:21:00	2	7	7.5m	7	0
WT347-23/24	Wintering	VP3	21/03/2024	09:12:00	3	64	62.5m	50	14
WT350-23/24	Wintering	VP3	21/03/2024	09:27:00	3	53	62.5m	53	
WT357-23/24	Wintering	VP3	21/03/2024	10:39:00	2	30	62.5m	15	15
WT362-23/24	Wintering	VP3	21/03/2024	11:27:00	2	18	15m	9	9

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT363-23/24	Wintering	VP3	21/03/2024	11:52:00	1	14	62.5m	7	7
WT380-23/24	Wintering	VP5	27/03/2024	12:28:00	6	11	25m	7	4
WT383-23/24	Wintering	VPA	27/03/2024	09:10:00	2	15	2.5m	5	10
WT390-23/24	Wintering	VPA	27/03/2024	10:40:00	2	20	15m	20	0
WT394-23/24	Wintering	VPA	27/03/2024	13:23:00	1	160	15m	130	30
WT407-23/24	Wintering	VPB	27/03/2024	12:58:00	4	236	62.5m	100	136
WT409-23/24	Wintering	VPB	27/03/2024	14:26:00	4	84	62.5m	24	60
WT410-23/24	Wintering	VPB	27/03/2024	14:32:00	1	52	62.5m	10	42
WT50-24	Breeding	VP3	24/06/2024	09:29:00	3	170	62.5m	0	170
WT51-24	Breeding	VP3	24/06/2024	09:29:00	2	170	62.5m	0	170
WT56-24	Breeding	VP2	24/06/2024	10:34:00	1	9	17.5m	9	0
WT72-24	Breeding	VPA	27/06/2024	12:49:00	1	15	2.5m	15	0
WT88-24	Breeding	VP2	24/07/2024	11:41:00	1	10	2.5m	10	0
WT91-24	Breeding	VP4	24/07/2024	12:04:00	3	30	62.5m	0	30
WT96-24	Breeding	VP4	24/07/2024	14:23:00	4	34	62.5m	0	34
N/A	Breeding	VP4	24/09/2024	12:23:00	3	-	62.5m	-	-
WT178-24	Breeding	VP3	24/09/2024	12:04:00	4	25	30m	0	25
WT181-24	Breeding	VP5	24/09/2024	12:19:00	2	80	62.5m	0	80
WT184-24	Breeding	VP3	24/09/2024	13:19:00	1	210	35m	30	180
WT185-24	Breeding	VP5	24/09/2024	13:19:00	4	17	62.5m	0	17

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00126	Winter	VP2	25/11/2025	16:00:00	2	12	0	0	0	0	12
F00134	Winter	VP3	28/11/2025	09:00:00	5	0	6	0	0	0	6
F00376	Winter	VP5	09/02/2026	14:42:00	2	10	0	0	0	0	10
F00379	Winter	VP4	11/02/2026	07:30:00	4	15	0	0	0	0	15
F00381	Winter	VP4	11/02/2026	07:59:00	2	22	0	0	0	0	22
F00383	Winter	VP4	11/02/2026	08:24:00	1	13	10	0	0	0	23
F00387	Winter	VP4	11/02/2026	09:03:00	2	0	18	0	0	0	18
F00388	Winter	VP4	11/02/2026	10:02:00	2	0	35	0	0	0	35
F00389	Winter	VP4	11/02/2026	10:12:00	2	16	0	0	0	0	16
F00397	Winter	VP1	10/02/2026	13:33:00	2	25	0	0	0	0	25
F00399	Winter	VP1	10/02/2026	17:17:00	3	0	23	0	0	0	23
F00414	Winter	VP2	12/02/2026	11:43:00	2	10	0	0	0	0	10
F00416	Winter	VP2	12/02/2026	13:05:00	3	13	0	0	0	0	13
F00438	Winter	VP5	24/02/2026	08:24:00	3	32	60	0	0	0	92
F00439	Winter	VP5	24/02/2026	08:46:00	3	10	15	0	0	0	25
F00440	Winter	VP5	24/02/2026	09:00:00	2	15	10	0	0	0	25
F00441	Winter	VP5	24/02/2026	09:20:00	1	22	5	0	0	0	27
F00444	Winter	VP5	24/02/2026	10:58:00	2	0	22	0	0	0	22
F00445	Winter	VP5	24/02/2026	11:10:00	1	8	10	0	0	0	18
F00446	Winter	VP5	24/02/2026	11:18:00	3	0	15	20	0	0	35
F00451	Winter	VP5	24/02/2026	12:54:00	1	0	22	0	0	0	22
F00455	Winter	VP1	24/02/2026	13:27:00	2	0	0	26	0	0	26
F00456	Winter	VP1	24/02/2026	13:49:00	3	0	0	35	0	0	35
F00473	Winter	VP2	25/02/2026	13:25:00	1	31	0	0	0	0	31
F00476	Winter	VP2	25/02/2026	13:43:00	1	9	0	0	0	0	9

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00477	Winter	VP2	25/02/2026	14:06:00	5	0	0	27	0	0	27
F00487	Winter	VP2	25/02/2026	18:42:00	2	12	0	0	0	0	12
F00493	Winter	VP3	26/02/2026	14:13:00	1	10	0	0	0	0	10
F00510	Winter	VP2	17/02/2026	08:38:00	2	0	51	0	0	0	51
F00512	Winter	VP2	17/02/2026	08:41:00	5	0	12	0	0	0	12
F00513	Winter	VP2	17/02/2026	08:44:00	2	10	0	0	0	0	10
F00515	Winter	VP2	17/02/2026	08:45:00	1	11	0	0	0	0	11
F00516	Winter	VP2	17/02/2026	08:46:00	2	0	24	0	0	0	24
F00517	Winter	VP2	17/02/2026	08:56:00	3	0	32	0	0	0	32
F00520	Winter	VP2	17/02/2026	09:13:00	4	0	29	0	0	0	29
F00522	Winter	VP2	17/02/2026	09:21:00	2	19	0	0	0	0	19
F00528	Winter	VP2	17/02/2026	09:49:00	5	0	29	0	0	0	29
F00533	Winter	VP2	17/02/2026	10:51:00	1	8	0	0	0	0	8
F00126	Winter	VP2	25/11/2025	16:00:00	2	12	0	0	0	0	12
F00134	Winter	VP3	28/11/2025	09:00:00	5	0	6	0	0	0	6
F00376	Winter	VP5	09/02/2026	14:42:00	2	10	0	0	0	0	10
F00379	Winter	VP4	11/02/2026	07:30:00	4	15	0	0	0	0	15
F00381	Winter	VP4	11/02/2026	07:59:00	2	22	0	0	0	0	22
F00383	Winter	VP4	11/02/2026	08:24:00	1	13	10	0	0	0	23
F00387	Winter	VP4	11/02/2026	09:03:00	2	0	18	0	0	0	18
F00388	Winter	VP4	11/02/2026	10:02:00	2	0	35	0	0	0	35
F00389	Winter	VP4	11/02/2026	10:12:00	2	16	0	0	0	0	16
F00397	Winter	VP1	10/02/2026	13:33:00	2	25	0	0	0	0	25
F00399	Winter	VP1	10/02/2026	17:17:00	3	0	23	0	0	0	23
F00414	Winter	VP2	12/02/2026	11:43:00	2	10	0	0	0	0	10

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00416	Winter	VP2	12/02/2026	13:05:00	3	13	0	0	0	0	13
F00438	Winter	VP5	24/02/2026	08:24:00	3	32	60	0	0	0	92
F00439	Winter	VP5	24/02/2026	08:46:00	3	10	15	0	0	0	25
F00440	Winter	VP5	24/02/2026	09:00:00	2	15	10	0	0	0	25
F00441	Winter	VP5	24/02/2026	09:20:00	1	22	5	0	0	0	27
F00444	Winter	VP5	24/02/2026	10:58:00	2	0	22	0	0	0	22
F00445	Winter	VP5	24/02/2026	11:10:00	1	8	10	0	0	0	18
F00446	Winter	VP5	24/02/2026	11:18:00	3	0	15	20	0	0	35
F00451	Winter	VP5	24/02/2026	12:54:00	1	0	22	0	0	0	22
F00455	Winter	VP1	24/02/2026	13:27:00	2	0	0	26	0	0	26
F00456	Winter	VP1	24/02/2026	13:49:00	3	0	0	35	0	0	35
F00473	Winter	VP2	25/02/2026	13:25:00	1	31	0	0	0	0	31
F00476	Winter	VP2	25/02/2026	13:43:00	1	9	0	0	0	0	9
F00477	Winter	VP2	25/02/2026	14:06:00	5	0	0	27	0	0	27
F00487	Winter	VP2	25/02/2026	18:42:00	2	12	0	0	0	0	12
F00493	Winter	VP3	26/02/2026	14:13:00	1	10	0	0	0	0	10
F00510	Winter	VP2	17/02/2026	08:38:00	2	0	51	0	0	0	51
F00512	Winter	VP2	17/02/2026	08:41:00	5	0	12	0	0	0	12
F00513	Winter	VP2	17/02/2026	08:44:00	2	10	0	0	0	0	10
F00515	Winter	VP2	17/02/2026	08:45:00	1	11	0	0	0	0	11
F00516	Winter	VP2	17/02/2026	08:46:00	2	0	24	0	0	0	24
F00517	Winter	VP2	17/02/2026	08:56:00	3	0	32	0	0	0	32
F00520	Winter	VP2	17/02/2026	09:13:00	4	0	29	0	0	0	29
F00522	Winter	VP2	17/02/2026	09:21:00	2	19	0	0	0	0	19
F00528	Winter	VP2	17/02/2026	09:49:00	5	0	29	0	0	0	29

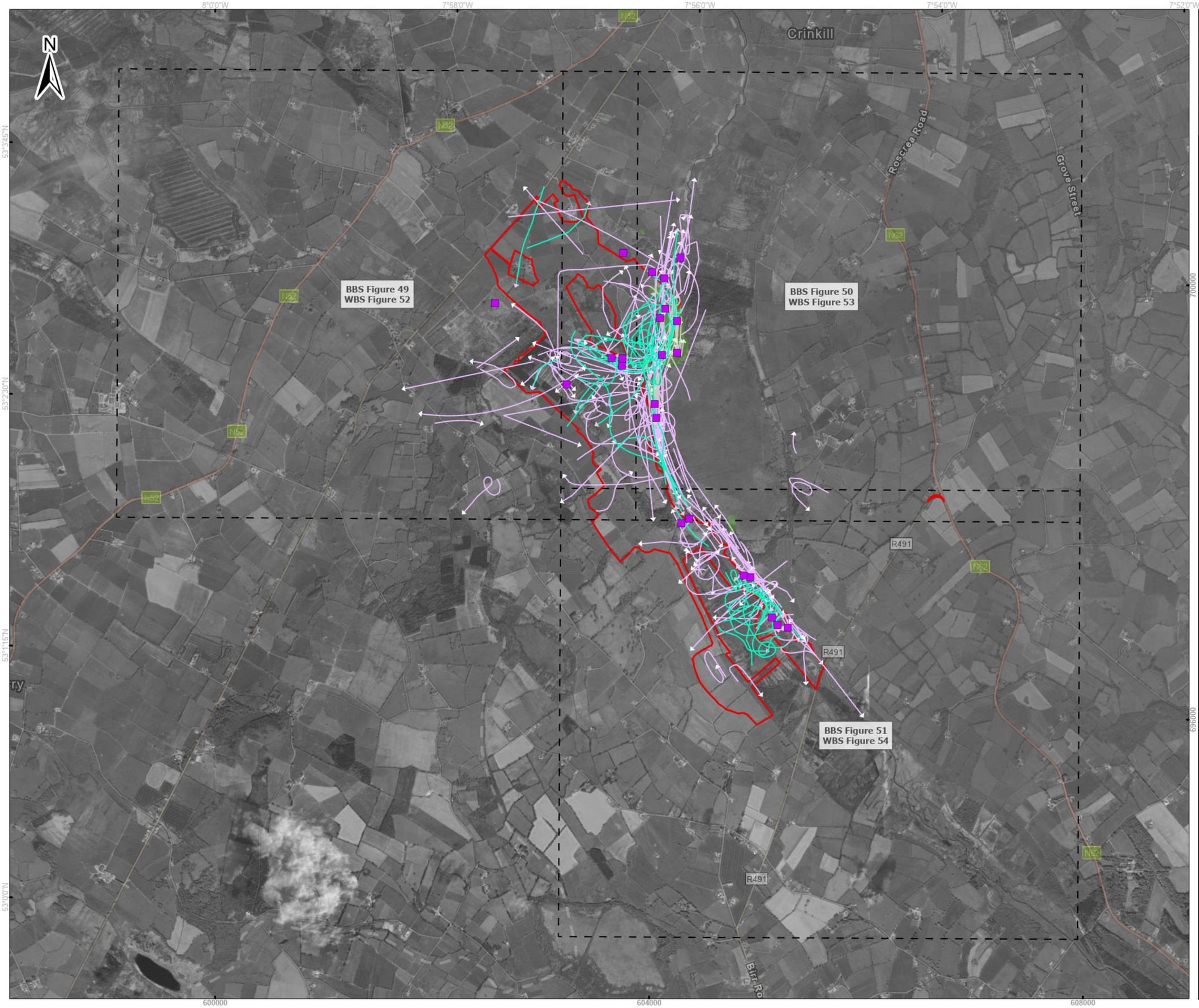
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00533	Winter	VP2	17/02/2026	10:51:00	1	8	0	0	0	0	8

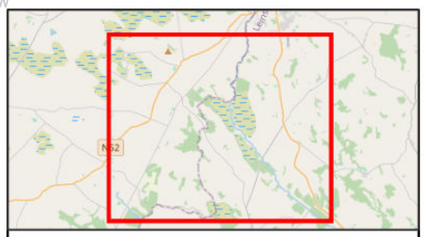
Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	2	-	-	-	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
2022/2023	2	2	-	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
2020/2021	-	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
2023	-	-	1	-	1	-	-	4	-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
2023/2024	-	2	-	-	2	-	-	-	-	2	-	1	1	-	2	2	-	-	-	2	-	5	-	-
2024	-	3	1	-	-	-	-	2	2	-	-	-	-	-	-	3	-	-	-	-	-	-	1	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00177	Winter	Transect	T1	20/11/2025	13:59:00	8	FW2	on water
P00262	Winter	Transect	T2,5,6	24/11/2025	12:30:00	2	FW2	on ground
P00434	Winter	Transect	T2, T5, T6	05/12/2025	10:46:00	2	FW2	on water
P00438	Winter	Transect	T2, T5, T6	05/12/2025	10:58:00	9	FW2	in flight
P00553	Winter	Transect	T2. T5, T6	22/01/2026	13:05:00	2	FW2	on water
P00556	Winter	Transect	T2. T5, T6	22/01/2026	13:14:00	2	FW2	on water

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00609	Winter	Transect	T1, T3, T4	10/02/2026	07:55:00	2	GA1	N/A
P00613	Winter	Transect	T1, T3, T4	10/02/2026	10:33:00	1	PB4	N/A
P00647	Winter	Transect	T1, T3, T4	11/02/2026	12:38:00	2	FW2	N/A
P00650	Winter	Transect	T1, T3, T4	11/02/2026	12:45:00	1	FW2	N/A
P00663	Winter	Transect	T1, T3, T4	11/02/2026	14:52:00	2	PB4	N/A
P00762	Winter	HH roost	HHVP2	09/03/2026	N/A	2	PB4	N/A
P00804	Winter	Transect	T2	13/03/2026	16:18:00	2	FW4	Flushed
P00806	Winter	Transect	T2	13/03/2026	16:31:00	2	PB4	Flushed
P00177	Winter	Transect	T1	20/11/2025	13:59:00	8	FW2	on water
P00262	Winter	Transect	T2,5,6	24/11/2025	12:30:00	2	FW2	on ground
P00434	Winter	Transect	T2, T5, T6	05/12/2025	10:46:00	2	FW2	on water
P00438	Winter	Transect	T2, T5, T6	05/12/2025	10:58:00	9	FW2	in flight
P00553	Winter	Transect	T2. T5, T6	22/01/2026	13:05:00	2	FW2	on water
P00556	Winter	Transect	T2. T5, T6	22/01/2026	13:14:00	2	FW2	on water
P00609	Winter	Transect	T1, T3, T4	10/02/2026	07:55:00	2	GA1	N/A
P00613	Winter	Transect	T1, T3, T4	10/02/2026	10:33:00	1	PB4	N/A
P00647	Winter	Transect	T1, T3, T4	11/02/2026	12:38:00	2	FW2	N/A
P00650	Winter	Transect	T1, T3, T4	11/02/2026	12:45:00	1	FW2	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	60	N/A	N/A
Winter	I-WeBS	Site 4	15/10/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	3	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	4	N/A	N/A
Winter	I-WeBS	Glasderry Wood	01/12/2025	N/A	6	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	01/12/2025	N/A	7	N/A	N/A
Winter	I-WeBS	Glasderry Wood	09/02/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	09/02/2026	N/A	7	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	6	N/A	N/A
Winter	I-WeBS	Riverstown bridge	09/02/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	12/03/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Site 2	15/10/2025	N/A	60	N/A	N/A
Winter	I-WeBS	Site 4	15/10/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	09/02/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	3	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	4	N/A	N/A
Winter	I-WeBS	Glasderry Wood	01/12/2025	N/A	6	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	01/12/2025	N/A	7	N/A	N/A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Mallard

Flightlines - Ecology Ireland 2020 - 2026

- Mallard

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 48:
over the survey period
(May 2020 – March 2026)
Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-012.ApX-VP-MA-SUM-A_overview

Draft: A

8°0'0"W

7°58'0"W

53°3'45"N

53°2'30"N

600000

700000

N52

WT66-23

WT069-23

WT72-24

WT10-23

WT50-23

WT8-23

WT9-21

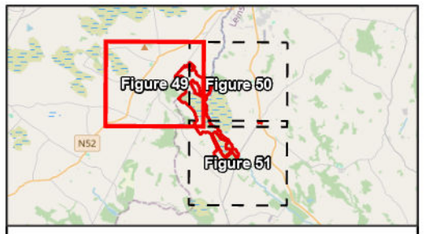
WT77-20

WT107-23

WT20-21

WT38-20

WT16-20



Legend

Proposed wind farm boundary

High activity area - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

Mallard

0 250 500

Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 49:
Mallard observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-012.ApX.BBS-VP-MA-SUM-A

Draft: A

7°56'0"W

7°54'0"W

53°3'45"N

53°2'30"N

604000

7000000

N

Roscrea Road

Grove Street

N62

WT069-23

WT146-23

WT3-23

WT57-23

WT183-23

WT108-23

WT75-23

WT72-24

WT10-23

WT50-23

WT8-23

WT9-21

WT014-23

WT54-23

WT185-24

WT76-23

WT12-20

WT101-20

WT20-21

WT37-20

WT11-21

WT070-23

WT23-21

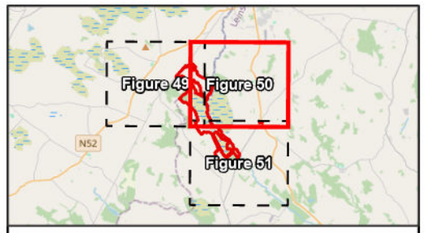
WT22-21

WT13-21

WT178-24

WT28-23

WT6-20



Legend

Proposed wind farm boundary

High activity area - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

Mallard

0 250 500

Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 50:
Mallard observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

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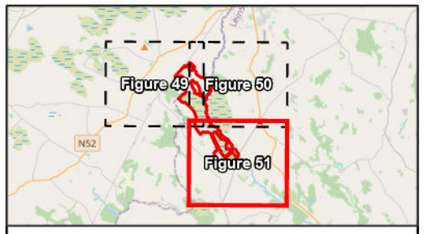
Map Ref: 11333-012.ApX.BBS-VP-MA-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

- Mallard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 51:
Mallard observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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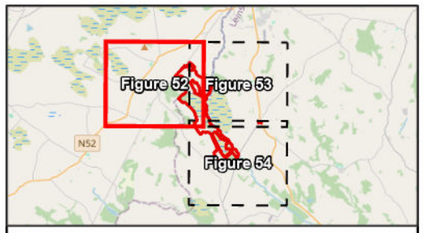
Map Ref: 11333-012.ApX.BBS-VP-MA-SUM-A

Draft: A

8°0'0"W
7°58'0"W
53°3'45"N
53°2'30"N
600000
604000
700000
N52
WT74-23/24
WT410-23/24
WT409-23/24
WT407-23/24
F00456
F00455
P00789
P00649
P00255
P00429
F00126
WT247-23/24
P00561
WT51-21/22
WT383-23/24
WT43-23/24
P00550
P00792
P00555
F00510
WT45-23/24
F00473
P00221
P00436
P00653
P00801
F00416
P00557
WT204-22/23
F00414
WT201-21/22
WT200-22/23
F00476
F00513
F00477
P00565
WT220-22/23
WT297-23/24
WT362-23/24
P00811
WT192-21/22
WT21-23/24
WT133-20/21
F00522
WT363-23/24
P00809
WT390-23/24
F00533
WT153-22/23
F00134
P00413
P00351
WT296-23/24



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Mallard

Flightlines - Ecology Ireland 2020 - 2024

- Mallard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 52:
Mallard observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-012.ApX.WBS-VP-MA-SUM-A

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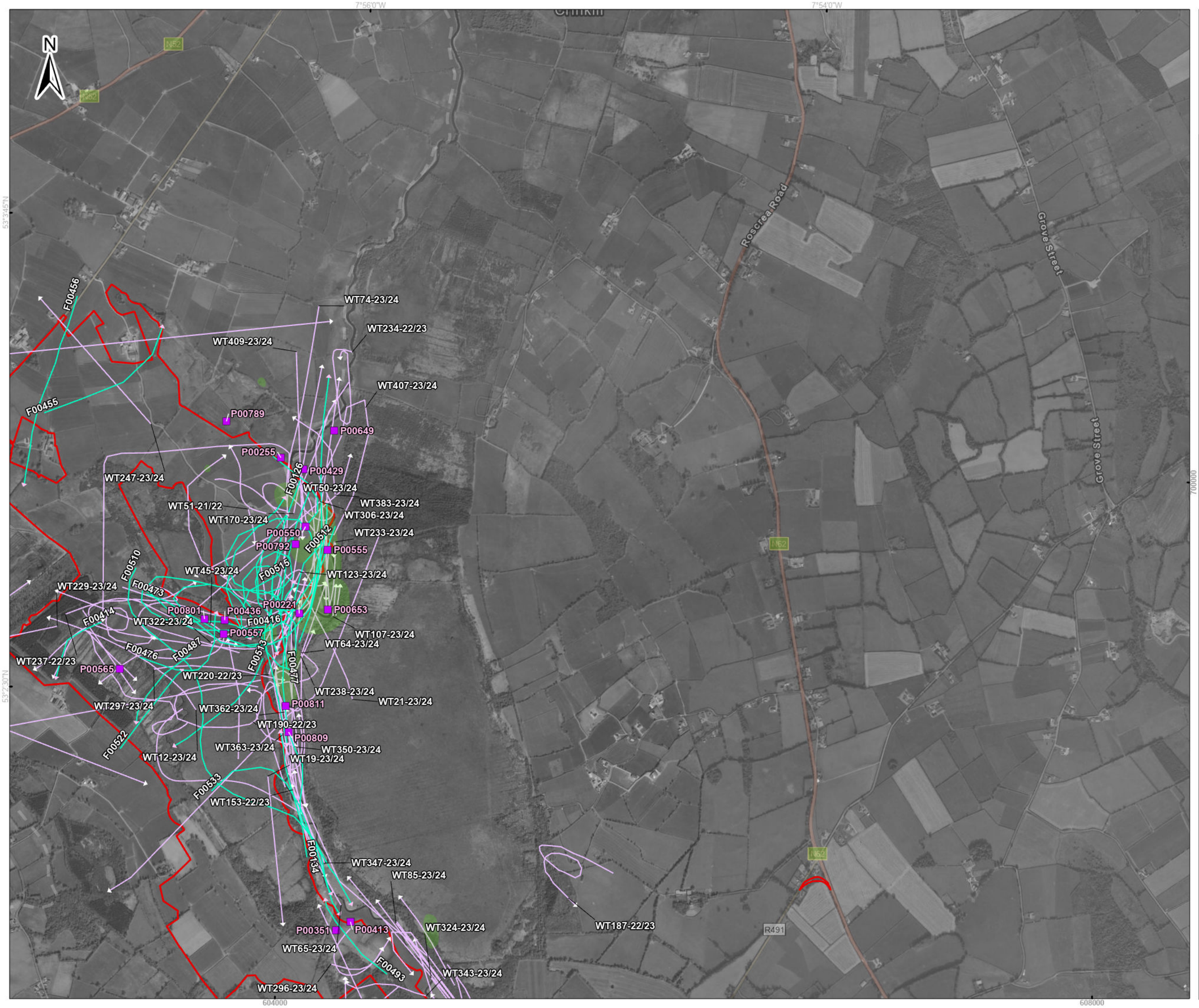

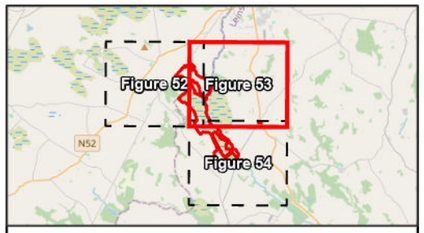

Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Mallard

Flightlines - Ecology Ireland 2020 - 2024

- Mallard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 53:
Mallard observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:17,000

Prepared by:	Checked by:	Date:
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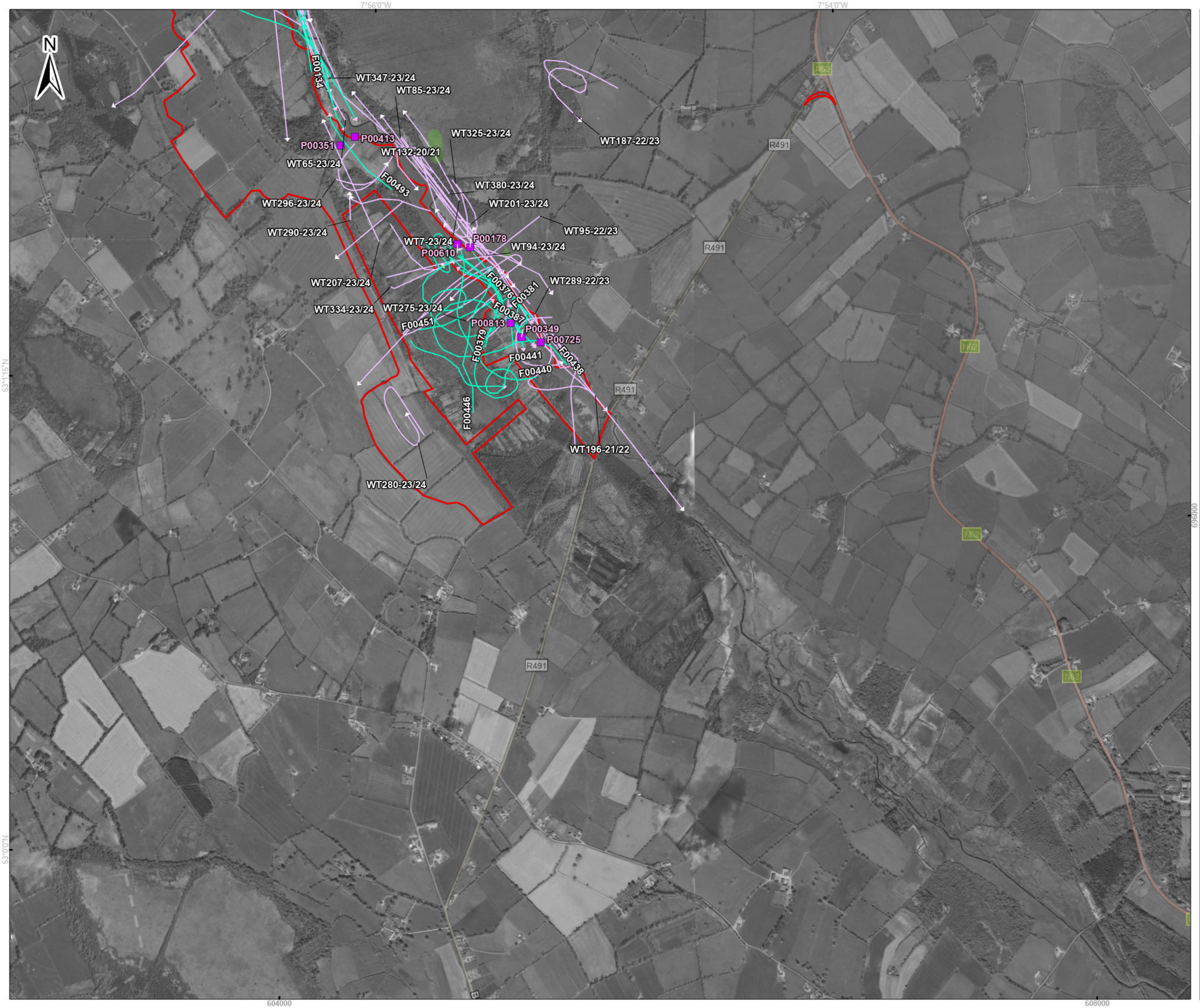
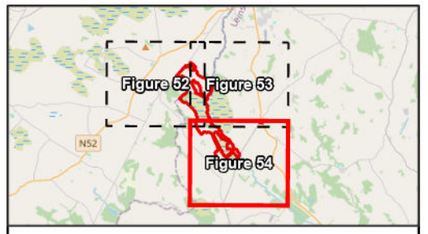
Map Ref: 11333-012.ApX.WBS-VP-MA-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Mallard

Flightlines - Ecology Ireland 2020 - 2024

- Mallard

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 54:
Mallard observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:17,000

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Map Ref: 11333-012.ApX.WBS-VP-MA-SUM-A

Draft: A

Appendix 7-1 - XIV MERLIN

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP24-20/21	Wintering	VP, 3	08/10/2020	12:00:00	1	90	16.5m	50	40
RP42-20/21	Wintering	VP, 3	08/10/2020	14:30:00	1	15	27.5m	0	15
RP64-20/21	Wintering	VP, 3	05/11/2020	14:30:00	1	1103	2m	1103	0
RP65-20/21	Wintering	VP, 1	05/11/2020	14:45:00	1	110	12.5m	100	10
RP102-20/21	Wintering	VP, 4	14/01/2021	11:10:00	1	Unknown	15m	Unknown	0
RP158-20/21	Wintering	VP, 1	08/03/2021	11:58:00	1	120	45m	10	110
RP30-21/22	Wintering	VP1	02/12/2021	12:16:00	1	240	5m	240	0
RP77-21/22	Wintering	VP4	14/01/2022	14:12:00	1	26	5m	26	0
RP120-21/22	Wintering	VP1	11/02/2022	09:34:00	1	68	5m	0	68
RP122-21/22	Wintering	VP1	11/02/2022	09:40:00	1	4200	5m	0	4200
RP180-21/22	Wintering	VP5	14/03/2022	13:16:00	1	23	25m	3	20
RP68-22/23	Wintering	VP3	20/02/2023	08:59:00	1	20	2.5m	20	0
RP71-22/23	Wintering	VP3	20/02/2023	10:00:00	1	16	2.5m	16	0
RP105-22/23	Wintering	VPA	27/03/2023	10:24:00	1	28	2.5m	28	0
RP45-23	Breeding	VP3	02/05/2023	12:12:00	1	40	2.5m	40	0
RP55-23/24	Wintering	VP2	27/11/2023	14:22:00	1	22	15m	22	0
RP78-23/24	Wintering	VP5	20/12/2023	10:53:00	1	15	5m	0	15
RP102-23/24	Wintering	VP1	25/01/2024	14:30:00	1	480	2.5m	0	480
RP111-23/24	Wintering	VP3	25/01/2024	09:35:00	1	35	15m	35	0
RP117-23/24	Wintering	VP3	25/01/2024	11:45:00	1	110	62.5m	60	50
RP119-23/24	Wintering	VP3	25/01/2024	12:04:00	1	720	2.5m	720	0
RP95-23/24	Wintering	VP1	25/01/2024	12:25:00	1	22	15m	15	7
RP96-23/24	Wintering	VP1	25/01/2024	12:25:00	1	840	2.5m	0	840

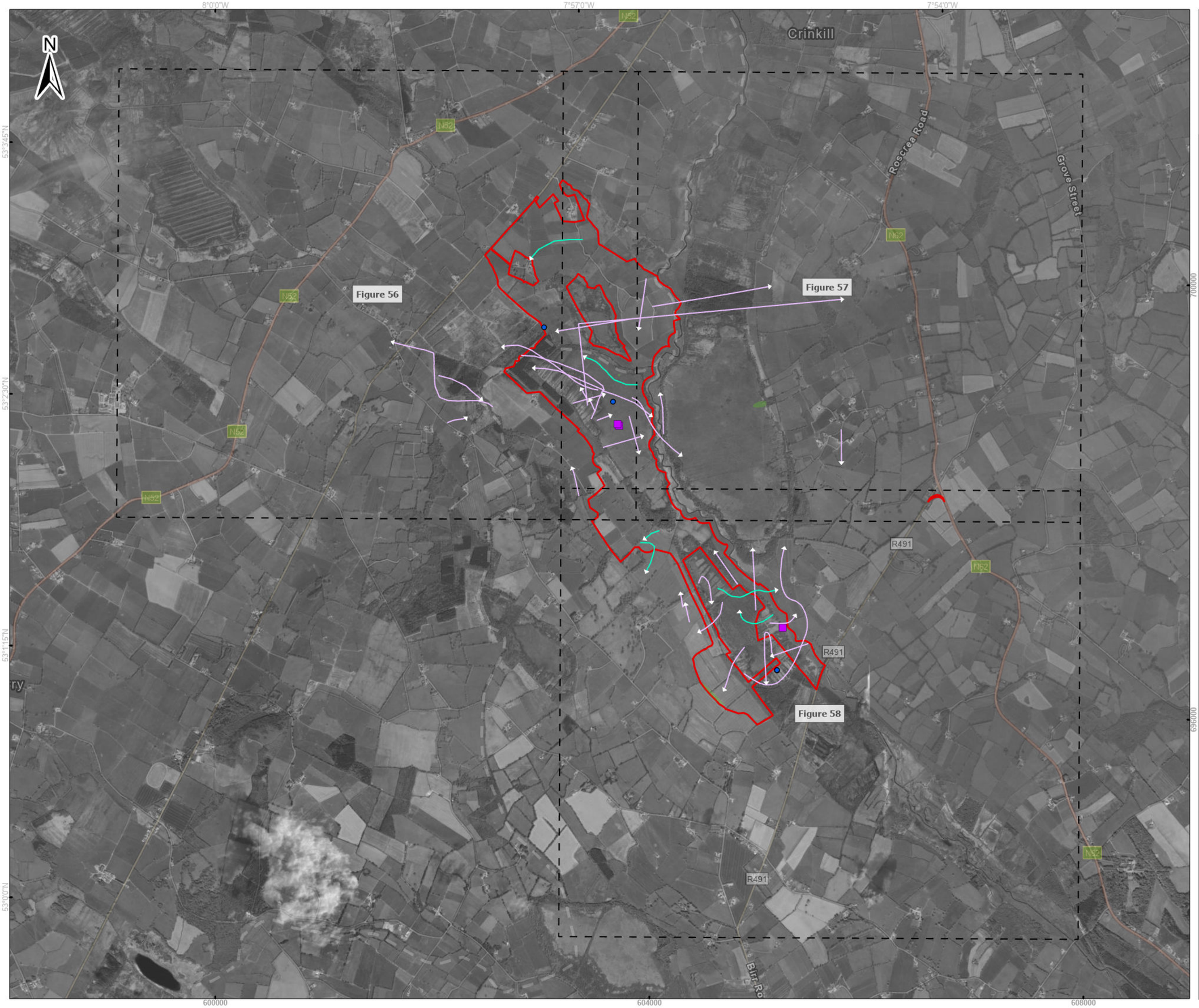
Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP97-23/24	Wintering	VP1	25/01/2024	12:39:00	1	31	2.5m	6	25
RP133-23/24	Wintering	VPA	02/02/2024	11:05:00	1	10	2.5m	10	0
RP134-23/24	Wintering	VPA	02/02/2024	13:22:00	1	300	-	300	0
RP136-23/24	Wintering	VP2, VP1	23/02/2024	11:05:00	1	120	2.5m	120	0
RP144-23/24	Wintering	VP1	23/02/2024	14:10:00	1	30	15m	15	15
RP159-23/24	Wintering	VP3	26/02/2024	13:46:00	1	20	2m	20	0
RP160-23/24	Wintering	VP3	26/02/2024	13:51:00	1	15	2m	15	0
RP162-23/24	Wintering		26/02/2024	13:08:00	1	1200	22.5m	0	1200
RP204-23/24	Wintering	VP3	21/03/2024	08:54:00	1	18	62.5m	0	18
RP106-24	Breeding	VP4	26/06/2024	14:21:00	1	40	37.5m	0	40
RP168-24	Breeding	VP1	28/08/2024	12:55:00	1	15	15m	10	5
RP169-24	Breeding	VP1	28/08/2024	13:02:00	1	10	2.5m	5	5
RP182-24	Breeding	VP3	28/08/2024	14:14:00	1	70	27.5m	50	20

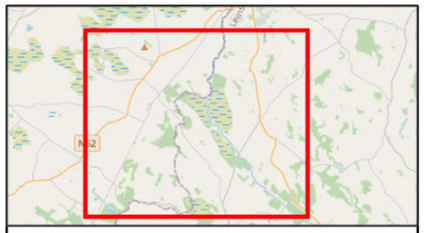
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00033	Winter	VP2	30/10/2025	11:19:00	1	18	0	0	0	0	18
F00078	Winter	VP5	19/11/2025	15:22:00	1	28	0	0	0	0	28
F00300	Winter	VP5	14/01/2026	09:33:00	1	45	10	0	0	0	55
F00311	Winter	VP1	27/01/2026	09:03:00	1	16	0	0	0	0	16

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00488	Winter	VP3	26/02/2026	12:37:00	2	7	0	0	0	0	7
F00489	Winter	VP3	26/02/2026	12:42:00	2	14	0	0	0	0	14

Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020/2021	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023/2024	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00279	Winter	HH roost	HHVP1	24/11/2025	16:37:00	1	PB1	in flight
P00333	Winter	VP	VP5	08/12/2025	13:30:00	1	N/A	N/A
P00581	Winter	HH roost	HHVP1	22/01/2026	17:06:00	1	PB1	in flight





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Merlin

Flightlines - Ecology Ireland 2020 - 2024

- Merlin

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 55:
Merlin observations
over the survey period
(May 2020 – March 2026)
Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-013.ApX-VP-ML-SUM-A_overview

Draft: A

8°0'0"W

7°58'0"W

53°3'45"N

53°2'30"N

600000

700000

N52

F00311

RP134

RP40-23/24

RP162-23/24

RP106-24

RP102-20/21

RP111-23/24

RP160-23/24

RP68-22/23

RP119

P00581

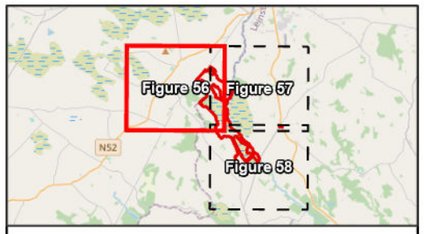
P00279

RP64-20/21

RP24-20/21

RP45-23

RP71-22/23



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Merlin

Flightlines - Ecology Ireland 2020 - 2024

- Merlin

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 56:
Merlin observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-013.ApX-VP-ML-SUM-A

Draft: A

7°56'0"W

7°54'0"W

53°3'45"N

53°2'30"N

604000

700000

N

Roscrea Road

Grove Street

N62

F00311

RP104-22/23

RP180-21/22

RP133-23/24

RP64-20/21

F00033

RP24-20/21

RP119

RP160-23/24

RP45-23

RP68-22/23

P00581

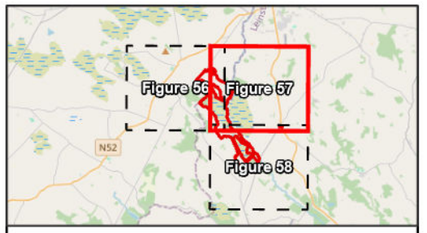
P00279

RP71-22/23

RP204-23/24

RP42-20/21

RP78-23/24



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Merlin

Flightlines - Ecology Ireland 2020 - 2024

- Merlin

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 57:
Merlin observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-013.ApX-VP-ML-SUM-A

Draft: A

7°56'0"W

7°54'0"W

53°11'5"N

53°0'0"N

604000

696000

N

F00488

F00489

F00300

RP136-23/24

RP55-23/24

RP122-21/22

RP120-21/22

F00078

RP65-20/21

P00333

RP168-24

RP95-23/24

RP158-20/21

RP97-23/24

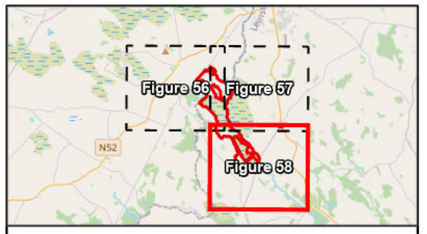
RP102

RP96

RP30-21/22

R491

N62



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Merlin

Flightlines - Ecology Ireland 2020 - 2024

- Merlin

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 58:
Merlin observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-013.ApX-VP-ML-SUM-A

Draft: A

Appendix 7-1 - XV MUTE SWAN

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT41-20	Breeding	VP3	14/05/2020	14:04:00	2	152	25m	100	52
WT38-20/21	Wintering	VP, 5	05/11/2020	10:50:00	4	0	0m	Unknown	Unknown
WT69-20/21	Wintering	VP, 5	04/12/2020	09:15:00	1	14400	0m	14400	0
WT78-20/21	Wintering	VP, 3	04/12/2020	12:29:00	3	25	100m	20	5
WT103-20/21	Wintering	VP, 5	14/01/2021	12:59:00	3	Unknown	0m	0	Unknown
WT117-20/21	Wintering	VP, 5	09/02/2021	09:30:00	3	21600	0m	0	21600
WT136-20/21	Wintering	VP, 3, VP, 5	08/03/2021	12:52:00	2	40	10m	0	40
WT24-21	Breeding	VP1	17/05/2021	09:07:00	2	20	2.5m	20	0
WT34-21	Breeding	VP3	11/06/2021	09:13:00	1	45	30m	45	0
WT41-21	Breeding	VP5	11/06/2021	12:04:00	1	120	-	120	0
WT44-21	Breeding	VP1	14/06/2021	12:58:00	1	20	17.5m	0	20
WT10-21/22	Wintering	VP5, VP2, VP1	23/11/2021	09:07:00	2	215	15m	10	205
WT33-21/22	Wintering	VP5	23/11/2021	14:46:00	1	840	0m	840	0
WT37-21/22	Wintering	VP1	02/12/2021	08:56:00	3	8	5m	8	0
WT40-21/22	Wintering	VP5	02/12/2021	09:00:00	4	10800	0m	0	10800
WT72-21/22	Wintering	VP5	06/12/2021	09:05:00	7	21300	0m	0	21300
WT73-21/22	Wintering	VP5	06/12/2021	09:20:00	2	46	10m	15	31
WT74-21/22	Wintering	VP5	06/12/2021	10:46:00	1	76	40m	0	76
WT96-21/22	Wintering	VP2	10/12/2021	12:26:00	2	4	15m	4	0
WT97-21/22	Wintering	VP1	10/12/2021	12:28:00	2	60	5m	60	0
WT107-21/22	Wintering	VP3, VP5	14/01/2022	09:22:00	3	169	5m	169	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT120-21/22	Wintering	VP3	14/01/2022	12:33:00	1	47	5m	24	23
WT121-21/22	Wintering	VP3, VP5	14/01/2022	12:44:00	2	71	5m	28	43
WT122-21/22	Wintering	VP5	14/01/2022	12:53:00	7	3000	0m	0	3000
WT146-21/22	Wintering	VP3	10/02/2022	09:27:00	3	19980	0m	0	19980
WT154-21/22	Wintering	VP3	10/02/2022	11:47:00	3	146	5m	0	146
WT162-21/22	Wintering	VP5	11/02/2022	09:05:00	7	0	0m	0	0
WT167-21/22	Wintering	VP2, VP5	11/02/2022	11:06:00	1	60	5m	35	25
WT172-21/22	Wintering	VP5	11/02/2022	12:58:00	3	60	0m	60	0
WT174-21/22	Wintering	VP5	11/02/2022	13:05:00	5	50	0m	50	0
WT178-21/22	Wintering	VP5	11/02/2022	13:30:00	2	0	0m	0	0
WT180-21/22	Wintering	VP5	11/02/2022	13:36:00	2	40	20m	0	40
WT181-21/22	Wintering	VP5	11/02/2022	13:42:00	2	20	15m	0	20
WT186-21/22	Wintering	VP5	11/02/2022	14:52:00	2	0	0m	0	0
WT187-21/22	Wintering	VP5	11/02/2022	14:57:00	2	0	0m	0	0
WT59-22/23	Wintering	VPA	30/11/2022	13:09:00	2	600	2.5m	600	0
WT61-22/23	Wintering	VPA	30/11/2022	13:15:00	3	3600	2.5m	3600	0
WT78-22/23	Wintering	VPA	20/12/2022	10:04:00	2	0	-	-	-
WT84-22/23	Wintering	VPB, VPA	20/12/2022	10:21:00	2	68	15m	48	20
WT85-22/23	Wintering	VP3	20/12/2022	10:22:00	2	15	2.5m	13	2
WT89-22/23	Wintering	VP4	20/12/2022	10:41:00	2	66	62.5m	12	54
WT128-22/23	Wintering	VP5, VP2	21/12/2022	09:49:00	2	172	12.5m	53	119
WT147-22/23	Wintering	VP5	21/12/2022	13:33:00	2	37	15m	7	30
WT265-22/23	Wintering	VP2	25/01/2023	12:20:00	1	120	0m		120
WT294-22/23	Wintering	VP5	25/01/2023	11:12:00	2	60	10m	10	50

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT297-22/23	Wintering	VP5	25/01/2023	14:05:00	1	30	30m	30	0
WT239-22/23	Wintering	VPA	27/01/2023	09:41:00	1	27	25m	12	15
WT242-22/23	Wintering	VPA	27/01/2023	09:55:00	6	15600	2.5m	15600	
WT254-22/23	Wintering	VPA	27/01/2023	14:15:00	6	4680	2.5m	4680	
WT259-22/23	Wintering	VPB	27/01/2023	09:52:00	3	78	10m	60	18
WT273-22/23	Wintering	VP3	27/01/2023	09:18:00	1	60	30m	60	0
WT152-22/23	Wintering	VP3	20/02/2023	09:05:00	2	265	15m	180	85
WT154-22/23	Wintering	VP4	20/02/2023	09:09:00	2	30	5m	0	30
WT201-22/23	Wintering	VPA	27/03/2023	10:01:00	2	16800	2.5m	16800	0
WT227-22/23	Wintering	VPB	27/03/2023	12:35:00	2	20	2.5m	0	20
WT233-22/23	Wintering	VPA, VPB	27/03/2023	14:21:00	2	92	62.5m	52	40
WT129-23	Breeding	VPA	26/09/2023	09:02:00	5	1800	0m	1800	0
WT139-23	Breeding	VPB	26/09/2023	11:36:00	2	90	2.5m	45	45
WT174-23/24	Wintering	VPA	20/12/2023	13:01:00	2	5400		0	5400
WT240-23/24	Wintering	VP5, VPB	29/01/2024	14:06:00	2	58	62.5m	3	55
WT248-23/24	Wintering	VPB	29/01/2024	11:35:00	2	6	10m	0	6
WT262-23/24	Wintering	VPA	02/02/2024	10:10:00	6	600	-	600	0
WT264-23/24	Wintering	VPA	02/02/2024	10:40:00	6	120	15m	20	100
WT265-23/24	Wintering	VPA	02/02/2024	10:40:00	4	200	62.5m	200	0
WT270-23/24	Wintering	VPA	02/02/2024	12:24:00	6	120	15m	100	20
WT273-23/24	Wintering	VPA	02/02/2024	13:58:00	2	60	62.5m	55	5
WT305-23/24	Wintering	VPA	26/02/2024	08:54:00	2	21600	2.5m	21600	0
WT319-23/24	Wintering	VPB	26/02/2024	11:26:00	2	60	2.5m	0	60
WT135-24	Breeding	VP5	28/08/2024	09:09:00	1	36	62.5m	0	36

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT141-24	Breeding	VP2, VP1	28/08/2024	11:35:00	1	90	40m	40	50
WT142-24	Breeding	VPB, VP5	28/08/2024	11:52:00	1	72	12.5m	0	72
WT144-24	Breeding	VP1	28/08/2024	12:07:00	2	25	15m	20	5
WT151-24	Breeding	VP2, VP1	23/09/2024	09:23:00	3	18	27.5m	3	15
WT154-24	Breeding	VP2, VP1	23/09/2024	09:51:00	1	12	35m	0	12
WT173-24	Breeding	VP5	24/09/2024	10:34:00	2	8	15m	0	8
WT175-24	Breeding	VP3, VP5	24/09/2024	10:51:00	1	15	30m	0	15
WT176-24	Breeding	VP3	24/09/2024	11:28:00	5	35	25m	0	35
WT187-24	Breeding	VP5	24/09/2024	13:56:00	1	33	15m	0	33
WT191-24	Breeding	VPA	27/09/2024	11:31:00	2	6	2m	0	6
WT193-24	Breeding	VPA	27/09/2024	14:02:00	1	21	3.5m	3	18
WT205-24	Breeding	VPB	28/09/2024	12:28:00	1	15	2.5m	15	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00017	Winter	VP1	28/10/2025	14:47:00	2	0	68	0	0	0	68
F00096	Winter	VP1	27/11/2025	12:34:00	2	10	0	0	0	0	10
F00162	Winter	VP5	08/12/2025	10:36:00	3	15	0	0	0	0	15
F00166	Winter	VP5	08/12/2025	12:54:00	3	0	66	0	0	0	66
F00244	Winter	VP2	03/12/2025	10:01:00	2	5	0	0	0	0	5

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00290	Winter	VP4	12/01/2026	09:13:00	3	0	0	82	0	0	82
F00294	Winter	VP4	12/01/2026	09:36:00	3	20	15	0	0	0	35
F00396	Winter	VP1	10/02/2026	13:32:00	2	18	0	0	0	0	18
F00407	Winter	VP2	12/02/2026	10:04:00	1	12	22	0	0	0	34
F00409	Winter	VP2	12/02/2026	10:21:00	1	2	4	32	0	0	38
F00458	Winter	VP1	24/02/2026	14:36:00	1	24	0	0	0	0	24
F00508	Winter	VP3	26/02/2026	17:52:00	2	0	0	41	0	0	41

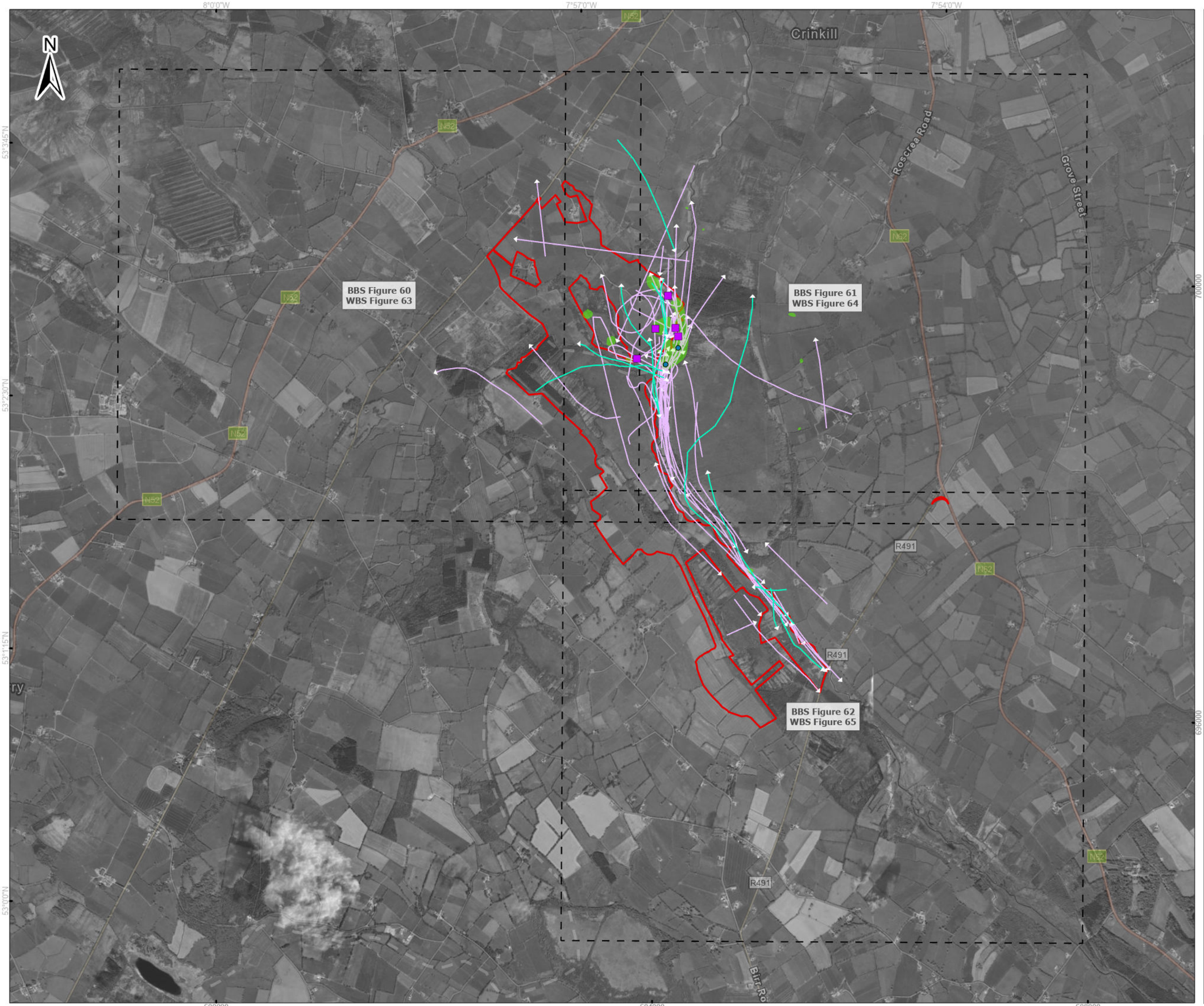
Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
2022/2023	-	1	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
2020/2021	-		-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	2	-	-

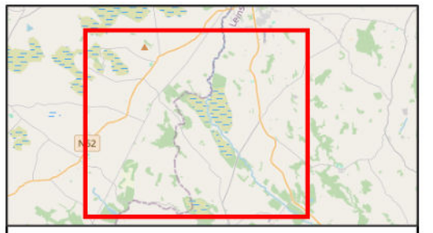
TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00261	Winter	Transect	T2,5,6	24/11/2025	12:29:00	1	FW2	on water

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00370	Winter	VP	VP1	02/12/2025	N/A	N/A	N/A	N/A
P00435	Winter	Transect	T2, T5, T6	05/12/2025	10:47:00	1	FW2	on water
P00439	Winter	Transect	T2, T5, T6	05/12/2025	11:09:00	2	FW2	in flight
P00652	Winter	Transect	T1, T3, T4	11/02/2026	12:47:00	2	FW2	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	26/11/2025	N/A	10	N/A	N/A
Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	4	N/A	N/A
Winter	I-WeBS	Dovesgrove Callows	01/12/2025	N/A	4	N/A	N/A
Winter	I-WeBS	Glasderry More bridge	01/12/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Glassdery More Bridge	16/01/2026	N/A	6	N/A	N/A
Winter	I-WeBS	Glasderry Wood	16/01/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Glasderry Wood	09/02/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	2	N/A	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Dovegrove Callows	09/02/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	4	N/A	N/A
Winter	I-WeBS	Glasderry Wood	12/03/2026	N/A	2	N/A	N/A
Winter	I-WeBS	Birr, Croghan Road Bridge	12/03/2026	N/A	3	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	12/03/2026	N/A	1	N/A	N/A
Winter	I-WeBS	Ashton Callow hut	12/03/2026	N/A	7	N/A	N/A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Mute Swan

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 59:
Mute Swan observations over the survey period (May 2020 – March 2026) Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-014.ApX-VP-MS-SUM-A_overview

Draft: A

8°0'0"W

7°58'0"W

53°3'45"N

53°2'30"N

600000

603000

700000

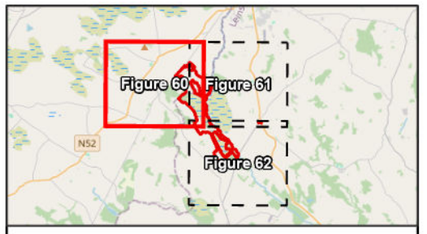
N52

WT242-22/23

WT254-22/23

WT38-20/21

WT34-21



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 250 500

Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 60:
Mute Swan observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-014.ApX.BBS-VP-MS-SUM-A

Draft: A

7°56'0"W

7°54'0"W

53°3'45"N

53°2'30"N

606000

700000

N

Roscrea Road

Grove Street

WT122-21/22

WT40-21/22

WT174-23/24

WT191-24

WT061-22/23

WT139-23

WT305-23/24

WT242-22/23

WT201-22/23

WT078-22/23

WT162-21/22

WT261-23/24

WT254-22/23

WT33-21/22

WT175-24

WT41

WT72-21/22

WT059-22/23

WT173-24

WT38-20/21

WT129-23

WT319

WT103-20/21

WT69-20/21

WT146-21/22

WT142-24

WT117-20/21

WT135-24

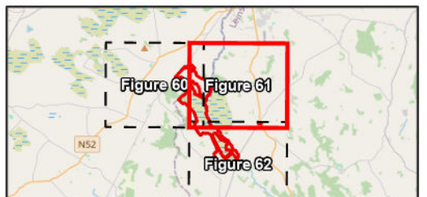
WT141-20

WT34-21

WT176-24

WT141-24

N62



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 61:
Mute Swan observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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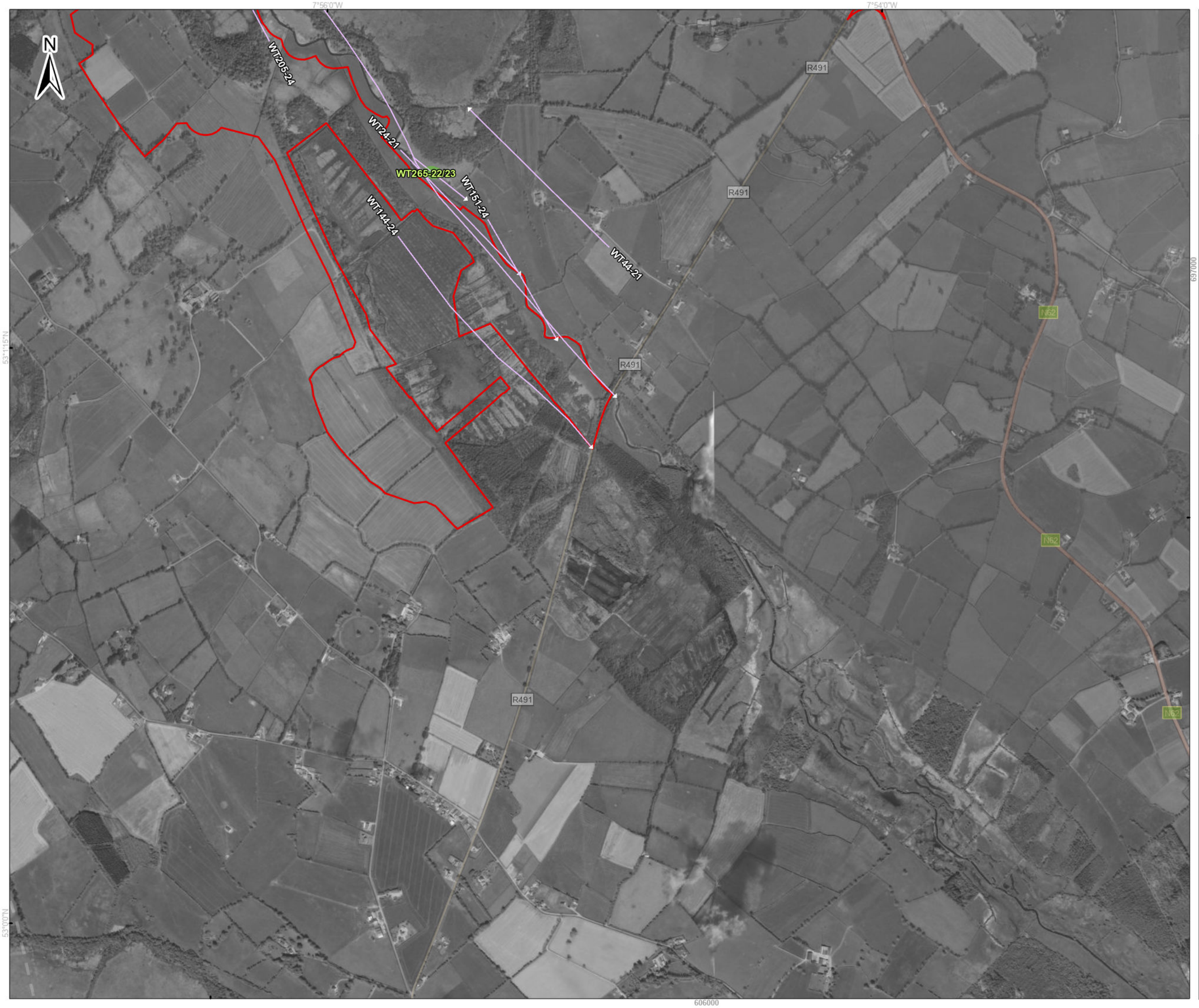
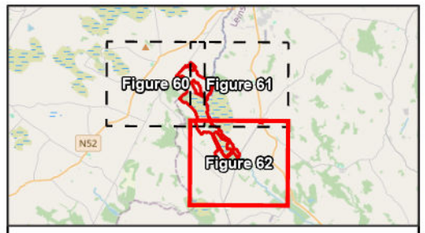
Map Ref: 11333-014.ApX.BBS-VP-MS-SUM-A

Draft: A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Rev	Date	Description	By	Chkd
A	07/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 62:
Mute Swan observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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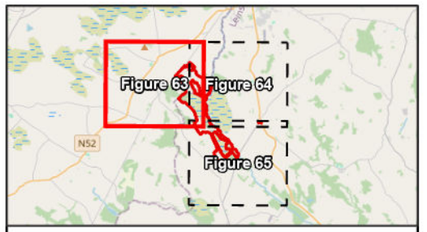
Map Ref: 11333-014.ApX.BBS-VP-MS-SUM-A

Draft: A

8°0'0"W
7°58'0"W
53°3'45"N
53°2'30"N
600000
603000
700000
N52
F00017
WT140-23/24
WT128-23/24
WT270-23/24
WT107-21/22
WT242-22/23
WT261-23/24
P00652
WT265-23/24
WT254-22/23
WT273-22/23
P00435
WT78-20/21
WT38-20/21
F00409
WT85-22/23
WT146-21/22
WT273-23/24
WT154-22/23



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Mute Swan

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 63:
Mute Swan observations
over the survey period
(May 2020 – March 2026)
- Sheet 1 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-014.ApX.WBS-VP-MS-SUM-A

Draft: A

7°56'0"W

7°54'0"W

53°3'45"N

53°2'30"N

606000

700000

N

N52

N62

R491

Roscrea Road

Grove Street

F00017

F00458

F00244

F00407

F00696

WT239-22/23

WT122-21/22

WT40-21/22

WT248-23/24

WT84-22/23

WT259-22/23

WT107-21/22

WT174-23/24

WT233-22/23

WT242-22/23

P00439

WT139-23

WT89-22/23

WT180-21/22

WT061-22/23

WT10-21/22

WT201-22/23

P00261

WT261-23/24

WT110-23/24

P00652

WT33-21/22

P00370

WT254-22/23

WT129-23

WT38-20/21

WT41

P00435

WT174-21/22

WT72-21/22

WT319

WT78-20/21

WT173-24

WT128-22/23

WT85-22/23

WT154-21/22

WT146-21/22

WT74-21/22

WT294-22/23

WT297-22/23

WT273-23/24

WT120-21/22

WT121-21/22

WT240-23/24

WT152-22/23

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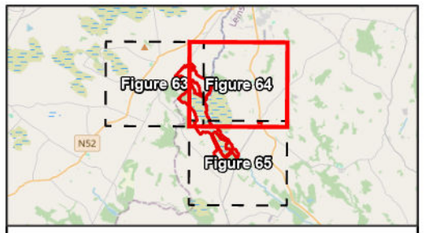
WT167-21/22

WT103-20/21

WT69-20/21

WT117-20/21



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Mute Swan

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Rev	Date	Description	By	Chkd
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 64:
Mute Swan observations
over the survey period
(May 2020 – March 2026)
- Sheet 2 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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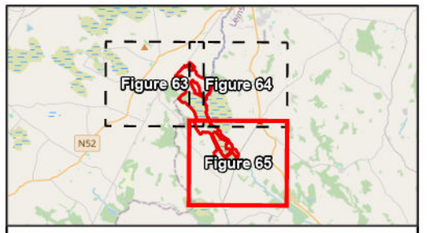
Map Ref: 11333-014.ApX.WBS-VP-MS-SUM-A

Draft: A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Mute Swan

Flightlines - Ecology Ireland 2020 - 2024

- Mute Swan

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 65:
Mute Swan observations
over the survey period
(May 2020 – March 2026)
- Sheet 3 of 3 -

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-014.ApX.WBS-VP-MS-SUM-A

Draft: A

Appendix 7-1 - XVI PEREGRINE

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP11-20/21	Wintering	VP, 2	08/10/2020	11:02:00	1	10	10m	10	0
RP4-20/21	Wintering	VP, 3	08/10/2020	10:07:00	1	10	15m	10	0
RP68-20/21	Wintering	VP, 3	05/11/2020	15:04:00	1	30	50m	10	20
RP70-20/21	Wintering	VP, 3	05/11/2020	15:40:00	1	15	5m	15	0
RP101-20/21	Wintering	VP, 5	14/01/2021	11:04:00	1	15	65m	0	15
RP117-20/21	Wintering	VP, 4	09/02/2021	10:34:00	1	75	45m	40	35
RP129-20/21	Wintering	VP, 2	09/02/2021	14:00:00	1	10	20m	10	0
RP142-20/21	Wintering	VP, 2	08/03/2021	10:42:00	1	20	15m	20	0
RP168-20/21	Wintering	VP, 2	08/03/2021	12:38:00	1	350	95m	25	325
RP5-21	Breeding	VP2	23/04/2021	14:12:00	1	27	50m	0	27
RP6-21	Breeding	VP2	23/04/2021	14:21:00	1	15	20m	14	1
RP7-21	Breeding	VP2	23/04/2021	14:30:00	1	64	40m	64	0
RP8-21	Breeding	VP3	23/04/2021	12:13:00	1	12	40m	7	5
RP81-21	Breeding	VP2	16/07/2021	12:22:00	1	10	62.5m	10	0
RP10-21/22	Wintering	VP5	23/11/2021	12:01:00	1	10	1m	0	10
RP11-21/22	Wintering	VP5	23/11/2021	12:30:00	1	5400	1m	0	5400
RP12-21/22	Wintering	VP5	23/11/2021	13:01:00	1	2880	1m	0	2880
RP14-21/22	Wintering	VP1	02/12/2021	08:46:00	1	26	35m	12	14
RP20-21/22	Wintering	VP1, VP1	02/12/2021	10:19:00	1	33	25m	0	33
RP28-21/22	Wintering	VP5	02/12/2021	11:45:00	1	5	10m	0	5
RP50-21/22	Wintering	VP5	06/12/2021	11:32:00	1	5280	1m	0	5280
RP125-21/22	Wintering	VP5	11/02/2022	10:09:00	1	60	1m	0	60
RP129-21/22	Wintering	VP5	11/02/2022	11:02:00	1	10	10m	0	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP131-21/22	Wintering	VP1	11/02/2022	11:59:00	1	1260	5m	1260	0
RP132-21/22	Wintering	VP2	11/02/2022	12:04:00	1	600	5m	600	0
RP152-21/22	Wintering	VP4	14/03/2022	10:31:00	1	4	20m	0	4
RP11-22/23	Wintering	VP3, VPA	30/11/2022	09:14:00	1	180	62.5m	180	0
RP28-22/23	Wintering	VPA	30/11/2022	14:55:00	1	71	15m	0	71
RP40-22/23	Wintering	VP3	20/12/2022	10:50:00	1	120	62.5m	0	120
RP54-22/23	Wintering	VP2	21/12/2022	09:37:00	1	51	17.5m	48	3
RP84-22/23	Wintering	VPA	20/02/2023	12:31:00	1	317	60m	17	300
RP110-22/23	Wintering	VP2	27/03/2023	10:40:00	1	5	15m	5	0
RP136-22/23	Wintering	VPB	27/03/2023	12:23:00	1	40	62.5m	40	0
RP144-22/23	Wintering	VP1	27/03/2023	13:08:00	1	5	62.5m	0	5
RP101-23	Breeding	VP2	23/06/2023	12:37:00	1	72	62.5m	0	72
RP160-23	Breeding	VPA	20/07/2023	11:46:00	1	46	15m	16	30
N/A	Breeding	VP5	26/09/2023	10:40:00	1	0	1m	-	-
RP227-23	Breeding	VP2, VP5	26/09/2023	11:02:00	1	85	62.5m	0	85
RP228-23	Breeding	VP2	26/09/2023	11:02:00	1	65	25m	60	5
RP229-23	Breeding	VPA	26/09/2023	11:05:00	1	20	62.5m	20	0
RP246-23	Breeding	VPA	26/09/2023	12:14:00	1	60	62.5m	0	60
RP12-23/24	Wintering	VP4	24/10/2023	11:01:00	1	75	62.5m	0	75
RP18-23/24	Wintering	VP4	24/10/2023	13:46:00	1	50	15m	20	30
RP25-23/24	Wintering	VPA	24/10/2023	08:34:00	1	205	17.5m	190	15
RP28-23/24	Wintering	VPA	24/10/2023	10:20:00	1	212	10m	200	12
RP29-23/24	Wintering	VPA	24/10/2023	10:23:00	1	30	10m	30	0
RP30-23/24	Wintering	VPA	24/10/2023	11:37:00	2	137	15m	137	0
RP6-23/24	Wintering	VP3	24/10/2023	09:30:00	1	75	20m	75	0

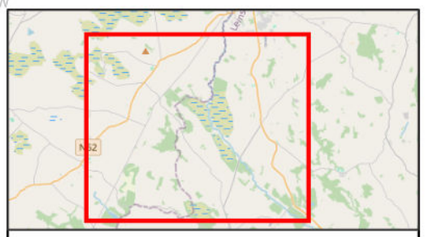
Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Wintering	VPB	20/12/2023	14:32:00	1	2	15m	-	-
RP83-23/24	Wintering	VP5	20/12/2023	13:08:00	1	45	75m	0	45
RP88-23/24	Wintering	VPA	20/12/2023	14:21:00	1	29	15m	0	29
RP103-23/24	Wintering	VP2	25/01/2024	09:05:00	1	10	15m	10	0
RP98-23/24	Wintering	VP1	25/01/2024	13:35:00	1	43	2.5m	30	13
RP145-23/24	Wintering	VP2, VP1	23/02/2024	14:19:00	1	29	15m	29	
RP175-23/24	Wintering	VPA	26/02/2024	12:55:00	1	360	15m	30	330
RP14-24	Breeding	VP2	31/05/2024	09:10:00	1	42	62.5m	0	42
RP30-24	Breeding	VP2	31/05/2024	11:25:00	2	115	62.5m	15	100
RP119-24	Breeding	VP2	24/07/2024	11:26:00	1	20	62.5m	10	10
RP176-24	Breeding	VP5	28/08/2024	13:51:00	1	52	62.5m	0	52
RP220-24	Breeding	VP5	24/09/2024	14:16:00	1	106	62.5m	0	106

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00040	Winter	VP3	29/10/2025	13:52:00	2	5	20	10	0	0	35
F00146	Winter	VP3	28/11/2025	12:25:00	1	0	16	43	0	0	59
F00232	Winter	VP2	03/12/2025	08:46:00	1	0	0	37	0	0	37
F00248	Winter	VP2	03/12/2025	10:47:00	1	0	12	30	0	0	42
F00524	Winter	VP2	17/02/2026	09:31:00	1	0	0	21	11	0	32

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00541	Winter	VP2	17/02/2026	12:22:00	1	3	34	29	0	0	66

Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2022/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
2020/2021	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-
2024	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2022/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	1	N/A	N/A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Peregrine

Flightlines - Ecology Ireland 2020 - 2024

- Peregrine

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 66:
Peregrine Falcon observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-015.ApX-VP-PE-SUM-A

Draft: A

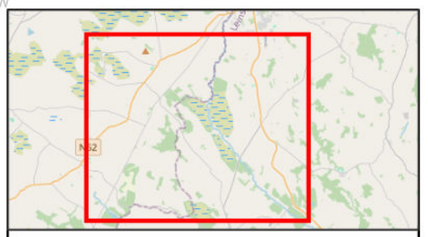
Appendix 7-1 - XVII PINTAIL

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT167-23/24	Wintering	VPA	20/12/2023	08:40:00	6	21600	2.5m	21600	-
WT310-23/24	Wintering	VPA, VPB	26/02/2024	08:54:00	3	21600	2.5m	21600	0
WT387-23/24	Wintering	VPA	27/03/2024	10:20:00	200	14000	2.5m	0	14000

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00357	Winter	VP3	23/01/2026	12:22:00	1	34	61	0	0	0	95

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00797	Winter	Transect	T6	13/03/2026	15:04:00	34	FW2	Foraging

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00129	Winter	I-WeBS	Site 2	15/10/2025	N/A	25	N/A
P00294	Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	23	N/A
P00304	Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	69	N/A
P00315	Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	7	N/A
P00447	Winter	I-WeBS	Dovegrove Callows	01/12/2025	N/A	3	N/A
P00449	Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	35	N/A
P00461	Winter	I-WeBS	Ashton Callow Hut	01/12/2025	N/A	17	N/A
P00590	Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	67	N/A
P00596	Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	52	N/A
P00709	Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	27	N/A
P00718	Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	27	N/A
P00786	Winter	I-WeBS	Ashton Callow hut	12/03/2026	N/A	7	N/A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Pintail

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 67:
Pintail observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-016.ApX-VP-PT-SUM-A

Draft: A

Appendix 7-1 - XVIII SNIPE

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD1-20	Breeding	VP5	04/06/2020	11:09:00	2	30	15m	0	30
WD2-20	Breeding	VP4	04/06/2020	11:12:00	2	110	47.5m	20	90
WD2-20/21	Wintering	VP, 2	08/10/2020	10:01:00	13	55	40m	50	5
WD5-20/21	Wintering	VP, 3	08/10/2020	11:44:00	25	20	12m	20	0
WD20-20/21	Wintering	VP, 1	05/11/2020	14:10:00	12 (?)	15	10m	15	0
WD8-20/21	Wintering	VP, 2	05/11/2020	10:20:00	3	10	Unknown	10	0
WD21-20/21	Wintering	VP, 4	04/12/2020	08:49:00	2	20	10m	0	20
WD22-20/21	Wintering	VP, 2	04/12/2020	09:12:00	3	10	2.5m	10	0
WD26-20/21	Wintering	VP, 4	04/12/2020	11:15:00	1	20	10m	0	20
WD30-20/21	Wintering	VP, 1	04/12/2020	12:59:00	4	10	10m	5	5
WD38-20/21	Wintering	VP, 3	09/02/2021	13:49:00	1	0	10m	Unknown	0
WD40-20/21	Wintering	VP, 3	09/02/2021	14:55:00	1	0	10m	Unknown	0
WD1-21	Breeding	VP1	16/07/2021	10:39:00	1	1	2.5m	1	0
WD2-21/22	Wintering	VP1	23/11/2021	11:26:00	4	2	5m	0	2
WD3-21/22	Wintering	VP1	02/12/2021	12:04:00	1	3	0m	0	3
WD4-21/22	Wintering	VP2	02/12/2021	13:51:00	1	19	30m	16	3
WD5-21/22	Wintering	VP3	14/01/2022	08:45:00	1	1	0.5m	1	0
WD13-21/22	Wintering	VP3	14/03/2022	11:12:00	5	70	25m	70	0
WD1-22/23	Wintering	VP1	28/11/2022	09:22:00	1	115	15m	48	67
WD3-22/23	Wintering	VP2	28/11/2022	13:20:00	40	60	2.5m	60	0
WD4-22/23	Wintering	VP1	28/11/2022	14:03:00	7	10	10m	10	0
WD13-22/23	Wintering	VPB	20/12/2022	12:10:00	1	2	2.5m	2	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD17-22/23	Wintering	VP4	20/12/2022	14:36:00	1	53	15m	13	40
WD19-22/23	Wintering	VP2	21/12/2022	10:54:00	3	15	5m	15	0
WD47-22/23	Wintering	VP2	25/01/2023	12:56:00	21	25	25m	25	
WD11-23	Breeding	VPA	28/08/2023	08:22:00	1	30	15m	30	0
WD12-23	Breeding	VPA	28/08/2023	08:57:00	20	75	25m	75	0
WD13-23	Breeding	VP3	28/08/2023	09:31:00	10	10	12.5m	0	10
WD3-23	Breeding	VPA	28/08/2023	09:34:00	18	15	10m	15	0
WD10-23	Breeding	VPB	26/09/2023	14:12:00	4	240	15m	240	0
WD4-23	Breeding	VPB	26/09/2023	08:50:00	3	40	15m	0	40
WD5-23	Breeding	VP1	26/09/2023	10:16:00	1	15	2.5m	15	0
WD9-23	Breeding	VP3	26/09/2023	14:09:00	6	18	10m	18	0
WD1-23/24	Wintering	VP1	24/10/2023	10:06:00	2	20	20m	2	18
WD10-23/24	Wintering	VP4	24/10/2023	10:02:00	1	38	62.5m	0	38
WD13-23/24	Wintering	VPA	24/10/2023	10:30:00	3	6	1m	6	0
WD2-23/24	Wintering	VP1	24/10/2023	12:48:00	1	10	40m	7	3
WD5-23/24	Wintering	VP2	24/10/2023	13:25:00	20	10	2.5m	10	0
WD8-23/24	Wintering	VP3	24/10/2023	09:52:00	3	20	5m	20	0
WD24-23/24	Wintering	VP2	27/11/2023	12:30:00	1	20	2.5m	20	0
WD32-23/24	Wintering	VPA	20/12/2023	09:52:00	2	160	62.5m	0	160
WD34-23/24	Wintering	VPA	20/12/2023	11:29:00	2	22	2.5m	22	0
WD41-23/24	Wintering	VP2	25/01/2024	10:35:00	39	60	-	60	0
WD47-23/24	Wintering	VP3	26/02/2024	08:45:00	1	10	3m	10	0
WD51-23/24	Wintering	VPA	26/02/2024	10:03:00	1	35	15m	17	18
N/A	Breeding	VP4	29/05/2024	09:20:00	1	-	7.5m	-	-
WD1-24	Breeding	VP1	23/09/2024	11:28:00	1	30	30m	20	10

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD2-24	Breeding	VP1	23/09/2024	14:36:00	1	30	25m	30	0
WD3-24	Breeding	VP3	24/09/2024	08:56:00	1	90	50m	80	10
WD5-24	Breeding	VP5	24/09/2024	09:20:00	3	38	62.5m	0	38
WD7-24	Breeding	VP4	24/09/2024	12:53:00	1	70	2.5m	0	70

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00044	Winter	VP4	16/10/2025	16:00:00	1	10	8	0	0	0	18
F00098	Winter	VP1	27/11/2025	12:54:00	14	4	23	154	0	0	181
F00100	Winter	VP1	27/11/2025	12:56:00	10	0	3	31	0	0	34
F00230	Winter	VP2	03/12/2025	08:44:00	2	17	0	0	0	0	17
F00337	Winter	VP2	21/01/2026	12:51:00	1	21	0	0	0	0	21
F00466	Winter	VP1	24/02/2026	16:01:00	1	12	0	0	0	0	12

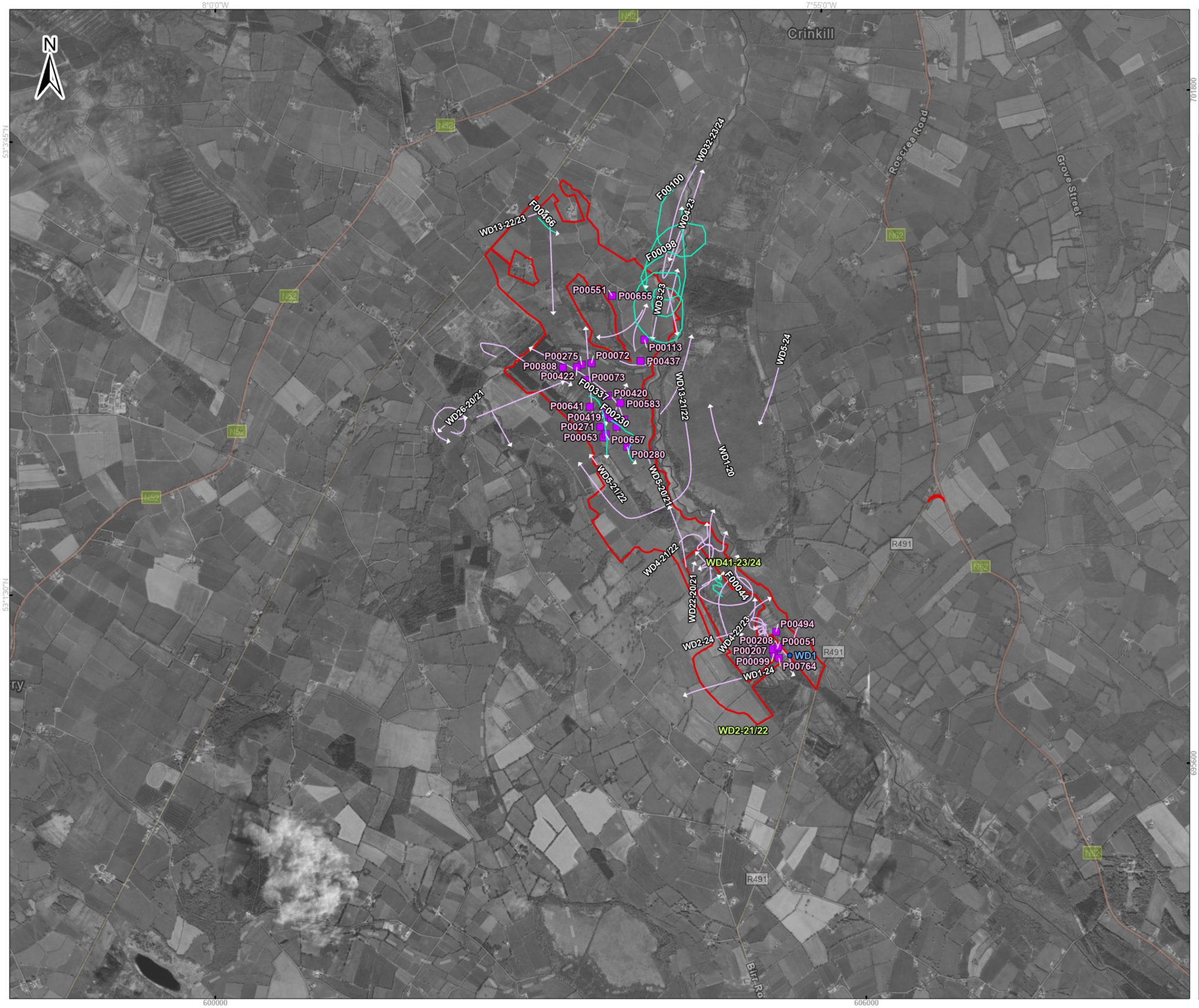
Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	-	5	-	4	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
2022/2023	-	-	1	-	4	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020/2021	1	1	2	-	4	1	6	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	-	2	-	5	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
2023/2024	-	-	2	-	4	-	5	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-	1	-
2024	-	-	1	-	3	-	4	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00020	Winter	VP	VP2	30/10/2025	06:48:00	1	N/A	Flushed
P00021	Winter	VP	VP2	30/10/2025	06:52:00	1	N/A	Flushed
P00051	Winter	HH roost	HHVP2	13/10/2025	19:18:00	1	PB4	flushed
P00053	Winter	HH roost	HHVP1	14/10/2025	18:59:00	1	PB4	Flushed
P00072	Winter	Transect	T2	14/10/2025	16:21:00	1	PB3	flushed
P00073	Winter	Transect	T2	14/10/2025	16:30:00	1	PB3	flushed
P00099	Winter	Transect	T4	13/10/2025	12:40:00	1	PB4	in flight
P00113	Winter	Transect	T6	14/10/2025	12:50:00	1	N/A	in flight
P00127	Winter	I-WeBS	Site 2	15/10/2025	N/A	32	N/A	N/A
P00137	Winter	I-WeBS	Site 10	15/10/2025	N/A	1	N/A	N/A
P00207	Winter	HH roost	HHVP2	20/11/2025	17:20:00	1	N/A	in flight
P00208	Winter	HH roost	HHVP2	20/11/2025	17:25:00	1	N/A	in flight
P00271	Winter	Transect	T2,5,6	24/11/2025	14:15:00	1	PB1	in flight
P00275	Winter	Transect	T2,5,6	24/11/2025	14:25:00	2	PB1	in flight
P00280	Winter	HH roost	HHVP1	24/11/2025	17:13:00	2	PB1	calling
P00298	Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	5	N/A	N/A

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00419	Winter	Transect	T2, T5, T6	05/12/2025	08:39:00	1	PB1	in flight
P00420	Winter	Transect	T2, T5, T6	05/12/2025	08:44:00	1	PB1	in flight
P00422	Winter	Transect	T2, T5, T6	05/12/2025	09:04:00	2	PB1	in flight
P00437	Winter	Transect	T2, T5, T6	05/12/2025	10:53:00	2	GA1	in flight
P00485	Winter	HH roost	HHVP2	03/12/2025	16:56:00	3	PB1	N/A
P00494	Winter	VP	VP4	12/01/2026	09:00:00	1	PB4	on ground
P00551	Winter	Transect	T2. T5, T6	22/01/2026	13:00:00	1	GA1	in flight
P00563	Winter	Transect	T2. T5, T6	22/01/2026	14:12:00	1	PB1	in flight
P00583	Winter	HH roost	HHVP1	22/01/2026	17:34:00	2	PB1	calling
P00584	Winter	HH roost	HHVP1	22/01/2026	17:51:00	2	PB1	calling
P00641	Winter	HH roost	HHVP1	11/02/2026	18:13:00	2	PB1	N/A
P00655	Winter	Transect	T1, T3, T4	11/02/2026	12:58:00	1	GA1	N/A
P00657	Winter	Transect	T1, T3, T4	11/02/2026	14:12:00	1	PB1	N/A
P00764	Winter	HH roost	HHVP2	09/03/2026	N/A	1	PB4	N/A
P00808	Winter	Transect	T2	13/03/2026	16:52:00	1	PB1	Flushed

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	3	N/A	N/A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Snipe

Flightlines - Ecology Ireland 2020 - 2024

- Snipe

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 68:
Snipe observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-017.ApX-VP-SN-SUM-A

Draft: A

Appendix 7-1 - XIX SPARROWHAWK

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP10-20	Breeding	VP2	28/04/2020	11:32:00	1	30	65m	30	0
RP8-20	Breeding	VP4	28/04/2020	11:05:00	1	60	87.5m	0	60
RP106-20	Breeding	VP2	10/07/2020	11:41:00	1	7	25m	7	0
RP149-20	Breeding	VP2	14/08/2020	11:38:00	1	5	1.5m	5	0
RP166-20	Breeding	VP1	14/08/2020	14:00:00	1	28	20m	0	28
RP13-20/21	Wintering	VP, 1	08/10/2020	11:06:00	1	20	1m	20	0
RP14-20/21	Wintering	VP, 2	08/10/2020	11:10:00	1	10	20m	10	0
RP43-20/21	Wintering	VP, 2	08/10/2020	14:38:00	2	5	20m	5	0
RP9-20/21	Wintering	VP, 3	08/10/2020	10:42:00	2	390	52.5m	120	270
RP46-20/21	Wintering	VP, 5	05/11/2020	11:04:00	2	20	17.5m	20	0
RP52-20/21	Wintering	VP, 2	05/11/2020	12:16:00	1	10	15m	10	0
RP55-20/21	Wintering	VP, 4	05/11/2020	12:44:00	1	20	25m	0	20
RP59-20/21	Wintering	VP, 3	05/11/2020	13:36:00	1	188	35m	188	0
RP60-20/21	Wintering	VP, 3	05/11/2020	13:37:00	1	30	22.5m	30	0
RP61-20/21	Wintering	VP, 1	05/11/2020	13:43:00	1	80	65m	40	40
RP63-20/21	Wintering	VP, 3	05/11/2020	14:17:00	1	17	7.5m	17	0
RP75-20/21	Wintering	VP, 3	04/12/2020	10:13:00	1	24	25m	24	0
RP80-20/21	Wintering	VP, 1	04/12/2020	11:30:00	1	9	7.5m	4	5
RP84-20/21	Wintering	VP, 5	04/12/2020	12:00:00	1	20	15m	0	20
RP103-20/21	Wintering	VP, 2	14/01/2021	11:19:00	1	35	30m	20	15
RP106-20/21	Wintering	VP, 2	14/01/2021	12:12:00	2	89	55m	89	0
RP118-20/21	Wintering	VP, 4	09/02/2021	10:53:00	1	25	25m	0	25
RP121-20/21	Wintering	VP, 2	09/02/2021	11:38:00	2	40	70m	40	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP135-20/21	Wintering	VP, 4	08/03/2021	09:51:00	1	283	90m	0	283
RP140-20/21	Wintering	VP, 4	08/03/2021	10:37:00	1	18	7m	0	18
RP141-20/21	Wintering	VP, 4	08/03/2021	10:41:00	1	17	7m	0	17
RP173-20/21	Wintering	VP, 4	08/03/2021	12:58:00	1	123	30m	0	123
RP182-20/21	Wintering	VP, 4	08/03/2021	13:11:00	1	120	40m	0	120
RP193-20/21	Wintering	VP, 4	08/03/2021	13:46:00	1	142	45m	0	142
RP205-20/21	Wintering	VP, 4	08/03/2021	14:29:00	1	60	50m	0	60
RP18-21	Breeding	VP3	14/05/2021	09:24:00	1	30	62.5m	30	0
RP31-21	Breeding	VP3	14/05/2021	12:44:00	1	20	17.5m	20	0
RP39-21	Breeding	VP4	14/05/2021	13:54:00	1	35	90	32	3
RP42-21	Breeding	VP5	14/05/2021	11:33:00	1	75	47.5m	0	75
RP51-21	Breeding	VP1	17/05/2021	12:00:00	1	60	100m+	0	60
RP64-21	Breeding	VP5	11/06/2021	10:03:00	1	15	62.5m	0	15
RP71-21	Breeding	VP1	14/06/2021	13:54:00	1	3	2.5m	2	1
RP79-21	Breeding	VP1, VP2	16/07/2021	13:23:00	1	180	25m	180	0
RP100-21	Breeding	VP1	18/08/2021	13:10:00	1	35	35m	0	35
RP101-21	Breeding	VP1	18/08/2021	13:26:00	1	110	70m	10	100
RP17-21/22	Wintering	VP1, VP1	02/12/2021	10:03:00	1	74	5m	74	0
RP25-21/22	Wintering	VP4	02/12/2021	11:30:00	1	60	15m	0	60
RP45-21/22	Wintering	VP1	02/12/2021	14:33:00	1	14	5m	13	1
RP47-21/22	Wintering	VP4	06/12/2021	10:09:00	1	10	10m	0	10
RP48-21/22	Wintering	VP5	06/12/2021	10:55:00	1	8	2m	0	8
RP51-21/22	Wintering	VP5	06/12/2021	11:40:00	1	80	20m	0	80
RP52-21/22	Wintering	VP5	06/12/2021	11:53:00	1	35	25m	0	35
RP64-21/22	Wintering	VP1	10/12/2021	12:28:00	1	60	5m	60	0

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP66-21/22	Wintering	VP2	10/12/2021	13:24:00	1	6	10m	6	0
RP67-21/22	Wintering	VP2	10/12/2021	14:16:00	1	10	0m	10	0
RP69-21/22	Wintering	VP4	14/01/2022	09:38:00	1	11	25m	11	0
RP70-21/22	Wintering	VP3	14/01/2022	10:27:00	1	44	25m	22	22
RP79-21/22	Wintering	VP1	17/01/2022	10:32:00	1	4	15m	4	0
RP81-21/22	Wintering	VP2	17/01/2022	11:34:00	1	14	15m	14	0
RP82-21/22	Wintering	VP1, VP2	17/01/2022	14:32:00	1	50	20m	50	0
RP106-21/22	Wintering	VP3	10/02/2022	13:29:00	1	23	5m	0	23
RP112-21/22	Wintering	VP4, VP3	10/02/2022	13:56:00	1	201	25m	190	11
RP126-21/22	Wintering	VP2	11/02/2022	10:36:00	1	10	5m	10	0
RP128-21/22	Wintering	VP1	11/02/2022	10:42:00	1	79	25m	0	79
RP159-21/22	Wintering	VP2	14/03/2022	11:19:00	1	98	60m	98	0
RP175-21/22	Wintering	VP5	14/03/2022	12:32:00	1	99	25m	0	99
RP188-21/22	Wintering	VP5, VP2	14/03/2022	13:41:00	1	111	25m	111	0
RP1-22/23	Wintering	VP2	28/11/2022	09:21:00	1	15	15m	9	6
RP2-22/23	Wintering	VP2	28/11/2022	09:30:00	1	10	2.5m	4	6
RP3-22/23	Wintering	VP5	28/11/2022	10:12:00	1	3	10m	0	3
RP9-22/23	Wintering	VP2	28/11/2022	13:40:00	1	10	25m	0	10
RP14-22/23	Wintering	VP3	30/11/2022	09:40:00	1	8	15m	0	8
RP17-22/23	Wintering	VPB	30/11/2022	10:47:00	1	15	10m	15	0
RP21-22/23	Wintering	VPA	30/11/2022	12:38:00	1	175	2.5m	0	175
RP22-22/23	Wintering	VPB	30/11/2022	12:40:00	1	20	10m	1	19
RP23-22/23	Wintering	VP3	30/11/2022	12:45:00	1	16	15m	16	0
RP24-22/23	Wintering	VPB	30/11/2022	13:06:00	1	278	110m	168	110
RP26-22/23	Wintering	VPB	30/11/2022	14:18:00	1	79	160m	0	79

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP41-22/23	Wintering	VP4	20/12/2022	10:52:00	1	20	15m	0	20
RP46-22/23	Wintering	VPA	20/12/2022	11:18:00	1	1713	25m	0	12
RP53-22/23	Wintering	VP2	21/12/2022	09:35:00	1	83	20m	83	0
RP56-22/23	Wintering	VP2	21/12/2022	10:33:00	1	30	55m	30	0
RP57-22/23	Wintering	VP2, VP1	21/12/2022	11:14:00	2	199	40m	199	0
RP59-22/23	Wintering	VP2	21/12/2022	12:29:00	1	81	27.5m	60	21
RP60-22/23	Wintering	VP2	21/12/2022	12:30:00	1	20	35m	0	20
RP61-22/23	Wintering	VP2, VP1	21/12/2022	12:34:00	1	65	30m	65	0
RP158-22/23	Wintering	VP3	27/01/2023	15:00:00	1	34	22.5m	34	
RP102-22/23	Wintering	VP2	20/02/2023	14:45:00	1	103	62.5m	30	73
RP69-22/23	Wintering	VP4	20/02/2023	09:32:00	1	20	5m	15	5
RP82-22/23	Wintering	VPA	20/02/2023	12:25:00	1	75	35m	0	75
RP98-22/23	Wintering	VP4	20/02/2023	14:25:00	1	50	5m	0	50
RP104-22/23	Wintering	VP5	27/03/2023	10:06:00	1	45	50m	0	45
RP122-22/23	Wintering	VPA, VPB	27/03/2023	11:37:00	1	360	62.5m	300	60
RP129-22/23	Wintering	VP4	27/03/2023	12:00:00	1	10	1m	0	10
RP135-22/23	Wintering	VP1	27/03/2023	12:12:00	1	12	15m	12	0
RP138-22/23	Wintering	VP5	27/03/2023	12:38:00	1	12	0.5m	0	12
RP153-22/23	Wintering	VPB	27/03/2023	14:16:00	1	30	62.5m	18	12
RP10-23	Breeding	VPB	01/05/2023	12:13:00	1	360	62.5m	330	30
RP12-23	Breeding	VP4	01/05/2023	12:36:00	1	150	117.5m	50	100
RP18-23	Breeding	VPB	01/05/2023	13:31:00	1	24	62.5m	12	12
RP23-23	Breeding	VP4	01/05/2023	13:50:00	1	25	40m	0	25
RP41-23	Breeding	VP3	02/05/2023	11:12:00	1	235	15m	220	15

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP107-23	Breeding	VP1	23/06/2023	14:10:00	1	100	15m	100	0
RP108-23	Breeding	VP2	23/06/2023	14:11:00	1	27	15m	0	27
RP110-23	Breeding	VP2	23/06/2023	14:23:00	1	40	15m	20	20
RP111-23	Breeding	VP1	23/06/2023	14:28:00	1	60	15m	40	20
RP112-23	Breeding	VP2	23/06/2023	14:29:00	1	17	15m	0	17
RP87-23	Breeding	VP2	23/06/2023	10:20:00	1	45	15m	45	0
RP99-23	Breeding	VP1	23/06/2023	12:27:00	1	25	15m	8	17
RP167-23	Breeding	VPA	20/07/2023	13:15:00	1	165	100m	110	55
RP169-23	Breeding	VP5	20/07/2023	13:54:00	1	10	15m	0	10
RP172-23	Breeding	VP2	27/07/2023	08:55:00	1	127	45m	0	127
RP174-23	Breeding	VP2	27/07/2023	09:32:00	1	10	15m	10	0
RP185-23	Breeding	VPB	27/07/2023	11:59:00	1	272	15m	130	142
RP190-23	Breeding	VP1	27/07/2023	12:55:00	1	332	62.5m	0	332
RP194-23	Breeding	VP1	27/07/2023	13:29:00	1	31	62.5m	7	24
N/A	Breeding	VP2	28/08/2023	11:17:00	1	0	-	-	-
RP203-23	Breeding	VP4	28/08/2023	10:43:00	1	103	50m	0	103
RP216-23	Breeding	VP5	28/08/2023	14:27:00	1	210	62.5m	0	210
N/A	Wintering	VPA	24/10/2023	14:11:00	1	15	80m	-	-
RP10-23/24	Wintering	VP4	24/10/2023	10:04:00	1	46	15m	0	46
RP21-23/24	Wintering	VP4	24/10/2023	14:45:00	1	165	62.5m	120	45
RP24-23/24	Wintering	VP5	24/10/2023	12:55:00	1	12	15m	0	12
N/A	Wintering	VP4	27/11/2023	14:30:00	1	19	15m	-	-
RP50-23/24	Wintering	VP2	27/11/2023	13:36:00	1	64	62.5m	64	0
RP58-23/24	Wintering	VP4	27/11/2023	11:13:00	1	52	15m	0	52
RP62-23/24	Wintering	VP4	27/11/2023	11:53:00	1	23	15m	0	23

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP65-23/24	Wintering	VP4	27/11/2023	12:43:00	1	58	15m	0	58
RP73-23/24	Wintering	VP1	20/12/2023	09:26:00	1	4	3.5m	0	4
RP77-23/24	Wintering	VP2	20/12/2023	13:36:00	1	9	35m	9	0
RP86-23/24	Wintering	VPA	20/12/2023	09:36:00	1	360	15m	0	360
RP106-23/24	Wintering	VP2	25/01/2024	13:22:00	1	100	62.5m	20	80
RP109-23/24	Wintering	VP3	25/01/2024	09:11:00	1	70	15m	70	0
RP110-23/24	Wintering	VP3	25/01/2024	09:23:00	1	26	15m	26	0
RP113-23/24	Wintering	VP3	25/01/2024	10:42:00	1	34	62.5	34	0
RP115-23/24	Wintering	VP3	25/01/2024	11:00:00	2	45	62.5m	45	0
RP118-23/24	Wintering	VP3	25/01/2024	11:56:00	1	20	62.5m	20	0
RP130-23/24	Wintering	VP4	25/01/2024	10:08:00	1	7	15m	7	0
RP143-23/24	Wintering	VP1	23/02/2024	13:34:00	1	16	15m	0	16
RP147-23/24	Wintering	VP2	23/02/2024	09:55:00	1	145	62.5m	10	35
RP149-23/24	Wintering	VP2	23/02/2024	12:07:00	1	387	62.5m	0	387
RP151-23/24	Wintering	VP3	26/02/2024	09:14:00	1	35	85m	35	0
RP157-23/24	Wintering	VP3	26/02/2024	12:43:00	1	82	110m	72	10
RP180-23/24	Wintering	VPB	26/02/2024	09:44:00	1	10	1.5m	6	4
RP184-23/24	Wintering	VPB	26/02/2024	11:36:00	1	40	100m+	0	40
RP211-23/24	Wintering	VP3	21/03/2024	12:06:00	1	42	62.5m	0	42
RP234-23/24	Wintering	VPA	27/03/2024	10:39:00	1	30	62.5m	0	30
RP242-23/24	Wintering	VPB	27/03/2024	09:55:00	1	82	62.5m	0	82
RP20-24	Breeding	VP2, VP1	31/05/2024	09:58:00	1	113	62.5m	88	25
RP80-24	Breeding	VP3	24/06/2024	12:32:00	1	65	62.5m	0	65
RP149-24	Breeding	VPA	23/08/2024	12:11:00	1	70	62.5m	65	5
RP179-24	Breeding	VP1	28/08/2024	14:03:00	1	10	15m	5	5

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
RP185-24	Breeding	VP1	23/09/2024	10:44:00	1	60	25m	30	30
N/A	Breeding	VP4	24/09/2024	12:31:00	1	-	2.5m	-	-
N/A	Breeding	VP4	24/09/2024	14:15:00	2	-	62.5m	-	-
RP199-24	Breeding	VP4	24/09/2024	09:04:00	1	10	2.5m	0	10
RP205-24	Breeding	VP5	24/09/2024	10:20:00	1	12	15m	0	12
RP210-24	Breeding	VP4	24/09/2024	11:49:00	1	60	62.5m	60	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00082	Winter	VP1	27/11/2025	08:53:00	1	0	13	0	0	0	13
F00139	Winter	VP3	28/11/2025	09:54:00	1	0	19	0	0	0	19
F00163	Winter	VP5	08/12/2025	11:07:00	1	15	0	0	0	0	15
F00247	Winter	VP2	03/12/2025	10:46:00	2	0	22	37	0	0	59
F00275	Winter	VP3	04/12/2025	11:30:00	1	15	0	0	0	0	15
F00278	Winter	VP3	04/12/2025	12:07:00	1	10	0	0	0	0	10
F00287	Winter	VP3	04/12/2025	13:54:00	1	13	0	0	0	0	13
F00391	Winter	VP4	11/02/2026	11:12:00	1	45	0	0	0	0	45
F00405	Winter	VP2	12/02/2026	09:39:00	2	22	0	0	0	0	22
F00415	Winter	VP2	12/02/2026	11:59:00	1	0	17	0	0	0	17
F00420	Winter	VP3	13/02/2026	10:53:00	1	0	4	42	0	0	46

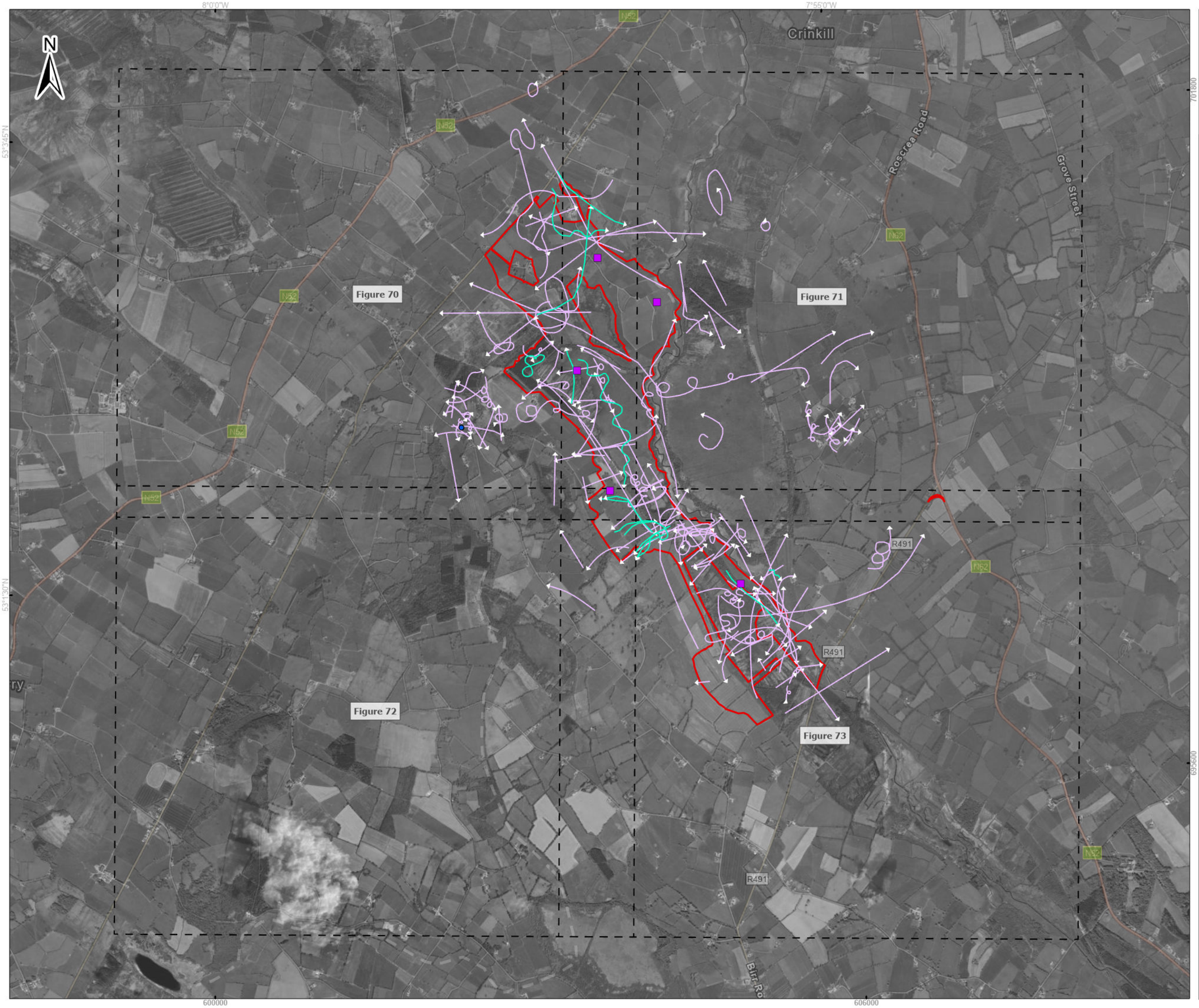
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00454	Winter	VP1	24/02/2026	13:22:00	1	0	0	42	0	0	42
F00467	Winter	VP1	24/02/2026	16:23:00	1	16	11	0	0	0	27
F00503	Winter	VP3	26/02/2026	16:29:00	1	19	0	0	0	0	19

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2020	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2022/2023	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
2020/2021	-	-	-	-	-	-		-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
2023/2024	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
2024	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00086	Winter	Transect	T3	13/10/2025	15:02:00	1	GA1	in flight
P00354	Winter	Transect	T4	11/12/2025	09:32:00	1	GS4	in flight
P00548	Winter	Transect	T2. T5, T6	22/01/2026	12:53:00	1	GA1	in flight

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00638	Winter	HH roost	HHVP1	11/02/2026	17:02:00	1	PB1	N/A
P00644	Winter	Transect	T1, T3, T4	11/02/2026	12:21:00	1	GA1	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	1	N/A	N/A



Legend

- Proposed wind farm boundary
- Point Data - TOBIN 2025/26
- Non-flight - Ecology Ireland 2020 - 2024

Flightlines - TOBIN 2025/26

- Sparrowhawk

Flightlines - Ecology Ireland 2020 - 2024

- Sparrowhawk

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community,

Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 69:
Sparrowhawk observations over the survey period (May 2020 – March 2026) Overview

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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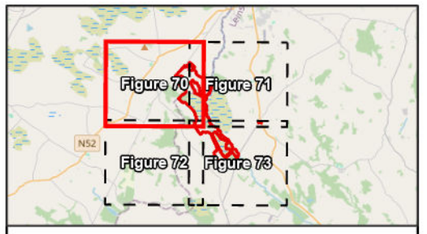
Map Ref: 11333-018.ApX-VP-SH-SUM-A_overview

Draft: A



Legend

- Proposed wind farm boundary
- Non-flight - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Sparrowhawk

Flightlines - Ecology Ireland 2020 - 2024

- Sparrowhawk

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title: Appendix A-I, Figure 70: Sparrowhawk observations over the survey period (May 2020 – Sept 2024) - Sheet 1 of 4 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-018.ApX-VP-SH-SUM-A

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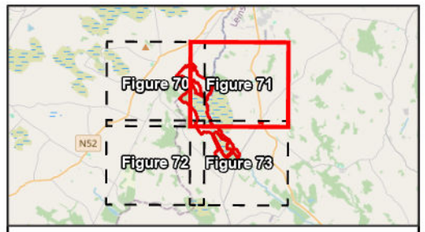
7°56'40"W
7°54'8"W
53°3'54"N
53°2'36"N
604000
606000
700000
698000
N
Roscrea Road
Grove Street
N62
RP22-22/23
RP64-21
RP21-22/23
RP167-23
P00548
RP46-22/23
RP121-22/23
P00644
RP18-23
RP86-23/24
RP234-23/24
RP211-23/24
RP242-23/24
RP14-22/23
RP106-21/22
RP130-23/24
F00247
RP113-23/24
P00638
RP23-22/23
RP82-22/23
RP75-20/21
RP63-20/21
F00415
RP175-21/22
RP9-22/23
RP169-23
RP52-21/22
RP137-22/23
RP84-20/21
RP42-21
RP41-23/24
RP43-20/21
RP51-21
RP51-21/22
RP3-22/23
RP48-21/22
RP158-22/23
RP69-21/22
RP52-20/21
RP70-21/22
RP60-20/21
RP109-23/24
P00086
F00278
RP81-21/22



Legend

- Proposed wind farm boundary
- Non-flight - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Sparrowhawk

Flightlines - Ecology Ireland 2020 - 2024

- Sparrowhawk

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix A-I, Figure 71:
Sparrowhawk observations
over the survey period
(May 2020 – Sept 2024)
- Sheet 2 of 4 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-018.ApX-VP-SH-SUM-A

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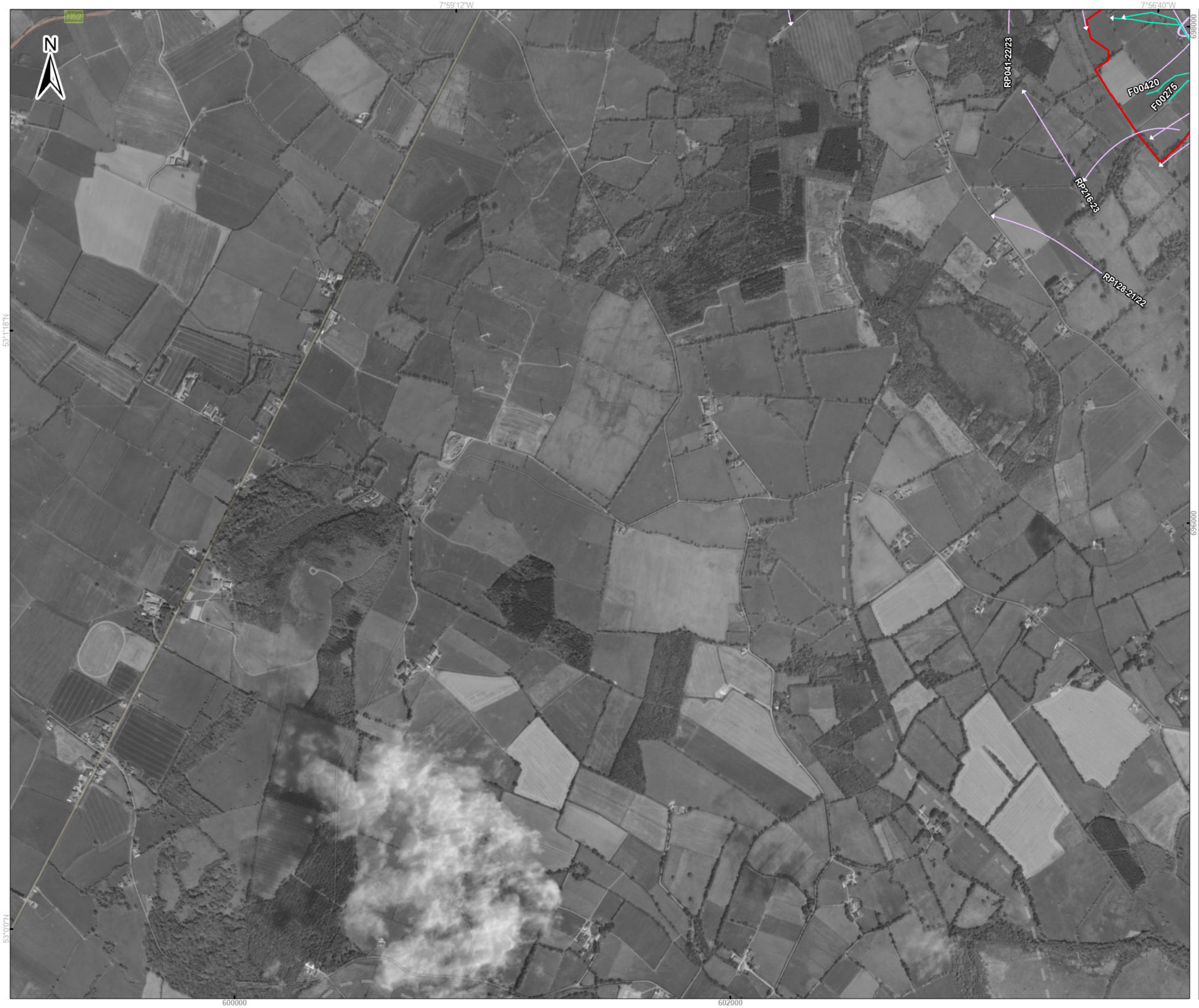

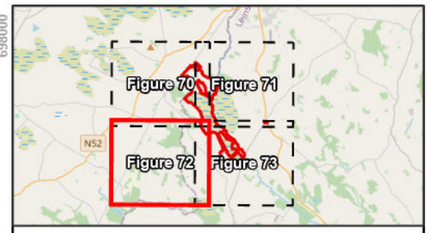

Legend

- Proposed wind farm boundary
- Non-flight - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Sparrowhawk

Flightlines - Ecology Ireland 2020 - 2024

- Sparrowhawk

0 250 500
Meters

Spatial Reference
Datum: IRENET95
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Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix A-I, Figure 72:
Sparrowhawk observations
over the survey period
(May 2020 – Sept 2024)
- Sheet 3 of 4 -

Scale @ A3: 1:14,000

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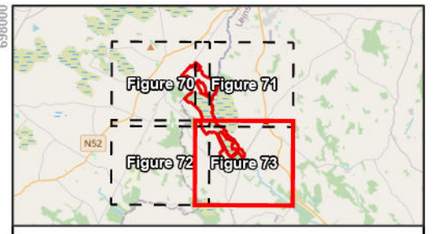

Legend

- Proposed wind farm boundary
- Non-flight - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Sparrowhawk

Flightlines - Ecology Ireland 2020 - 2024

- Sparrowhawk

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Client: RWE

Project:

Ballincor Wind Farm

Title: Appendix A-I, Figure 73: Sparrowhawk observations over the survey period (May 2020 – Sept 2024) - Sheet 4 of 4 -

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-018.ApX-VP-SH-SUM-A

Draft: A

Appendix 7-1 - XX TEAL

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT53-21/22	Wintering	VP2	02/12/2021	09:59:00	1	18	1m	18	0
WT166-23/24	Wintering	VPA	20/12/2023	08:40:00	300	21600	2.5m	21600	0
WT189-23/24	Wintering	VP4	11/01/2024	10:10:00	6	30	62.5m	-	-
WT211-23/24	Wintering	VP2	25/01/2024	14:00:00	20	120	-	0	120
WT253-23/24	Wintering	VPB	29/01/2024	13:50:00	50	6	10m	6	0
WT312-23/24	Wintering	VPA	26/02/2024	08:54:00	31	21600	2.5m	21600	0
WT382-23/24	Wintering	VPA	27/03/2024	09:05:00	4	20	2.5m	20	0
WT393-23/24	Wintering	VPA	27/03/2024	12:10:00	20	30	2.5m	0	30

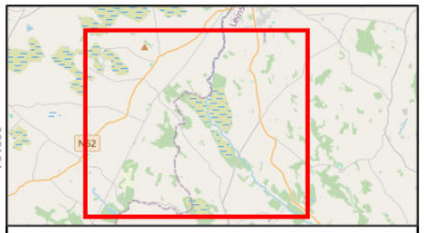
Ecology Ireland Transect Survey																				
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2023/2024										2												2		

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00549	Winter	Transect	T2. T5, T6	22/01/2026	12:55:00	33	FW2	in flight

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00560	Winter	Transect	T2. T5, T6	22/01/2026	13:19:00	6	FW2	in flight
P00645	Winter	Transect	T1, T3, T4	11/02/2026	12:30:00	11	FW2	N/A
P00654	Winter	Transect	T1, T3, T4	11/02/2026	12:49:00	42	FW2	N/A
P00800	Winter	Transect	T6	13/03/2026	15:08:00	17	FW2	Foraging

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 2	15/10/2025	N/A	30	N/A	N/A
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	94	N/A	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	187	N/A	N/A
Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	37	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	01/12/2025	N/A	101	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	752	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	01/12/2025	N/A	95	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	101	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	202	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	26	N/A	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	92	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	12/03/2026	N/A	29	N/A	N/A
Winter	I-WeBS	Little Brosna Callow hut	12/03/2026	N/A	59	N/A	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Ashton Callow hut	12/03/2026	N/A	74	N/A	N/A



Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - Ecology Ireland 2020 - 2024

- Teal

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 74: Teal observations over the survey period (May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
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Map Ref: 11333-019.ApX-VP-T.-SUM-A

Draft: A

Appendix 7-1 - XXI WHOOPER SWAN

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT21-20/21	Wintering	VP, 4	08/10/2020	10:32:00	1	90	100m	30	60
WT101-20/21	Wintering	VP, 5	14/01/2021	12:59:00	4	75	100m	0	75
WT102-20/21	Wintering	VP, 5	14/01/2021	12:59:00	47	Unknown	0m	0	Unknown
WT116-20/21	Wintering	VP, 5	09/02/2021	09:30:00	6	21600	0m	0	21600
WT32-21/22	Wintering	VP5	23/11/2021	14:46:00	7	60	0m	60	0
WT34-21/22	Wintering	VP5	23/11/2021	14:49:00	2	10	0m	10	0
WT39-21/22	Wintering	VP5	02/12/2021	09:00:00	49	21600	0m	0	21600
WT50-21/22	Wintering	VP3	02/12/2021	09:45:00	Unknown	0	0m	0	0
WT70-21/22	Wintering	VP4	06/12/2021	08:36:00	10	3	20m	0	3
WT71-21/22	Wintering	VP5	06/12/2021	09:05:00	55	21300	0m	0	21300
WT79-21/22	Wintering	VP3	07/12/2021	10:52:00	1	120	25m	0	120
WT82-21/22	Wintering	VP3	07/12/2021	12:30:00	38	9600	0m	9600	0
WT91-21/22	Wintering	VP1	10/12/2021	11:58:00	2	120	35m	0	120
WT152-21/22	Wintering	VP3	10/02/2022	11:13:00	11	7200	0m	0	7200
WT161-21/22	Wintering	VP5	11/02/2022	09:05:00	15	0	0m	0	0
WT171-21/22	Wintering	VP5	11/02/2022	12:58:00	6	60	0m	60	0
WT173-21/22	Wintering	VP5	11/02/2022	13:05:00	9	50	0m	50	0
WT5-22/23	Wintering	VP5, VP1, VP2	28/11/2022	10:59:00	1	366	15m	26	340
WT18-22/23	Wintering	VP3	30/11/2022	09:52:00	4	26	15m	26	0
WT20-22/23	Wintering	VPA, VP3, VP4, VPB	30/11/2022	09:58:00	4	76	15m	0	76
WT25-22/23	Wintering	VPA	30/11/2022	10:11:00	4	32	15m	0	32

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT26-22/23	Wintering	VP3	30/11/2022	10:13:00	4	240	15m	60	180
WT63-22/23	Wintering	VPA	30/11/2022	13:50:00	1	34	15m	0	34
WT132-22/23	Wintering	VP5	21/12/2022	10:17:00	14	0	-	0	0
WT138-22/23	Wintering	VP5	21/12/2022	12:24:00	7	12	7.5m	12	0
WT139-22/23	Wintering	VP5	21/12/2022	12:47:00	7	20	10m	20	0
WT141-22/23	Wintering	VP5	21/12/2022	13:06:00	3	15	10m	15	0
WT142-22/23	Wintering	VP5	21/12/2022	13:11:00	4	35	10m	35	0
WT143-22/23	Wintering	VP5	21/12/2022	13:11:00	3	17	20m	17	0
WT291-22/23	Wintering	VP5	25/01/2023	09:23:00	23	45	15m	0	45
WT292-22/23	Wintering	VP5	25/01/2023	09:48:00	3	60	20m	0	60
WT240-22/23	Wintering	VPA, VPB, VP3	27/01/2023	09:42:00	5	55	25m	35	20
WT241-22/23	Wintering	VPA	27/01/2023	09:55:00	19	15600	2.5m	15600	
WT247-22/23	Wintering	VPA, VPB	27/01/2023	11:07:00	6	32	25m	16	16
WT253-22/23	Wintering	VPA	27/01/2023	14:15:00	33	4680	2.5m	4680	
WT255-22/23	Wintering	VPB	27/01/2023	08:53:00	3	126	10m	100	26
WT256-22/23	Wintering	VPB	27/01/2023	09:03:00	6	85	10m	70	15
WT257-22/23	Wintering	VPB, VP3	27/01/2023	09:18:00	13	110	10m	40	70
WT258-22/23	Wintering	VPB, VP3	27/01/2023	09:27:00	6	84	10m	40	44
WT274-22/23	Wintering	VP3	27/01/2023	10:33:00	1	120	25m	100	20
WT192-22/23	Wintering	VPA, VP5, VPB	27/03/2023	09:28:00	6	140	15m	55	85
WT197-22/23	Wintering	VP5, VP2, VP1,	27/03/2023	09:50:00	16	454	90m	80	374

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
		VPA, VPB							
WT2-23/24	Wintering	VP1, VP2, VP3, VP4, VPA, VPB	24/10/2023	12:27:00	3	45	40m	20	25
WT162-23/24	Wintering	VP5, VPB, VPA	20/12/2023	08:59:00	16	117	10m	17	100
WT163-23/24	Wintering	VPA, VPB	20/12/2023	08:31:00	16	21600	2.5m	21600	0
WT175-23/24	Wintering	VPA, VPB	20/12/2023	13:38:00	5	28	62.5m	10	18
WT177-23/24	Wintering	VPA, VPB	20/12/2023	13:57:00	11	41	62.5m	11	30
WT179-23/24	Wintering	VPA	20/12/2023	14:13:00	7	1020	15m	1020	0
WT180-23/24	Wintering	VPA, VPB	20/12/2023	14:27:00	9	180	15m	90	90
WT263-23/24	Wintering	VPA	02/02/2024	10:10:00	4	600	-	600	0
WT352-23/24	Wintering	VP3	21/03/2024	09:45:00	10	200	62.5m	0	200
WT402-23/24	Wintering	VPB	27/03/2024	09:44:00	12	72	62.5m	0	72

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00019	Winter	VP1	28/10/2025	15:04:00	3	0	25	33	0	0	58
F00056	Winter	VP4	21/11/2025	09:25:00	8	0	0	140	60	0	200
F00060	Winter	VP4	21/11/2025	11:01:00	8	0	0	110	0	0	110
F00103	Winter	VP1	27/11/2025	13:13:00	8	0	16	0	0	0	16
F00130	Winter	VP3	28/11/2025	08:49:00	6	0	0	37	0	0	37
F00137	Winter	VP3	28/11/2025	09:49:00	2	0	0	57	0	0	57
F00228	Winter	VP1	02/12/2025	16:36:00	4	0	67	0	0	0	67
F00250	Winter	VP2	03/12/2025	11:46:00	5	0	67	57	0	0	124
F00271	Winter	VP3	04/12/2025	09:43:00	1	0	43	0	0	0	43
F00276	Winter	VP3	04/12/2025	11:48:00	3	22	0	0	0	0	22
F00292	Winter	VP4	12/01/2026	09:20:00	2	0	12	30	0	0	42
F00354	Winter	VP3	23/01/2026	12:09:00	2	0	0	45	0	0	45
F00459	Winter	VP1	24/02/2026	14:41:00	5	0	19	0	0	0	19

Ecology Ireland Transect Survey																							
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2022/2023	-	-	-	1	-	-	-	3	-	-	-	-	-	-	-	2	-	7	-	-	-	17	-	9
2020/2021	-	-	-	2	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023/2024	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	10	-	9

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00206	Winter	HH roost	HHVP2	20/11/2025	16:50:00	2	N/A	in flight

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	All Saints Bog SPA	26/11/2025	N/A	10	N/A	N/A
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	8	N/A	N/A
Winter	I-WeBS	Dovesgrove Callows	01/12/2025	N/A	19	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	01/12/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	15	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	09/02/2026	N/A	7	N/A	N/A

Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - Ecology Ireland 2020 - 2024

- Whooper Swan

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	02/04/2026	First issue	K.K	J.S

Client: RWE

Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 75:
Whooper Swan observations over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Map Ref: 11333-020.ApX-VP-WS-SUM-A

Draft: A

Appendix 7-1 - XXII WIGEON

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT79-23/24	Wintering	VP 4	30/11/2022	12:40:00	35	90	100m	30	60
WT217-23/24	Wintering	VP3	25/01/2024	10:08	50	180	62.5m	80	100
WT254-23/24	Wintering	VPB	29/01/2024	13:50	4	6	10m	6	0
WT050-22/23	Wintering	VPA	30/11/2022	12:40:00	35	7200	2.5m	7200	0
WT165-23/24	Wintering	VPA	20/12/2023	08:40	100	21600	2.5m	21600	0
WT311-23/24	Wintering	VPA, VPB	26/02/2024	08:54	125	21600	2.5m	21600	0
WT315-23/24	Wintering	VPA	26/02/2024	14:18	90	2160	15m	2160	0
WT388-23/24	Wintering	VPA	27/03/2024	10:20	40	14000	2.5m	0	14000

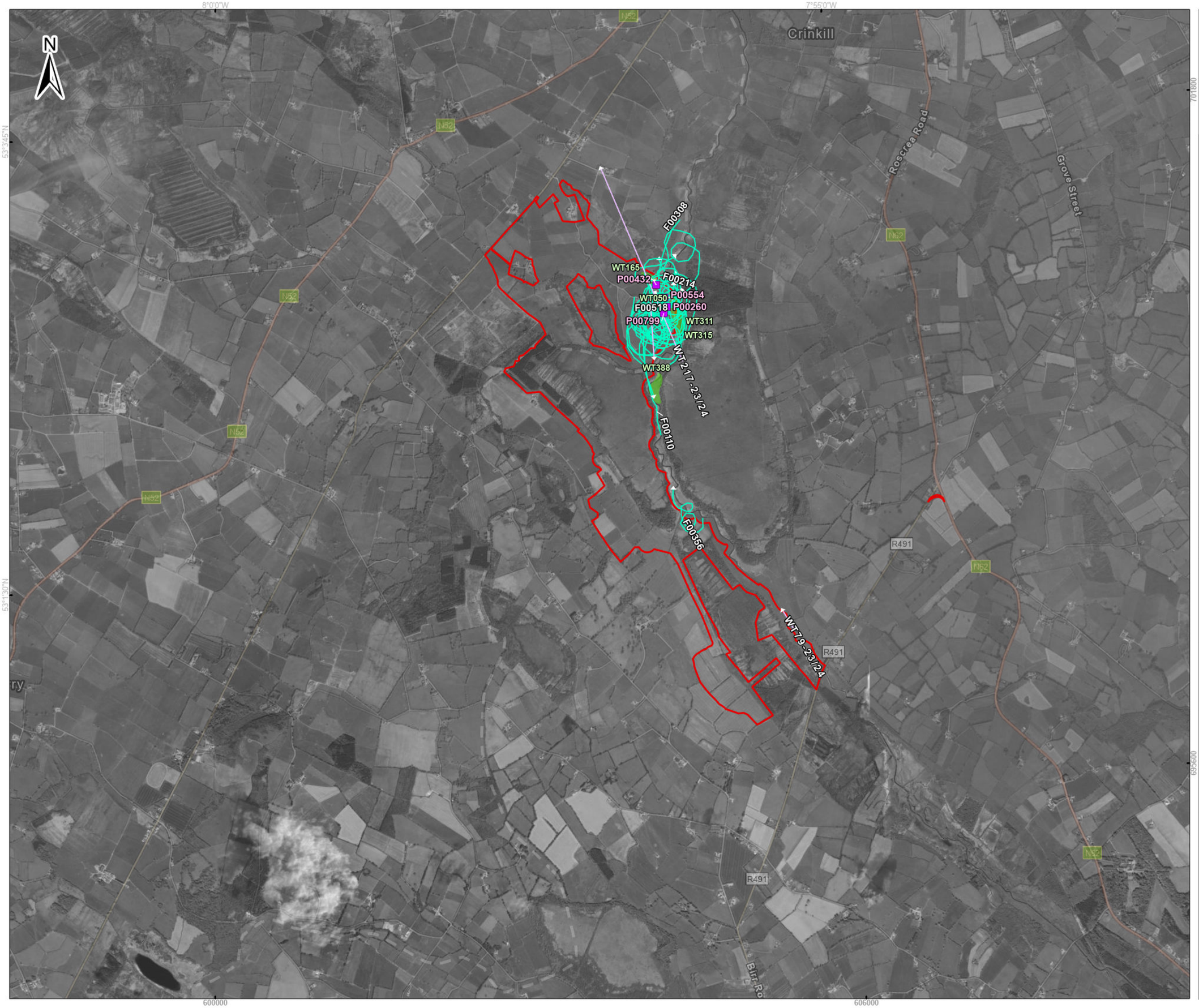
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00086	Winter	VP1	27/11/2025	09:37:00	207	6	76	50	0	0	132
F00107	Winter	VP2	25/11/2025	11:45:00	154	0	10	59	0	0	69
F00110	Winter	VP2	25/11/2025	12:38:00	8	0	22	0	0	0	22
F00214	Winter	VP1	02/12/2025	14:35:00	101	9	29	101	0	0	139
F00218	Winter	VP1	02/12/2025	15:05:00	121	11	89	43	0	0	143
F00239	Winter	VP2	03/12/2025	09:48:00	4	12	0	0	0	0	12
F00243	Winter	VP2	03/12/2025	10:01:00	33	0	21	19	0	0	40
F00272	Winter	VP3	04/12/2025	09:44:00	41	0	5	46	0	0	51

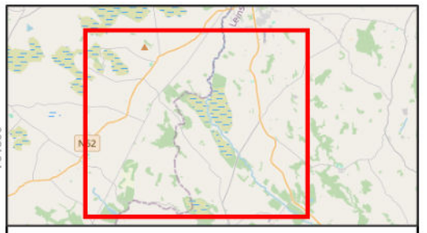
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00306	Winter	VP1	27/01/2026	08:36:00	6	36	0	0	0	0	36
F00308	Winter	VP1	27/01/2026	08:42:00	9	17	0	0	0	0	17
F00323	Winter	VP1	27/01/2026	11:40:00	54	8	23	0	0	0	31
F00356	Winter	VP3	23/01/2026	12:22:00	32	34	61	0	0	0	95
F00511	Winter	VP2	17/02/2026	08:40:00	8	0	14	0	0	0	14
F00518	Winter	VP2	17/02/2026	09:02:00	82	0	34	49	0	0	83

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00260	Winter	Transect	T2,5,6	24/11/2025	12:19:00	217	FW2	on water
P00432	Winter	Transect	T2, T5, T6	05/12/2025	10:37:00	72	FW2	on water
P00554	Winter	Transect	T2. T5, T6	22/01/2026	13:06:00	23	FW2	on water
P00799	Winter	Transect	T6	13/03/2026	15:06:00	27	FW2	Foraging

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	563	N/A	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	623	N/A	N/A
Winter	I-WeBS	Clonfree 1	26/11/2025	N/A	195	N/A	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Dovegrove Callows	01/12/2025	N/A	82	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	845	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	01/12/2025	N/A	131	N/A	N/A
Winter	I-WeBS	Clonfree 1 (callow)	01/12/2025	N/A	81	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	612	N/A	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	1232	N/A	N/A
Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	731	N/A	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	367	N/A	N/A
Winter	I-WeBS	Dovegrove Callows	12/03/2026	N/A	17	N/A	N/A
Winter	I-WeBS	Little Brosna Callow hut	12/03/2026	N/A	26	N/A	N/A
Winter	I-WeBS	Ashton Callow hut	12/03/2026	N/A	321	N/A	N/A





Legend

- Proposed wind farm boundary
- High activity area - Ecology Ireland 2020 - 2024
- Point Data - TOBIN 2025/26

Flightlines - TOBIN 2025/26

- Wigeon

Flightlines - Ecology Ireland 2020 - 2024

- Wigeon

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	02/04/2026	First issue	K.K	J.S

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Project:

Ballincor Wind Farm

Title:

Appendix 7-I, Figure 76:
Wigeon observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:32,000

Prepared by:	Checked by:	Date:
K.Kale	J.Sherry	April 2026

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Draft: A

Appendix 7-1 - XXIII RARELY RECORDED TARGET SPECIES.

Common Gull

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT120-20/21	Wintering	VP, 4	09/02/2021	12:16:00	2	325	30m	0	325
WT155-21/22	Wintering	VP4	10/02/2022	12:37:00	2	40	25m	40	0
WT106-22/23	Wintering	VP4	20/12/2022	12:55:00	4	171	15m	0	171
WT108-22/23	Wintering	VP4	20/12/2022	13:07:00	1	55	15m	0	55
WT115-22/23	Wintering	VP4	20/12/2022	14:26:00	1	47	15m	7	40
WT214-22/23	Wintering	VPA	27/03/2023	10:57:00	1	22	15m	9	13
WT4-23	Breeding	VPB	01/05/2023	14:39:00	1	26	15m	0	26
WT2-24	Breeding	VPB	28/05/2024	10:16:00	6	300	10m	300	0

Ecology Ireland Transect Survey																								
Season	T1 (visit 1)		T1 (visit 2)		T2 (visit 1)		T2 (visit 2)		T3 (visit 1)		T3 (visit 2)		T4 (visit 1)		T4 (visit 2)		T5 (visit 1)		T5 (visit 2)		T6 (visit 1)		T6 (visit 2)	
2022/2023	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
2023/2024	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-

Coot

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 15	15/10/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Glasderry Wood	26/11/2025	N/A	3	N/A	N/A
Winter	I-WeBS	Glasderry Wood	01/12/2025	N/A	2	N/A	N/A
Winter	I-WeBS	Glasderry Wood	09/02/2026	N/A	3	N/A	N/A
Winter	I-WeBS	Glasderry Wood	12/03/2026	N/A	5	N/A	N/A

Curlew

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Wintering	VP, 2	08/03/2021	13:41:00	1	0	Unknown	0	0
WD1-23	Breeding	VPA, VP3, VP4	27/06/2023	11:15:00	1	268	80m	200	68

Greater Black-backed Gull

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT82-24	Breeding	VP5	24/07/2024	10:39:00	1	60	7.5m	0	60

Green Sandpiper

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Site 12	15/10/2025	N/A	1	N/A	N/A

Greenland White-fronted Goose

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT21-22/23	Wintering	VPA, VP3, VPB	30/11/2022	09:58:00	1	76	15m	0	76
WT67-22/23	Wintering	VP1	30/11/2022	14:02:00	1	38	50m	16	22

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00134	Winter	I-WeBS	Site 3	15/10/2025	N/A	22	N/A	N/A

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	107	N/A	N/A
Winter	I-WeBS	Little Brosna Callow Hut	16/01/2026	N/A	43	N/A	N/A
Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	52	N/A	N/A
Winter	Transect	T6	13/03/2026	14:59:00	2	GA1	Foraging

Herring Gull

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT97-23	Breeding	VP4, VPB	28/08/2023	10:40:00	1	20	30m	12	8
WT17-24	Breeding	VPA	28/05/2024	15:02:00	12	45	5m	0	45
WT7-24	Breeding	VPA, VPB	28/05/2024	11:42:00	2	40	20m	30	10

Jack Snipe

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WD6-23/24	Wintering	VP2	24/10/2023	13:25:00	1	10	2.5m	10	0
WD30-23/24	Wintering	VP3	20/12/2023	09:37:00	1	7	2m	7	0
WD40-23/24	Wintering	VP2	25/01/2024	10:35:00	9	600 (not a flightline)	-	600 (not a flightline)	0

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Ashton Callow hut	12/03/2026	N/A	1	N/A	N/A

Kingfisher

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
N/A	Wintering	VP, 1	08/10/2020	13:02:00	1	20	2m	20	0
N/A	Wintering	VP, 1	05/11/2020	09:12:00	1	4	1m	4	0

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00814	Winter	Incidental	VP5	09/02/2026	11:35:00	1	FW4	in-flight

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	1	N/A	N/A

Little Grebe

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
Little Grebe	WT52-22/23	Wintering	VPA	30/11/2022	12:42:00	2	7200	2.5m	Little Grebe
Little Grebe	WT132-23	Breeding	VPA	26/09/2023	09:10:00	5	1000	0m	Little Grebe

Redshank

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	3	N/A	N/A

Shoveler

Ecology Ireland Vantage Point (Flight)									
Map Ref.	Season	VP	Date	Time	Abundance	Duration of observation (s)	Initial flight height	Duration within Application Site	Off-site
WT313-23/24	Wintering	VPA, VPB	26/02/2024	08:54:00	3	21600	2.5m	21600	0

TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00241	Winter	VP2	03/12/2025	09:57:00	1	0	10	0	0	0	10

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00798	Winter	Transect	T6	13/03/2026	15:05:00	7	FW2	Foraging

TOBIN I-WeBS (Point)						
Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	27	N/A
Winter	I-WeBS	Ashton Callows	26/11/2025	N/A	102	N/A
Winter	I-WeBS	Dovegrove Callows	01/12/2025	N/A	3	N/A
Winter	I-WeBS	Little Brosna Callow Hut	01/12/2025	N/A	43	N/A
Winter	I-WeBS	Ashton Callow Hut	01/12/2025	N/A	72	N/A
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	623	N/A
Winter	I-WeBS	Little Brosna callow hut	09/02/2026	N/A	54	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	41	N/A
Winter	I-WeBS	Little Brosna Callow hut	12/03/2026	N/A	34	N/A
Winter	I-WeBS	Ashton Callow hut	12/03/2026	N/A	33	N/A

Tufted Duck

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Ashton Callow Hut	16/01/2026	N/A	10	N/A	N/A
Winter	I-WeBS	Ashton callow hut	09/02/2026	N/A	7	N/A	N/A

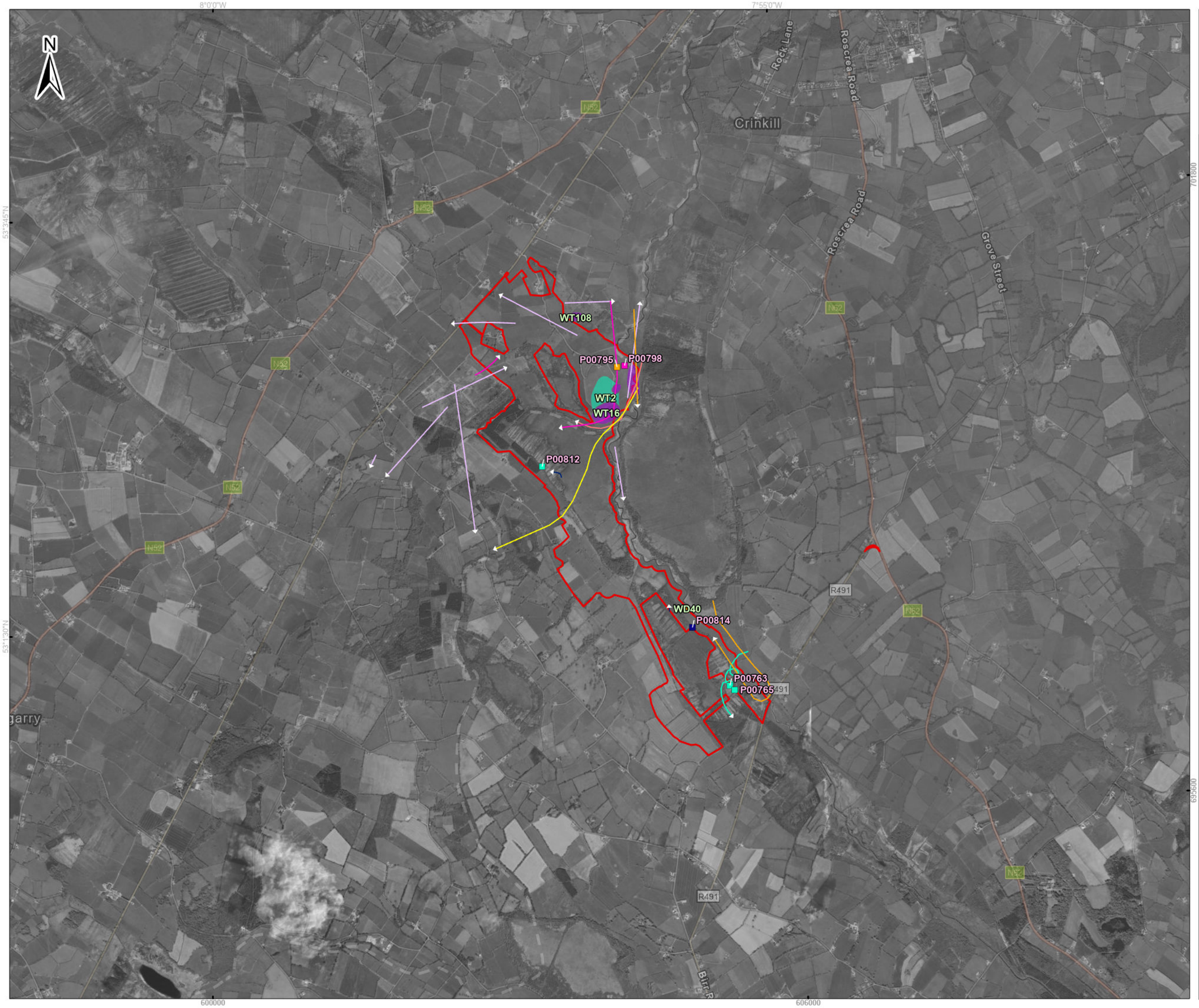
White-tailed Eagle

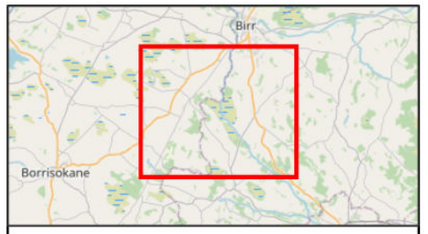
TOBIN Vantage Point (Flight)											
Map Ref.	Season	VP	Date	Time	Abundance	Duration within Band 1 (s)	Duration within Band 2 (s)	Duration within Band 3 (s)	Duration within Band 4 (s)	Duration within Band 5 (s)	Total Duration (s)
F00068	Winter	VP5	19/11/2025	10:44:00	1	0	0	118	0	0	118

TOBIN I-WeBS (Point)							
Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
Winter	I-WeBS	Little Brosna Callows SPA	26/11/2025	N/A	2	N/A	N/A

Woodcock

TOBIN Transects, Hen Harrier VP, and Incidental (Point)								
Map Ref.	Season	Survey Type	Location	Date	Time	Abundance	Habitat Code	Activity
P00763	Winter	HH roost	HHVP2	09/03/2026	N/A	1	PB4	N/A
P00765	Winter	HH roost	HHVP2	09/03/2026	N/A	2	PB4	N/A
P00812	Winter	HH roost	HHVP1	13/03/2026	19:18:00	4	WD1	Roding





Legend

- Proposed wind farm boundary

High activity area - Ecology Ireland 2020 - 2024

- Common Gull
- Herring Gull
- Jack Snipe
- Lesser Black-backed Gull

Point Data - TOBIN 2025/26

- Kingfisher
- Shoveler
- White-fronted Goose
- Woodcock

Flightlines - TOBIN 2025/26

- Shoveler
- White-tailed Eagle

Flightlines - Ecology Ireland 2020 - 2024

- Common Gull
- Curlew
- Herring Gull
- Jack Snipe
- White-fronted Goose

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	07/04/2026	First issue	S.P	J.S

Client: RWE

Project:
Ballincor Wind Farm

Title:
Appendix 7-I, Figure 77:
Bird observations
over the survey period
(May 2020 – March 2026)

Scale @ A3: 1:35,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Sherry	April 2026

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Draft: A

Appendix B COLLISION RISK MODEL REPORT

BALLINCOR WIND FARM: COLLISION RISK MODELLING REPORT

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REPORT NUMBER: 2604-F1
VERSION: Revision 4
STATUS OF REPORT: Final
DATE OF REPORT: 16 April 2026

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SUMMARY

This report presents the collision risk modelling and collision risk assessment for the proposed Ballincor Wind Farm, Co. Offaly. The proposed wind farm will comprise 11 turbines. The three turbine models analysed in this collision risk model have hub heights of 98.5–105 m and rotor diameters of 149.1–163 m, which create potential collision height airspaces of 17–180 m, 30–80 m and 30.15–179.2 m.

The collision risk model was based on nine seasons of vantage point survey data from up to seven vantage points with a survey effort of around six hours / month / vantage point. The NatureScot model was used. As well calculating predicted collision risks, the uncertainty ranges around the estimates were quantified. Collision risks that would cause a 1% or greater increase in mortality to the affected population were considered potentially significant.

The central estimates of the potential increase in annual mortality due to the predicted collision risk exceeded the 1% threshold for the local Mallard wintering population, the local Black-tailed Godwit wintering population and the county Kestrel population. The upper limit of the uncertainty range exceeded the thresholds by small amounts for the Grey Heron county population, the national Black-tailed Godwit wintering population, and the local Golden Plover wintering population.

The local Golden Plover and Black-tailed Godwit wintering populations are qualifying interests of the Little Brosna Callows SPA.

The predicted collision risk for Black-tailed Godwit was driven by a single large flock event, reflecting the species' tendency to occur in large flocks and to concentrate in response to local feeding conditions. The estimate is therefore subject to increased uncertainty and should be interpreted with caution.

The uncertainty ranges did not take account of potential under-detection of distant flightlines. Inclusion of this factor would raise the mortality increases by factors of around 1.5–3 times. However, for some species, these factors may be over-estimated.

The 1% threshold is likely to be very precautionary. Therefore, substantial increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations.

1. INTRODUCTION

1.1. SCOPE

This report presents the collision risk modelling and collision risk assessment for the proposed Ballincor Wind Farm, Co. Offaly. The proposed wind farm will comprise 11 turbines. The site location and proposed site layout is shown in Map 1.1. The three turbine models analysed in this collision risk model have hub heights of 98.5-105 m and rotor diameters of 149.1–163 m, which create potential collision height airspaces of 17–180 m, 30-180 m and 30.15–179.2 m.

The collision risk modelling methodology was based on the NatureScot guidance on collision risk modelling (NatureScot, 2024), and current practice in collision risk modelling.

This work was commissioned by TOBIN. The collision risk modelling, assessment and reporting was carried out by Tom Gittings.

1.2. COLLISION RISK MODELLING

Collision risk modelling uses statistical modelling techniques to predict the likely collision risk. It uses flight activity data from before the construction of a wind farm to calculate the likely risk of birds colliding with turbines in the operational wind farm. The flight activity data is used to calculate flight activity densities at potential collision height within the risk area of the wind farm. These densities are then used to predict the number of transits of the rotor swept volume in the wind farm based on the proportion of the total air space that is occupied by the rotor swept volume. However, most transits of the rotor swept volume will not result in a collision, because, for the duration of a transit, most of the rotor swept volume is not occupied by the turbine blades. Therefore, the probability that a bird will collide with a turbine blade when it transits the rotor swept volume is calculated. Most birds try to avoid the turbine blades, either by avoiding the wind farm area altogether, or by taking evasive action if they are likely to collide with a blade while transiting the wind farm, so it is also necessary to factor in an avoidance rate. The final collision risk is calculated by multiplying the number of predicted transits by the probability of a collision on a single transit and correcting for the avoidance rate and other relevant factors.

1.3. COLLISION RISK ASSESSMENT

The potential impact of the predicted collision risk depends on the size of the affected population and their demographics. The collision risk assessment examines whether the level of the predicted collision risk could have a significant effect on the dynamics of the affected population.

1.4. NATURESCOT GUIDANCE

NatureScot (2024) provides detailed guidance for carrying out collision risk modelling for onshore wind farm projects. This guidance was developed by Band (2024) from the original Scottish collision risk model (SNH, 2000) and the refinement of this model by Band (2012). The basic methods remain the same, but the NatureScot guidance introduces a number of new components. It deals with issues not covered by the previous guidance, such as how to combine data from multiple vantage points and how to account for nocturnal flight activity. It also includes a specific requirement to assess the uncertainty around the collision risk estimates, which is an issue that has been poorly dealt with in Irish collision risk modelling. There is a spreadsheet that accompanies the guidance that can be used to implement the collision risk model.

1.5. LIMITATIONS

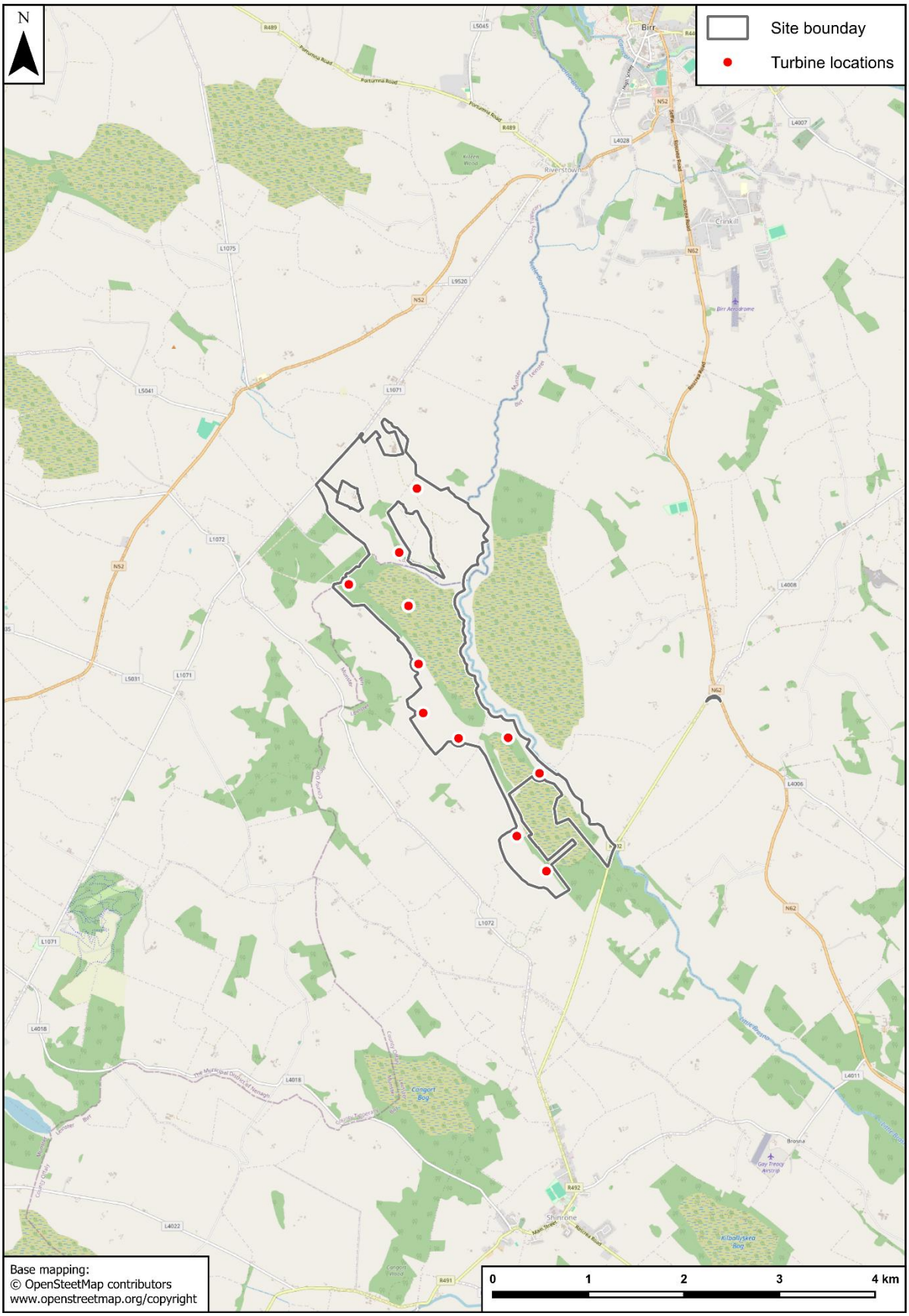
The methodology of most of the vantage point surveys carried out for this project deviated in a number of respects from the recommended methodology (NatureScot, 2025a). Conservative

assumptions have been applied where possible in this collision risk model to address the implications of these deviations, as described in the relevant sections of this report.

1.6. STATEMENT OF COMPETENCE

Tom Gittings has a BSc in Ecology, a PhD in Zoology and is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He has 30 years' experience in professional ecological consultancy work and research. He has specific expertise in ornithological assessments for wind energy projects and has been involved in numerous wind energy projects. His input to these projects has variously included field surveys (including vantage point surveys, breeding wader and raptor surveys and wintering waterbird surveys), collision risk modelling, writing the ornithological sections of EIS/EIAR and NIS reports, expert witness services at oral hearings, and provision of scoping advice and peer review services.

Tom's article on the implications for collision risk modelling of under-detection of distant flightlines in wind energy vantage point surveys (Gittings, 2024) was highly commended in the CIEEM Awards 2025.



Map 1.1. Site location and proposed turbine layout.

2. METHODOLOGY

2.1. INTRODUCTION

The collision risk modelling methodology was based on the NatureScot guidance on collision risk modelling (NatureScot, 2024), additional guidance provided by Band (2024), and current practice in collision risk modelling.

2.2. SPECIES

All the waterbird and raptor species recorded flying at potential collision height during the surveys, apart from Snipe, were included in the collision risk modelling. Snipe was not included because vantage point surveys are not an effective method of sampling their flight activity, so the results from collision risk modelling would not be very meaningful.

2.3. DATA SOURCES

2.3.1. Flight activity data

The flight activity data used for the collision risk model comprised a nine-season vantage point survey carried out between summer 2020 and summer 2024, with the exception of summer 2022, and in the winter of 2025/26.

The surveys between summer 2020 and summer 2024 were carried out by Ecology Ireland. The winter 2025/26 survey was carried out by TOBIN. To distinguish between the two datasets, the vantage points from the Ecology Ireland surveys have been given the prefix EI while those from the TOBIN survey have been given the prefix TB.

Five vantage points were surveyed in eight seasons (EI1–EI5) by Ecology Ireland with two additional vantage points surveyed in the final four seasons of their survey (EI6–EI7). The vantage point locations are shown in Map 2.1. Note that EI6 and EI7 were labelled VPA and VPB in the original vantage point survey datasets.

A separate set of five vantage points (TB1–TB5) were surveyed in the ninth season (winter 2025/26) by TOBIN (Map 2.1).

The viewshed arcs and viewsheds for each vantage point are shown in Map 2.2-Map 2.13. See Section 2.4.2 for details of the derivation of the viewsheds.

In six of the seasons, 36 hours of watches were completed at each vantage point surveyed, while in the other three seasons, 30 hours were completed (Table 2.1). The survey effort varied between months with 12–30 hours per month surveyed at EI1–5 and 6–18 hours per month surveyed at EI6–7 (apart from April when no vantage point watches were carried out at EI6–EI7) (Table 2.2). The TOBIN vantage points were surveyed between October and February (Table 2.2). Certain aspects of the Ecology Ireland survey methodology required adjustment prior to analysis; further details are provided in Sections 2.4.3, 3.1.2 and 3.2.

The Ecology Ireland vantage point surveys were concentrated in the middle of the day, but there was some coverage of the early morning period during the winter months (see Section 2.5.5). The TOBIN surveys included full coverage from sunrise to sunset, and also covered the hours before sunrise and after sunset as recommended for waterfowl by the NatureScot guidance (NS 2025a).

The survey recorded timed flight activity of all raptor and waterbird species. The Ecology Ireland surveys did not classify flight activity by height bands, but instead recorded information for most records on the height ranges of the flight activity. The TOBIN surveys classified flight activity into five height bands: 0-25 m, 25-50 m, 50-150 m, 150-200 m, and > 200 m.

The full vantage point survey data is included in Appendix 7-1 to the Environmental Impact Assessment Report Ornithology chapter.

Table 2.1. Total number of vantage point survey hours per vantage point per season.

Season	EI1	EI2	EI3	EI4	EI5	EI6	EI7
2020 summer	30	30	30	30	30	0	0
2020/21 winter	36	36	36	36	36	0	0
2021 summer	30	30	30	30	30	0	0
2021/22 winter	36	36	36	36	36	0	0
2022/23 winter	36	30	30	30	30	30	30
2023 summer	37	36	36	36	36	36	36
2023/24 winter	36	36	36	36	36	36	36
2024 summer	30	30	30	30	30	30	30
	TB1	**TB2**	**TB3**	**TB4**	**TB5**		
2025/26 winter	36	42	36	36	36		

Seasons: summer = April – September; winter = October – March. Durations are rounded to the nearest hour.

Table 2.2. Total number of vantage point survey hours per vantage point per month.

Month	EI1	EI2	EI3	EI4	EI5	EI6	EI7	TB1	TB2	TB3	TB4	TB5
Jan	24	24	24	30	24	6	12	6	6	6	6	6
Feb	24	24	24	24	24	18	12	12	18	6	6	6
Mar	24	24	24	24	24	12	12	0	0	0	0	0
Apr	12	12	12	12	12	0	0					
May	30	30	30	30	30	18	18					
Jun	24	24	24	24	24	12	12					
Jul	24	24	24	24	24	12	12					
Aug	24	24	24	24	24	12	12					
Sep	12	12	12	12	12	12	12					
Oct	12	12	12	12	12	6	6	6	6	6	6	6
Nov	30	24	18	24	24	12	12	6	6	6	6	6
Dec	30	30	30	24	30	12	12	6	6	6	6	6

Durations are rounded to the nearest hour.

2.3.2. Turbine specifications

The turbine specifications used for the collision risk model (apart from mean pitch angle; see Section 2.6.4) were supplied by TOBIN and are shown in Table 2.3.

Table 2.3. Turbine parameters used for the collision risk model.

Turbine	Rotor radius	Ground clearance	Max chord	Rotor speed range	Mean pitch angle
N149	74.55 m	30.15 m	4.15 m	6.2-12.2 rpm	0°, 15°, 30°
N163	81.5 m	17 m	4.15 m	6.0-11.6 rpm	0°, 15°, 30°
V150	75 m	30 m	4.2 m	4.9-12.6 rpm	0°, 15°, 30°

Sources: data supplied by TOBIN, except for mean pitch for which see Section 2.6.4.

2.3.3. Bird parameters

The bird biometric parameters used for the collision risk model are shown in Table 2.4.

The seasonal periods used in the collision risk model and assessment are shown in Table 2.5. For species not included in this table, collision risk was calculated and assessed on an annual basis. These comprised species that do not exhibit distinct seasonal use of the site, as well as those that had negligible annual collision risk. Seasonal periods were not defined for the latter, as they were only included to allow monthly collision estimates to be summed in the final stage of the modelling for the purposes of the collision risk assessment.

Table 2.4. Bird biometric parameters used for the collision risk model.

Species	Length (m)	Wingspan (m)	Flight speed (m/sec)
Mute Swan	1.525	2.23	16.2
Whooper Swan	1.525	2.305	17.3
White-fronted Goose	0.715	1.475	16.1
Wigeon	0.48	0.805	20.6
Teal	0.36	0.61	19.7
Mallard	0.575	0.895	18.5
Pintail	0.585	0.875	20.6
Shoveler	0.48	0.77	20.6
Cormorant	0.9	1.45	15.2
Little Egret	0.6	0.915	10.2
Grey Heron	0.94	1.85	11.2
White-tailed Eagle	0.8	2.2	11.3
Hen Harrier	0.48	1.1	9.1
Sparrowhawk	0.33	0.625	11.3
Buzzard	0.54	1.205	11.6
Golden Plover	0.275	0.715	17.9
Lapwing	0.295	0.845	12.8
Curlew	0.55	0.9	16.3
Black-tailed Godwit	0.42	0.76	18.3
Snipe	0.26	0.46	17.1
Black-headed Gull	0.355	1.05	11.9
Common Gull	0.41	1.2	13.4
Lesser Black-backed Gull	0.58	1.425	13.1
Herring Gull	0.595	1.44	12.8
Kestrel	0.335	0.755	10.1
Merlin	0.275	0.56	10.1
Peregrine	0.42	1.025	12.1

Length and wingspan from Cramp and Simmons (2004); flight speed from Alerstam et al. (2007). For Little Egret, Great White Egret speed was used; for Golden Plover, Grey Plover speed was used.

Table 2.5. Seasonal periods used in the collision risk modelling and assessment.

Species	Season	Months
Mute Swan	breeding	Apr-Aug
	non-breeding	Sep-Mar
Whooper Swan	winter	Oct-Mar
Wigeon	winter	Sep-Mar
Cormorant	breeding	Feb-Aug
	non-breeding	Sep-Feb
Little Egret	breeding	Apr-Aug
	non-breeding	Sep-Mar
Golden Plover	winter	Sep-Mar
Lapwing	summer	Apr-Sep
	winter	Oct-Mar
Black-tailed Godwit	non-breeding	Sep-Mar
Black-headed Gull	breeding	Apr-Jul
	non-breeding	Aug-Mar
Lesser Black-backed Gull	spring	Mar
	breeding	Apr-Jul
	autumn	Aug-Oct
	winter	Nov-Feb

For species not included in this table the collision risk was calculated and assessed for the whole year.

2.4. DATA MANAGEMENT AND PREPARATION

2.4.1. General

Before beginning the analyses, I audited the flight activity data for data entry errors and missing data and removed non-flight records. I also mapped viewsheds for each vantage point.

2.4.2. Viewshed analyses

2.4.2.1 Viewshed mapping

I carried out all analyses using custom scripts in R version 4.4.1 (R Core Team, 2024), primarily using the packages *terra* (Hijmans, 2023) and *sf* (Pebesma, 2018; Pebesma and Bivand, 2023).

Viewsheds were mapped at heights of 17 m and 30 m above ground level, representing the minimum ground clearance of the turbine models under consideration.

Vantage point (VP) locations and initial viewshed arcs were provided by Ecology Ireland and TOBIN. Because the Ecology Ireland arcs did not align precisely with the VP coordinates, I generated revised arcs using the azimuths of the supplied arc boundaries, ensuring geometric alignment with the VP locations. A 10 m buffer was applied during raster processing to avoid edge artefacts; final outputs were clipped to the unbuffered arcs.

Topographic inputs comprised Bluesky Digital Surface Model (DSM) data (1 m resolution; acquired 12/08/2022) and Digital Terrain Model (DTM) data (5 m resolution; acquired 19/09/2019). The DTM was resampled to the 1 m DSM grid using bilinear interpolation to produce a continuous terrain surface aligned exactly with the DSM. A canopy height raster was then derived as: Canopy height = DSM − DTM

Negative values (arising from interpolation differences) were set to zero.

Viewsheds were required to represent turbine clearance relative to ground level (DTM) while accounting for screening by vegetation and structures (DSM). To achieve this, DSM-based viewsheds were generated in 1 m vertical increments from 0 m up to the target height above ground level using the *viewshed* function in the *terra* package. For each raster cell, the appropriate

viewshed layer was selected according to the local canopy height. For example, where canopy height was 10 m and the target clearance was 30 m above ground level, the viewshed calculated at 20 m above the DSM was selected, thereby ensuring that clearance was referenced consistently to ground level while incorporating DSM-derived obstruction.

This procedure produced binary raster maps (1 m resolution) representing visibility at the specified height above ground level. Raw 1 m outputs exhibited highly irregular pixel-scale boundaries, reflecting fine-scale DSM variation and interpolation artefacts. Such detail exceeds the spatial precision achievable in VP survey recording and substantially increases geometric complexity in subsequent analyses.

To ensure outputs reflected ecologically meaningful spatial resolution, simplification was performed in raster space prior to vector conversion. First, a modal (majority) focal filter (5 × 5 window) was applied to remove single-pixel noise and minor jaggedness while preserving overall visibility structure. Second, contiguous visible regions were identified using eight-direction (queen) connectivity, and visible "islands" smaller than 10 ha were reclassified as non-visible. This threshold approximates the spatial scale at which visibility differences are likely to be practically distinguishable in VP surveys and relevant to collision risk modelling, recognising that no formally defined minimum mapping unit exists for such surveys.

The cleaned visibility rasters were then converted to vector polygons, simplified using a small tolerance (5 m), and lightly smoothed to remove residual geometric artefacts. Holes within visible polygons smaller than 1 ha were filled. This threshold reflects the spatial precision of flightline recording and the ecological irrelevance of very small internal visibility gaps at VP survey scales.

Finally, the vectorised viewsheds were clipped to the unbuffered viewshed arcs to produce the final viewshed maps used in subsequent collision risk modelling and analysis.

The resulting viewshed maps are shown in Map 2.2–Map 2.13.

2.4.2.2 Viewsheds used for the collision risk model

The Ecology Ireland viewsheds had large overlaps. EI1 and EI2 shared much of the closest sections of their viewsheds, where detection rates would have been highest, while there were large overlaps between EI3 and EI5, EI4 and EI7, and EI6 and EI7. Vantage point watches were frequently carried out concurrently at these overlapping viewsheds, resulting in duplicated spatial coverage and a high risk that the same flightlines were recorded at more than one vantage point. Conversely, periods of low activity would also have been spatially duplicated.

Some effort appears to have been made during assembly of the vantage point dataset to identify flightlines recorded at multiple vantage points. However, the proportion identified (approximately 10%) appears low given the extent of viewshed overlap, the prevalence of concurrent watches, and the concentration of flight activity along corridors that passed through multiple viewsheds.

The method for calculating flight activity densities in the NatureScot model assumes that each vantage point represents an independent sample. When this assumption is violated, as in the present case, the flight activity densities may be biased through double-counting of the same flightlines.

To address this issue, I removed overlapping sections of viewsheds so that each area of the site was allocated to a single vantage point. I then adjusted flight activity recorded at the affected vantage points pro rata based on the ratio of mapped flightline lengths within the reduced viewshed relative to the original viewshed.

The original 2 km viewsheds exhibited complex overlap patterns. To allow consistent rules to be applied, I first reduced the viewsheds to 1.5 km, which eliminated most of the three- and four-way overlaps. For the remaining pairwise overlaps, allocation was determined using the overlap areas weighted by distance from each vantage point. The small number of remaining three-way overlaps were peripheral. I allocated these visually to maintain coherent viewshed boundaries. I also

removed small outlying segments that had been isolated by the overlap removal. The resulting viewshed extents as used for the collision risk model are shown in Map 2.14–Map 2.15.

The TOBIN vantage point surveys did not include any concurrent watches at vantage points with overlapping viewsheds.

2.4.2.3 Spatial structure

The NatureScot methodology recommends dealing with spatial-structure by using a weighted averaging procedure to calculate the mean flight activity densities across the vantage points included in the model (see Section 2.6.2.1). However, while my review of the flightline distributions showed that there was significant spatial-structure for eleven species, the spatial-structure was generally not captured by differences between vantage points: e.g., the concentration of flight activity along the River Brosna involved small sections of the viewsheds of all the vantage points.

To analyse the spatial structure, I divided the viewsheds into sections reflecting the structure indicated by my review of the flightline distributions. The sections are described in Table 2.6 and shown in Map 2.16 and Map 2.17.

Table 2.6. Sections used for the spatially-structured models.

Species	Sections	VPs	Turbines	Notes
Mute Swan, Mallard, Cormorant, Little Egret, Grey Heron and Black-tailed Godwit	Brosna South Corridor	EI1, EI2, EI3, EI4, EI5, TB2–TB5	2	500 m wide corridor along the River Brosna south of confluence with tributary
	Brosna North Corridor	EI3–EI7, TB1–TB3	0	500 m wide corridor along the River Brosna north of confluence with tributary; excluded from collision risk model
	Other	EI1–EI7, TB1–TB5	9	Remainder of survey area
Whooper Swan, Wigeon and Lapwing	Brosna North Corridor	EI3–EI7, TB1–TB3	0	500 m wide corridor along the River Brosna north of confluence with tributary; excluded from collision risk model
	Other	EI1–EI7, TB2–TB5	11	Remainder of survey area
Black-headed Gull and Lesser Black-backed Gull	Brosna North Corridor	EI3–EI7, TB1–TB3	0	500 m wide corridor along the River Brosna north of confluence with tributary; excluded from collision risk model
	Commuting Corridor	EI3, EI5, EI6 and EI7, TB1–TB2	2	Corridor with concentration of flight activity west of the River Brosna and north of the tributary
	Other	EI1–EI6, TB1–TB5	9	Remainder of survey area

I first analysed the species distribution across all these sections by calculating their flight activity densities in each section using the NatureScot methodology (see Section 2.6.2.1). I used the results of these analyses (Section 2.5.3) to define the appropriate spatial structure to use for each species in the collision risk model, as shown in Table 2.6.

The Brosna North Corridor did not include any turbine locations. I excluded the flight activity within the Brosna North Corridor from the spatially-structured models because of the high concentration of flight activity associated with birds feeding on flooded fields and/or the differences in flight activity densities between the Brosna North Corridor and Brosna South Corridor. I did not include a separate section for the Brosna South Corridor in the Whooper Swan, Wigeon and Lapwing

spatially-structured models because their flight activity densities in this section was similar to their densities in the remainder of the survey area.

I divided the viewsheds of each vantage point between the relevant sections. Where the viewshed only included a very small component of a particular section, I excluded that component of the viewshed from the model. This was to prevent the mean flight activity densities for the section being biased by unrepresentative samples.

I calculated flight activity densities separately for each section of each viewshed and averaged the flight activity densities across vantage points separately for each section type.

2.4.3. Vantage point survey data

The vantage point survey data provided the core dataset for the collision risk model. However, some processing of the data was required before it could be used in the collision risk model. This included identifying and addressing vantage point watches that did not fully align with the NatureScot survey guidance (referred to hereafter as non-compliant watches), dealing with various issues in the Ecology Ireland vantage point records, selecting the appropriate height bands, and dealing with flightlines outside the viewsheds.

2.4.3.1 Non-compliant watches

The Ecology Ireland vantage point watches were all continuous six hour watches without the 30-minute break after three hours required by the NatureScot survey guidance (see Section 3.2.2). There were also some watches that were carried out in conditions of poor visibility (see Section 3.2.3). While analyses of recording rates (see Section 3.2.2) did not show any decline after three hours, I created a set of survey data that was restricted to the first three hours of each watch and excluded the watches with poor visibility.

However, as some non-compliant watches recorded relatively high activity for certain species, the collision risk modelling was carried out both including and excluding the non-compliant survey effort. In accordance with the precautionary principle, I used the higher of the two collision risk estimates for assessment purposes. This approach ensured that potential bias associated with survey non-compliance did not result in underestimation of collision risk.

2.4.3.2 Ecology Ireland vantage point survey effort

The review of the flightline mapping (Section 3.1.2) indicated that a substantial proportion of the Ecology Ireland survey time was spent tracking flightlines outside the viewshed arcs, with less than 50% of mapped flightlines falling within the defined viewshed arcs at some vantage points. This means that the effective survey effort will have been lower than the total vantage point survey durations, as time spent tracking flightlines outside the arcs was not directed at the defined viewshed areas. It was therefore necessary to adjust the vantage point survey durations to account for this factor.

For each vantage point, I calculated the proportion of total flightline duration occurring within the viewshed arc, excluding records that were not mapped as flightlines. This included flightlines beyond the 2 km boundary where they fell within the viewing angle subtended by the arc. I then used these proportions to adjust the vantage point survey durations for each vantage point. This resulted in adjustments of the vantage point survey durations by factors of 0.4 (VP6) to 0.9 (VP5).

2.4.3.3 Ecology Ireland vantage point survey records

The vantage point survey dataset required a number of preparation steps prior to use in the collision risk model. These included standardising the classification of flight, addressing records with incomplete information on flight durations and flight heights and/or that were not mapped, and filtering or refining records to ensure that only relevant flight activity by the target species was included in the analysis.

Most of the records had information in their notes on the height ranges of the flight activity. I extracted the maximum flight heights from this information and assumed that when the maximum

flight height was above the ground clearance of the turbine, all the flight activity was at potential collision height. Where there was no data on the maximum flight height, I also assumed that the flight activity was at potential collision height.

There were some records included in the vantage point survey dataset with no data on flight durations. Where these records had mapped flightlines, I used the flightline length and the mean flight speed from Table 2.4 to estimate the flight duration. For records with no flight durations or mapped flightlines, I used the 95th percentile of the distribution of flight durations for the relevant species in the dataset to make estimates of the missing flight durations. The 95th percentile was used rather than the maximum to avoid undue influence of a small number of exceptionally long recorded durations, which may reflect the aggregation of multiple flight events or other recording inconsistencies. Also, if the records had involved such long durations, it is likely that there would have been some indication of this in the notes.

I reviewed the notes for all records potentially included in the collision risk model and excluded records that referred entirely to non-flight activity. Where the records involved a mixture of flight activity and non-flight activity, I used details from the records notes to correct the recorded durations to only refer to the flight activity component, where the notes contained relevant details. For some records, the notes indicated that the activity consisted predominantly of non-flight behaviour (e.g. perching / on the ground for long periods with short flights), but did not allow the flight component to be quantified, or the recorded duration corresponded to non-flight activity. For these records, I used the medians of distribution of flight durations for the relevant species in the dataset to make estimates of the flight durations.

For records with no flightline mapping, I made the precautionary assumption that the flightlines were entirely within the relevant viewsheds. For the spatially-structured models, I had to allocate these records to sections within the viewsheds. To do this, I used details from the record notes: e.g., records described as “following the river” were assigned to the Brosna sections.

There were a few records that referred to the following non-species taxa: swan species, goose species, wader species and gull species. I allocated the swan species records to both Mute Swan and Whooper Swan, the wader species records to Black-tailed Godwit (the notes for one of the two records described the birds as “godwit species”) and the gull species records to Lesser Black-backed Gull (the notes for most of the records indicated that they were large gulls and Lesser Black-backed Gull was the most frequent large gull).

2.4.3.4 TOBIN vantage point survey data

The TOBIN vantage point survey dataset contains timed durations of flight activity for each record in specified height bands.

The potential collision height zones for the turbine models that are proposed for this project occupy height bands of 17-180 m (N163) and 30-180 m (N149 and V150) above ground level.

I used data from the following vantage point survey height bands for the collision risk modelling for the N163 turbine: 0-20 m, 20-50 m, 50-150 m and 150-200 m. For the N149 and V150 turbines, I used the same height bands apart from the 0-20 m band.

The 0-20 m height band will have included a significant amount of flight activity below the potential collision height zone of the N163 turbine; in fact, the majority of flight activity in this height band may have occurred below the potential collision height zone. Similarly, but to a lesser degree, the 20-50 m height band will have overestimated flight activity for the N149 and V150 turbines.

The 150-200 m height band may have included flight activity above the potential collision height zone. However, the low level of flight activity in this height band means that the inclusion of excess flight activity in this height band will not have had much effect on the predicted collision risk.

2.4.3.5 Flightlines

The collision risk model uses the viewshed area to derive the density of flight activity recorded during the vantage point surveys. Therefore, flight activity that occurred outside the viewshed of the vantage point being surveyed should be excluded from the collision risk model analyses.

For the collision risk model analyses and the analyses of distance effects, I excluded flightlines that occurred entirely outside the relevant viewshed. Where a flightline occurred partly outside the relevant viewshed, I adjusted its duration by the proportion of the flightline length that occurred in the viewshed. The flightline was clipped by the viewshed. The duration was then recalculated by multiplying the original value by (clipped flightline length) / (original flightline length). It should be noted that, this recalculation procedure assumes that the flight speed and flight height distribution were similar between the segments used for the recalculation.

I used similar procedures to split flightlines between sections within viewsheds in the spatially-structured models.

There were some records that were mapped as polygons, not polylines. For these records, I used the relative areas to make the same calculations as above.

2.4.3.6 Survey seasons

The vantage point survey dataset includes data from nine survey seasons (five winters and four summers) dating back to the summer of 2020. The minimum requirement of the NatureScot guidance is data from two winter and two summer seasons. Inclusion of additional seasons above the minimum requirement will generally improve the collision risk model by reducing the uncertainty due to sampling effects (see Section 4.7.2.1) and incorporating more annual variation. However, where a species shows a long-term increasing or decreasing trend, the older data may not reflect the current and likely future occurrence patterns. In this case, there was a large increase in Little Egret flight activity across the nine seasons covered by the vantage point survey, with only 0–1 records/200 hours in the first two winters, 6–15 records/200 hours in the final three winters, while there were no records in the first two summers and 1–2 records/200 hours in the last two summers (Section 3.4.1). Therefore, the collision risk model for Little Egret only used data from the most recent five seasons (winter 2022/23, summer 2023, winter 2023/24, summer 2024 and winer 2025/26).

2.5. EXPLORATORY ANALYSES

2.5.1. Scope

Before beginning the development of the collision risk model, I carried out a review of the vantage point survey coverage and results. This helped to assess the degree of spatial and temporal variability in the recorded flight activity, which needed to be considered in the development of the collision risk model. Note that spatial and temporal variability can only be assessed for the regularly occurring species. With species that were only recorded occasionally, it is not possible to distinguish between sampling effects and true spatial and temporal variability.

Details of the specific methodologies used for some of these exploratory analyses are provided in the following sections.

2.5.2. Distance effects

Declines in detection rates with distance from vantage points is a common issue in vantage point surveys (Gittings, 2024), and the guidance on vantage point surveys (NatureScot, 2025a) recommends considering corrections for detectability effects. Therefore, I carried out analyses to assess the relationships between distance from the vantage point locations and the flightline detections.

I carried out these analyses separately for the Ecology Ireland and TOBIN datasets due to differences in the vantage points and viewsheds. For the Ecology Ireland analyses, I used the full

2 km viewsheds as the purpose was to examine distribution patterns within the viewsheds, not across viewsheds.

The analyses assumed that flight activity is randomly distributed in relation to distance from the vantage point locations. At individual vantage points, habitat associations and / or topography may affect the relationship between distance from the vantage point location and flight activity. Averaging across a number of vantage points is likely to minimise these biases, because the habitat / topographic effects will differ between vantage points. However, very strong habitat / topographic effects affecting a lot of the flight activity at a vantage point could still bias these analyses. This was the case at the Ballincor Wind Farm site where there were very high levels of flight activity along the River Brosna. Therefore, I carried out two sets of analyses: one using the entire viewsheds and one using viewsheds with a 200 m wide corridor along the River Brosna removed.

As detectability will be strongly affected by body size, I divided the species recorded in the vantage point surveys into size groups, based on their cross-sectional indices (the body length multiplied by the wingspan).

I used three size groups for the Ecology Ireland dataset. The small species included Sparrowhawk, Golden Plover, Lapwing, Snipe, Black-headed Gull, Kestrel, and Merlin with body lengths of 0.26-0.36 m and wingspans of 0.46-1.05 m. The medium species included, Little Egret, Hen Harrier, Buzzard, Common Gull, Lesser Black-backed Gull, Herring Gull, and Peregrine with body lengths of 0.41-0.60 m and wingspans of 0.90-1.44 m. The large species included Mute Swan, Whooper Swan, White-fronted Goose, Mallard, Cormorant, Grey Heron with body lengths of 0.715-1.525 m and wingspans of 1.45-2.305 m.

Due to more limited data, I was only able to use two size groups for the TOBIN dataset. The smaller species included Wigeon, Mallard, Shoveler, Pintail, Little Egret, Hen Harrier, Sparrowhawk, Golden Plover, Lapwing, Black-tailed Godwit, Snipe, Black-headed Gull, Kestrel, and Merlin, and Peregrine with body lengths of 0.26-0.60 m and wingspans of 0.46-1.1 m. The larger species included Mute Swan, Whooper Swan, Cormorant, Grey Heron, White-tailed Eagle, Buzzard and Lesser Black-backed Gull with body lengths of 0.54-1.525 m and wingspans of 1.205-2.305 m.

I carried out the analyses using the 30 m viewsheds and divided each viewshed into eight bands, representing increasing distance from the vantage point, from 0-250 m to 1750-200 m.

I then calculated the total length of flightlines for each species group in each band. Flightlines with a maximum height lower than 30 m, or where heights were not recorded, in the Ecology Ireland dataset were excluded, as were flightlines with durations only recorded for the lowest height band in the TOBIN dataset, because the viewsheds had been derived using a minimum height of 30 m.

I then calculated the flightline density for each distance band in each viewshed using Equation EX1. This equation standardises the flightline density in each distance band by the total amount of flight activity recorded at that vantage point, to avoid the analyses being biased by vantage points where large amounts of flight activity were recorded.

Equation EX1: $FD_{i^*} = \sum(FD_i / FD_{VP}) \times FD_{mean}$

FD_{i^*} = weighted flightline density in band i; FD_i = raw flightline density in band i; FD_{VP} = summed flightline densities across all bands in the viewshed containing grid square i; FD_{mean} = mean of FD_{VP} = across all the vantage points included in the analysis.

I used the ratio of the weighted flightline density in each band to the maximum weighted flightline density across all bands to calculate weightings for each distance band. These weightings indicate the degree of under-recording in each distance band, based on the assumption that all flightlines were detected in the band with the maximum density. The latter was the 0–250 m, or the 250–500 m distance band.

I used the band weightings to calculate corrected viewshed areas that were adjusted to allow for the effects of under-estimation of distant flightlines. For each viewshed, I multiplied the area in each 250 m distance band by the band weightings. The ratio of the raw viewshed area to the

corrected viewshed area indicates the potential degree of under-estimation of flight activity densities due to distance effects.

2.5.3. Species-specific spatial structure

The basic model assumes random distribution of flight activity across the wind farm site, or across portions of it. Therefore, in addition to considering the distance effects on detectability, it is also necessary to consider whether deviations from this assumption are likely to significantly bias the model. In large wind farm sites, such as the Ballincor Wind Farm site, species are likely to show significant deviations from this assumption.

I investigated spatial structure for species / populations of conservation importance that had strong associations with the wind farm site. These included breeding populations within the wind farm site, non-breeding populations regularly using the wind farm site, and populations regularly commuting over the wind farm site.

First, I examined the flightline mapping to assess whether there were obvious concentrations of flight activity in particular areas, taking account of distance effects.

Where I identified potential spatial structure, I defined sections of the overall survey area (the combined viewsheds) to represent this structure and then calculated flight activity densities separately for each section (see Section 2.4.2.3).

2.5.4. Flight directions

Flight direction influences the single-transit collision risk in the NatureScot collision risk model, as birds flying upwind and downwind experience different relative airspeeds through the rotor-swept zone. Therefore, I examined the distribution of flight directions for all flightlines used for the collision risk modelling.

The mapped flightlines frequently comprised complex movement patterns, including circling and repeated manoeuvring associated with foraging and local commuting. As collision risk depends on flight direction at any given moment rather than the net bearing of an entire flight, I used flightline segments for the analyses.

First, I split each mapped flightline into their constituent segments using the st_segments function from the R package nngeo (Dorman, 2024). I then calculated the bearing of each segment using the line_bearing function from the R package stplanr (Lovelace and Ellison, 2018).

The prevailing winds at the Ballincor Wind Farm site are from the SE-NW[1]. Therefore, I assigned flightline segments with bearings of 315–360° and 0–135° to the downwind category and segments with bearings of 135–315° to the upwind category. I used the prevailing wind direction rather than the wind direction at the time of the observation because flight direction is more likely to be influenced by habitat, topography and commuting routes, rather than wind direction.

To ensure that longer periods of flight contributed proportionately more information than very short digitised segments, I weighted segments by their mapped length. I therefore calculated the raw upwind proportion for each species as the total length of segments classified as upwind divided by the total mapped flightline length for that species.

Segments within the same flight are not statistically independent, particularly where birds circle or make repeated passes through the site. Treating individual segments as independent observations would underestimate uncertainty and risk overstating evidence for directional bias. To address this, I quantified uncertainty in the upwind proportion using a cluster bootstrap, that resampled whole flight events with replacement, ensuring that within-flight correlation was preserved in each replicate. Resampling clusters rather than individual observations is appropriate for hierarchical or nested data structures and yields consistent confidence intervals.

[1] Wind-rose for 20 m above ground level at ITM grid reference 604000 69900 from Sustainable Energy Authority of Ireland - Wind Atlas (https://maps.seai.ie/apps/WindAtlas).

For each species, I assigned a unique identifier to every observed flight event and identified the set of n unique flights available for analysis. For each bootstrap replicate, I resampled n flight events with replacement from this set. I included all segments belonging to each selected flight in the resample, and when a flight appeared multiple times I included its segments multiple times by multiplying segment weights by the frequency with which that flight was selected. I then recalculated the length-weighted upwind proportion for the resample. Repeating this process 5,000 times generated a bootstrap distribution of the upwind proportion, from which I derived percentile-based 95% confidence intervals.

This approach preserves within-flight correlation in segment directions while appropriately reflecting uncertainty arising from the finite number of independent flight events.

For each species, I examined whether the 95% cluster-bootstrap confidence interval for the upwind proportion included 0.5. Where the interval included 0.5, I inferred no consistent directional bias. Where the interval excluded 0.5, I considered this as possible evidence of a directional bias, while recognising that marginal exclusions of 0.5 may arise by chance given the number of species examined.

I conducted all analyses using customised code in R version 4.4.1 (R Core Team 2025).

2.5.5. Temporal patterns of flight activity

I used record rates (number of records per unit time) to analyse patterns of seasonal, monthly and diel variation in flight activity. An alternative would have been to use flight activity (bird-seconds), but this parameter would be highly sensitive to occasional long-duration flights, resulting in large variation that may not reflect broader activity patterns.

I used the vantage point survey records after processing against the 30 m viewsheds used for the collision risk model. This mitigated the issue of duplication of flight events across viewsheds in the Ecology Ireland dataset (although some level of duplication will have remained; e.g. a Cormorant commuting along the River Brosna could have been recorded in multiple non-overlapping viewsheds).

2.6. COLLISION RISK MODELLING METHODOLOGY

2.6.1. General

I followed the NatureScot guidance for the collision risk modelling methodology.

The NatureScot guidance includes a spreadsheet that can be used to implement the collision risk model. However, use of spreadsheets for complex modelling is not best practice due to the difficulty of auditing the code. Also, in this case, where there were multiple species to model, and where I was running multiple variants of the model, use of spreadsheets would be very cumbersome. Therefore, I implemented the NatureScot methodology using custom scripts in R version 4.4.1 (R Core Team, 2024). I audited the scripts against the spreadsheet to ensure that they produced identical results. The scripts used for the modelling can be provided on request.

2.6.2. Stage A: flight activity

2.6.2.1 NatureScot methodology

Stage A involves calculating the density of flight activity in the area where collision risk will be generated by the installation of wind turbines. It also includes ranking nocturnal activity and calculating the distribution of daytime and nighttime hours.

Flight activity density

For onshore wind farms, calculations of flight activity density are usually based on flight durations recorded by vantage point surveys. This involves adjusting the total amount of flight activity recorded in the vantage point surveys by the area surveyed and the survey duration. Where data from multiple vantage points is available, it is also necessary to consider how to combine the data.

The NatureScot methodology for Stage A first calculates the mean areal density of flight activity in the viewshed of each vantage point:

Equation A1: $D1 = b / (t \times A)$ birds m^{-2}

b = total flight activity (bird-seconds); t = total duration of vantage point watches (seconds); A = viewshed area (km^2).

Note that flight activity is expressed as the sum of the duration of each flight multiplied by the number of birds: e.g., a record of 20 birds flying for 10 seconds = 200 bird-seconds.

The flight activity density is then averaged across all the vantage points. The NatureScot guidance presents two methods for doing this.

Where there were significant differences in survey effort between the vantage points, the flight activity density can be averaged by weighting for the viewshed area and the duration of the vantage point survey at each vantage point (Equation A2). This reflects the fact that, in principle, larger survey areas and/or survey durations will sample more flights and will, therefore, be less affected by sampling effects. However, note that there are some issues with this weighting method (see Section 4.7.3).

Equation A2: $D^* = \Sigma(D_i \sqrt{(t_i \times A_i)}) / \Sigma \sqrt{(t_i \times A_i)}$

D_i = flight activity areal density at VP i ; t = total duration of vantage point watches at VP i (seconds); A = viewshed area at VP i (km^2).

Where the variation in flight activity density between vantage points is likely to reflect real differences in flight activity, the flight activity density can be averaged by weighting for the number of turbines within the viewshed of each vantage point. However, before applying the weighting it is important to consider whether apparent variation between vantage points could be due to sampling effects.

Equation A3: $D^* = \Sigma(N_i \times D_i) / \Sigma N_i$

D_i = flight activity areal density at VP i ; N_i= the number of turbines in the viewshed of VP i.

Although not discussed in the NatureScot guidance, the weightings in Equations A2 and A3 could be combined to weight for both differences in survey effort and real differences in flight activity between vantage points.

Daytime and nighttime hours

The NatureScot methodology uses the formula in Forsythe et al. (1995) to calculate daytime and nighttime hours.

Nocturnal flight activity

Vantage point surveys only record flight activity during daylight hours (normally sunrise to sunset). Therefore, for species that also fly at night, it is necessary to adjust the flight activity densities to allow for nocturnal flight activity.

The NatureScot methodology adjusts for nocturnal flight activity by using a nocturnal activity ranking to categorise each species by its degree of nocturnal activity on a scale of 1-5, where 1 = hardly any nocturnal activity and 5 = as active at night as by day. It then uses this categorisation to include nocturnal flight activity in the calculation of predicted transits in Stage B.

To illustrate the effect of nocturnal flight activity on the collision risk predictions, I calculated nocturnal correction factors for species with non-zero nocturnal flight activity (nocturnal activity rankings of more than one), as shown in Equation A4.

Equation A4: $NCF = 1 + ((NAR - 1) \times 0.25) \times h_{night^*} / h_{day^*}$

NAR = nocturnal activity ranking (see text); h_{night^*} = mean night-time hours across seasonal period of occurrence; h_{day^*} = mean day-time hours across seasonal period of occurrence.

The nocturnal correction factor represents the increase in flight activity densities that is generated by the adjustment for nocturnal flight activity in the calculation of predicted transits in Stage B.

2.6.2.2 Data sources and preparation

Parameters

The parameters required for the Stage A modelling of flight activity densities using Equation A1 are the flight activity duration (b), the vantage point survey duration (t) and the viewshed area (A).

Stage A also requires classifications of nocturnal activity rankings for all species included in the model and calculations of monthly totals of daytime and nighttime hours.

The derivation of the data required for these parameters is described in the following sections.

Flight activity durations

The flight activity durations were obtained from the vantage point survey dataset. The processing of this dataset for use in the collision risk model is described in Section 2.4.3.

The flight activity durations included in Equation A1 comprise the sum of the duration of each flightline multiplied by the number of birds recorded on the flightline: e.g., a flock of 100 Golden Plover recorded flying for 10 seconds would generate a flight activity duration (b) value of 1000 bird-secs.

Vantage point survey durations (t)

The vantage point survey duration parameter represents the total vantage point survey effort over the seasonal period used for the collision risk modelling. I calculated this duration separately for each vantage point and each month in each dataset.

The Ecology Ireland durations were adjusted for estimated proportions of time tracking flightlines outside the viewshed arcs (see Section 2.4.3.2).

Some of the TOBIN vantage point surveys included the hour before sunset and the hour after sunrise. For waterfowl species, I included these periods in the total durations. For the other species, I excluded these periods from the total durations.

Viewshed area (A)

The viewshed area represents the spatial extent of the area covered by the vantage point survey. I calculated the viewshed areas from the mapped viewsheds for each vantage point. For the spatially-structured models, I calculated areas separately for each section within each viewshed.

Daytime and nighttime hours

I used the formula in Forsythe et al. (1995) to calculate day-time and night-time hours. I used the latitude of the centroid of the turbine locations and a p-value of 0.8333. The p-value represents the position of the sun relative to the horizon at sunrise and sunset.

Nocturnal activity ranking

The nocturnal activity ranking is an estimation of the degree of nocturnal activity ranked on a scale from 1 (hardly any nocturnal activity) to 5 (as active at night as by day). I applied nocturnal activity rankings of more than one to Wigeon, Teal, Mallard, Little Egret, Grey Heron, Golden Plover, Lapwing, Curlew and Black-tailed Godwit.

For Mallard, visual inspection of Figure 2 in Korner et al. (2016) suggests that nocturnal activity is around half that of diurnal activity, so I set the nocturnal activity ranking as 3. I applied the same rate to the ecologically similar Wigeon and Teal.

For Golden Plover, a figure of 25% of the day-time activity levels across the night-time hours is often used in collision risk modelling (e.g., MKOS, 2019), so I set the nocturnal activity ranking as 2. I applied the same rate to the ecologically similar Lapwing, Curlew and Black-tailed Godwit.

Flight activity patterns for Grey Heron from Vessem and Draulans (1987) indicate low levels of nocturnal flight activity, so I set the nocturnal activity ranking at the same rate as Golden Plover. I applied the same rate to the ecologically similar Little Egret.

I used nocturnal activity rankings of 1 for all the other species. This resulted in no nocturnal flight activity being included in the model for those species.

2.6.2.3 Implementation

Flight activity densities

The NatureScot spreadsheet requires the user to enter mean flight activity densities for each month. I used custom scripts in R to calculate these densities.

I calculated monthly flight activity densities separately for each vantage point, and each section in each viewshed in the spatially-structured models.

I used the weighted averaging method in Equation A2 to calculate mean flight activity densities for each month across all the vantage points. This method down weighted the contribution of EI6–EI7 and TB1–TB5 reflecting the lower survey effort at these vantage points.

For the spatially-structured models, I applied the weighted averaging method separately to each section.

I used viewshed areas adjusted for detectability based on the results of the distance analysis (see Section 2.5.2) in the weighted averaging. Use of the adjusted areas allowed for the fact that the removal of overlaps from the Ecology Ireland viewsheds resulted in some viewsheds losing much of the area closest to the vantage points. Consequently, similar nominal viewshed areas could have markedly different detection characteristics between vantage points.

Daytime and nighttime hours

The NatureScot spreadsheet requires the user to enter the latitude of the wind farm site, and nocturnal activity rankings for each species. It then uses the formula from Forsythe et al. (1995) to calculate the day-time and night-time hours. The correction for nocturnal flight activity is applied in Stage B.

I used a custom script in R to implement the formula from Forsythe et al. (1995) and calculate the day-time and night-time hours. For waterfowl species, I added two hours to the day-time hours and subtracted two from the night-time hours to reflect the fact that they are active in the hour before sunrise and the hour after sunset.

Nocturnal correction factors

I used a custom script in R to implement Equation A4 to calculate the nocturnal correction factors.

2.6.3. Stage B: transits

2.6.3.1 NatureScot methodology

Stage B involves calculating the number of bird transits through the turbine rotors. It uses the flight activity densities, distribution of daylight and nighttime hours, and nocturnal activity rankings derived in Stage A.

The NatureScot guidance does not provide details of the calculation procedure for Stage B, but Band (2024) includes an equation (Equation B1).

Equation B1: $v \times (D \times Q_{2R} / 2R) \times (T \times \pi R^2) \times (t_{day} + f_{night} \times t_{night})$

v = bird flight speed; D = flight activity density; Q_{2R} = proportion of flight activity at potential collision height; R = rotor radius; T = number of turbines; t_{day} = total daylight hours; f_{night} = nocturnal activity ranking - 1 × 0.25; t_{night} = total night-time hours.

The equation converts the areal density to a volumetric density by dividing the flight activity density by the rotor diameter and adjusting for the proportion of flight activity at potential collision height ($D \times Q_{2R} / 2R$). It then converts the density to a flux rate by multiplying by the rotor area ($T \times \pi R^2$) and the bird flight speed (v). It converts the flux rate to an absolute number of transits by multiplying by the total number of hours available for flight activity, including a correction for nocturnal flight activity ($t_{day} + f_{night} \times t_{night}$).

2.6.3.2 Data sources and preparation

The parameters required for the Stage B modelling are the bird flight speed (v), the flight activity density (D), the vantage point survey duration (t), the proportion of flight activity at potential collision height (Q_{2R}), the rotor area (R), the number of turbines (T), the total daylight and nighttime hours (t_{day} and t_{night}) and the nocturnal activity ranking.

The flight activity density, total daylight and nighttime hours and nocturnal activity ranking were derived in Stage A. The derivation of the data required for the remaining parameters is described in the following sections.

Bird flight speed

The NatureScot guidance states that for bird flight speed, "a typical mean flight speed as given in standard references will usually be adequate" but consideration should be given to exploring "the collision risk arising from different types of bird behaviour involving very different flight speeds".

Most collision risk modelling for onshore wind farms uses the mean bird flight speeds from Alerstam et al. (2007). This source covers most species relevant to collision risk modelling for Irish onshore wind farms. I used the mean bird flight speeds from this source. The values used in this collision risk model are shown in Table 2.4.

Proportion of flight activity at potential collision height (Q_{2R})

The NatureScot methodology involves calculating the total areal flight activity density across all height bands and then adjusting for the proportion of flight activity at potential collision height. However, this may introduce biases in the calculations due to variation between viewsheds in the proportion of viewshed that was visible below the height used to map the viewshed. In this collision risk model, I only used the flight activity at potential collision height to calculate the flight activity density. Therefore, for Equation B1, the value of the Q_{2R} parameter is 1.

Turbine parameters

The proposed number of turbines (T) was 11 and the proposed rotor radius (R) for each turbine model is shown in Table 2.3. The numbers of turbines in each section used for the spatially-structured models is shown in Table 2.6.

Implementation

The NatureScot spreadsheet automatically calculates the projected number of transits per month from the bird density and hours per month values calculated in Stage A and data entered by the user for the other parameters.

I implemented Equation B1 through a custom script in R to calculate the predicted number of transits per month.

2.6.4. Stage C: single transit collision risk

2.6.4.1 NatureScot methodology

Stage C involves calculating the probability of a collision when a bird makes a transit of the rotor swept volume (the single transit collision risk).

The NatureScot methodology for Stage C is based on the Scottish Natural Heritage collision risk model (SNH, 2000; Band et al., 2007; Band, 2012). This calculates the probability, p (r, φ), of collision for a bird at radius r from the hub and at a position along the radius that is at angle φ from the vertical. This probability is then integrated over the entire rotor disc, assuming that the bird transit may be anywhere at random within the area of the disc. Separate calculations are made for flapping and gliding birds and for upwind and downwind transits. This method assumes that: birds are of a simple cruciform shape; they fly through turbines in straight lines with a perpendicular approach to the plane of the rotor; their flight is not affected by the slipstream of the turbine blade; and that the turbine blades have width and pitch angle, but no thickness.

2.6.4.2 Parameters

The parameters required for Stage C are the bird body length, wingspan, flight speed and flight type, the percentage of flights upwind/downwind, and the turbine rotation speed, rotor radius, mean blade width, pitch angle and blade profile.

Turbine parameters

The turbine rotation speed, rotor radius, mean blade width and pitch angle values used for the modelling are shown in Table 2.3; for rotation speed I used the maximum values from the rotation speed ranges. I used the default blade profile values from the NatureScot spreadsheet for the modelling.

One of the turbine parameters used to calculate single transit collision risk is the mean pitch angle of the turbine blade. This parameter specifies the angle of the blade from the vertical, so the risk will generally increase as the mean pitch angle increases.

Data on mean pitch angle are surprisingly difficult to obtain, so generic values are often used in collision risk models. The limited available information is inconsistent. The NatureScot guidance states that a mean pitch angle of "15-30 degrees is reasonable for a typical large turbine", although the higher end of this range may be more typical for offshore turbines. Byrne and MacArtain (2022) reported that over 15 years of operation of an 850 kW turbine at Dundalk the pitch angle in normal operation was always less than 20°, with higher angles only used for stopping/feathering. Monitoring at an onshore wind farm (Meenwaun, Co. Offaly) indicated that much lower pitch angles are typical for onshore turbines (MKOS, 2019); over a continuous 12-month period, the pitch angle was between -3° and 9° for approximately 90% of the time.

I modelled single transit collision risks using four values for mean pitch angle: 0°, 9°, 15° and 30°. The 0° value lies within the –3° to 9° range recorded at Meenwaun and, in sensitivity analyses (Section 4.7.3), produced the highest collision probabilities for most species within this range. For the collision risk predictions I used the single transit collision risks calculated with a mean pitch angle of 15°. This value provides a pragmatic balance between NatureScot guidance and the limited operational data available from Irish onshore wind farms.

Bird parameters

The bird body length and wingspan values were obtained from Cramp and Simmons (2004). The bird flight speed values were obtained from Alerstam et al. (2007). The values used in the modelling are shown in Table 2.3.

While the review of the vantage point survey flightlines indicated some apparent directional biases, these biases are likely to have been artefacts due to properties of the datasets (see Section 0). Therefore, I set the percentages of flights upwind/downwind at 50% for all species.

2.6.4.3 Implementation

I carried out all the calculations of single transit collision risks in R, using an adapted version of the R code provided by Masden (2015). This code implements the methodology of Band (2012) and provides identical values to the spreadsheet provided by that source and to the values generated by the NatureScot spreadsheet.

I carried out separate sets of calculations using pitch angle values of 0°, 15° and 30°.

I calculated separate values for upwind and downwind flapping and gliding flight.

The NatureScot spreadsheet only allows values for either flapping or gliding flight to be used. I used the values for flapping flight, as these were slightly higher.

The spreadsheet uses the mean of values for upwind and downwind flight weighted by the relative proportion of these flight directions. I used a simple mean of the upwind and downwind single transit collision risks (i.e. a 50/50 weighting).

2.6.5. Stage D: non-avoidance collision risk

2.6.5.1 NatureScot methodology

Stage D multiplies the number of predicted transits from Stage B and the single transit collision risk from Stage C to provide an estimate of the overall predicted collision risk before avoidance. It also includes a correction for the proportion of time that the turbines are operational.

Equation D1: collision rate before avoidance = transits × stcr × Q_{op}

transits = predicted transits from Stage B; stcr = single transit collision risk from Stage C; Q_{op} = proportion of time that the turbines are operational.

2.6.5.2 Parameters

The parameters required for Stage D are the predicted transits from Stage B, the single transit collision risk values from Stage C, and the proportion of time that the turbines are operational (Q_{op}).

Site-specific values for Q_{op} were not available for this project. Therefore, I used a value of 0.85 for all the species in the model, which is a widely value for this parameter in collision risk modelling for onshore wind farms in Ireland.

2.6.5.3 Implementation

The NatureScot spreadsheet automatically calculates the projected number of transits per month from the bird density and hours per month values calculated in Stage A and data entered by the user for the other parameters.

I implemented Equation D1 through a custom script in R to calculate the collision rate before avoidance.

2.6.6. Stage E: collision risk after avoidance

2.6.6.1 NatureScot methodology

Stage E applies an avoidance rate to the non-avoidance collision risk to reflect the fact that most potential collisions are avoided due to birds taking evasive action (SNH 2010).

Equation E1: collision rate after avoidance = collision rate before avoidance × (1 – A)

collision rate before avoidance = predicted rates from Stage D; A = avoidance rate.

The avoidance rate includes both behavioural avoidance (micro-avoidance) and behavioural displacement (macro-avoidance).

Behavioural avoidance is "action taken by a bird, when close to an operational wind farm, which prevents a collision". Behavioural displacement refers to the process by which a "bird may (possibly over time) change its home range, territory, or flight routes between roosting areas and feeding areas, so that its range use (or flight paths) no longer brings the bird into the vicinity of an operational wind farm".

The NatureScot guidance for Stage E also notes that "consideration should be given to whether any habitat changes associated with developing the wind farm may result in attracting bird species". This issue is considered in Section 4.7.2.

Stage E can also include a large turbine array correction factor. This reflects the fact that "where the overall probability of a bird colliding is appreciable, it may be appropriate to take account of the fact that a declining proportion of the birds will survive passage through early rows of turbines and will thus be exposed to collision risk in later rows". However, this correction factor is only likely to be significant for wind farms with much larger numbers of turbines than are proposed for the Ballincor Wind Farm. Therefore, I did not apply this correction factor.

The NatureScot spreadsheet sums the monthly collision risks to provide a total annual collision risk. However, for some species it is more appropriate to calculate seasonal collision risks (e.g., to differentiate between separate breeding and wintering populations).

2.6.6.2 Parameters

The parameters required for Stage E are the non-avoidance collision risks from Stage D and avoidance rates for each species included in the model. In addition, definitions of the months included in seasonal periods are required if seasonal collision risks are to be calculated.

Avoidance rates

The default set-up in the NatureScot spreadsheet calculates the predicted collision risk after avoidance using four avoidance rates: 95%, 98%, 99% and 99.5%. However, the guidance states "if possible, use avoidance rates which have been established from previous monitoring studies for this species, and an appropriate range to cover the uncertainties involved".

Scottish Natural Heritage / NatureScot provides guidance on avoidance rates to use in collision risk modelling for onshore wind farms (SNH, 2010; NatureScot, 2025b). For some species, including Mute Swan, Whooper Swan, White-fronted Goose, Hen Harrier and Kestrel, there is some evidence available that has been used to specify species-specific avoidance rates (NatureScot, 2025b). In addition, a recent review for Scottish Natural Heritage recommended the use of an avoidance rate of 0.992 for small gulls (including Black-headed Gull and Common Gull) and 0.995 for large gulls (including Lesser Black-backed Gull and Herring Gull) at onshore wind farms (Furness, 2019).

For Golden Plover, my review of collision monitoring data from four UK wind farms recommended that collision risk modelling for wintering Golden Plover populations should use two avoidance rate values: 99.6% and 99.8% (Gittings, 2022).

For the other species included in this collision risk model, the Scottish Natural Heritage guidance specifies a default avoidance rate of 98%.

Seasonal periods

The periods used to calculate seasonal collision risks are defined in Table 2.5. For the species not included in this table the final collision risk was calculated for the whole year.

2.6.6.3 Implementation

The NatureScot spreadsheet automatically calculates the collision rate after avoidance per month from the collision rate before avoidance values calculated in Stage D and the avoidance rate values entered by the user.

I implemented Equation E1 through a custom script in R to calculate the collision rate after avoidance. This produced monthly predicted collision risks for various avoidance rates and for pitch angles of 0°, 15 ° and 30°.

For the final predicted collision risks used in the collision risk assessments, I summed the monthly predicted collision risks for the recommended avoidance rate and a pitch angle of 0° to produce annual or seasonal collision risks, as appropriate.

2.6.7. Stage F: assessing uncertainty

Stage F involves assessing the level of uncertainty that applies to the collision risk predictions.

In this assessment, I carried out analyses to provide some degree of quantification of the potential uncertainty in the flight activity data due to sampling effects, the under-detection of distant flightlines, and imprecision in the estimates of nocturnal flight activity.

I also carried out analyses to quantify potential uncertainty in the single transit collision risk predictions due to variation in pitch angle and rotation speed.

I carried out qualitative assessments of other sources of potential uncertainty.

2.6.7.1 Sampling effects

The standard vantage point survey effort of 36 hours per season only samples around 1.5-2% of the total daylight hours across the season. The temporal distribution of flight activity is often highly

aggregated, while a small number of long-duration flightlines can make a large contribution to the overall collision risk. Therefore, sampling effects are likely to strongly influence the collision risk predictions.

I assessed the potential influence of sampling effects on the collision risk predictions by using a simulation model.

Simulation model structure

The model used the observed distribution of flight activity to simulate flight activity across the entire season. This simulated distribution was then sampled to generate samples of vantage point survey data. I then compared the flight activity densities in the samples to the flight activity densities across the entire season.

I first calculated the total duration of daylight hours across the season using the R package suncalc (Thiermel and Elmarhraoui, 2022) and divided this duration by three to set up a dataframe representing all 3-hour periods of daylight hours across the season.

I used the negative binomial distribution to simulate the distribution of records in each 3-hour period at each vantage point across the entire season and the distribution of flock sizes per record (excluding simulated zero values for flock sizes). I used the fitdist function with the maximum likelihood estimation method in the R package fitdistplus (Muller and Dutang, 2015) to fit these negative binomial distributions. I used the exponential distribution to simulate the distribution of flight durations at potential collision height per record (excluding simulated zero durations). I used the rexp function in the R package stats (R Core Team, 2024), with a rate that was the reciprocal of the mean duration of observed flights at potential collision height, to fit the exponential distributions.

For each species / season, I compared the distribution of the simulated values with the observed values to assess the validity of the simulated data.

I then took 10,000 sets of random samples without replacement of twelve 3-hour periods per vantage point per survey season to simulate vantage point survey samples.

I calculated the flight activity densities for the entire season, and for each set of vantage point survey samples, by summing the bird-secs per record, dividing by the total duration of daylight hours (for the entire season dataset) or by the total duration of the sampled periods (for the vantage point survey datasets).

I used the distribution of the simulated vantage point survey datasets to calculate a 95% simulation interval for the resulting flight activity densities. The lower limit of the interval was defined as the 2.5th percentile of the distribution and the upper limit as the 97.5th percentile. This simulation interval can be interpreted as follows: if the underlying process behaved as represented by the fitted model, and the survey were repeated many times under the same design, the resulting estimates of flight activity density would fall within this interval in approximately 95% of cases.

I assessed the potential influence of sampling effects by comparing the upper and lower limits of the simulation interval with the flight activity density calculated from the complete dataset. This comparison provides an indication of the potential magnitude of over- or underestimation of flight activity density that could arise if a vantage point survey happened, by chance, to produce a sample near the upper or lower limits of the simulated distribution. For example, if the lower limit of the simulation interval was half the value of the overall flight activity density calculated from the complete dataset, this would imply that a survey sample representing this lower limit would underestimate the true flight activity density by a factor of two. Because predicted collision risk is directly proportional to flight activity density in the collision risk model, the true collision risk in such a case would also be approximately twice the value predicted from that survey sample.

Simulation model implementation

I carried out these simulations for the species included in the collision risk assessment, with the exception of Wigeon and Black-tailed Godwit for which the number of records were too low to fit the simulated distributions.

I modelled scenarios based on an increasing number of survey years, from one year to five years. This allowed me to assess how the increase in the survey effort affected the uncertainty.

I used six vantage points, which was the mean number of vantage points surveyed per season.

Relative error method

The technical report (Band 2024) accompanying the NatureScot collision risk modelling guidance (NS 2024) includes a method for calculating the sampling effects uncertainty from the relative error of the monthly flight activity densities. This method is shown in Equation F1[2].

Equation F1: $E_{se} = 1.96 \times SD_{monthly} / mean_{monthly}$

E_{se}= sampling effects error; $SD_{monthly}$ = standard deviation of the monthly flight activity densities; $mean_{monthly}$ = mean of the monthly flight activity densities.

I implemented this method to provide sampling effects uncertainties that are comparable with other collision risk models that follow this method. However, there are statistical issues with this method (see Section 4.7.2.1).

2.6.7.2 Distance effects

The exploratory data analyses included analyses of the distribution of flightline densities across distance bands from the vantage points and used the results to calculate corrected viewshed areas that that were adjusted to allow for the effects of under-estimation of distant flightlines (Section 2.5.2).

To assess the potential uncertainty in the predicted collision risks due to distance effects, I calculated flight activity densities using the corrected viewshed areas. The ratios of these densities to those from the collision risk model provided an indication of the potential underestimation of the collision risk due to distance effects.

2.6.7.3 Nocturnal flight activity

The NatureScot collision risk model uses a crude ranking of the degree of nocturnal flight activity to calculate nocturnal correction factors and the information available about the degree of nocturnal flight activity for most species is very limited. I examined the effects of uncertainty about nocturnal flight activity for each species. I did this by calculating nocturnal correction factors using nocturnal activity rankings of ±1 of the values used in the model (but not including values < 1 or > 5, which would be outside the range defined for these rankings). The ratio of these nocturnal correction factors to the nocturnal correction factor value used in the collision risk model indicates the potential effect on the predicted collision risk: e.g., if the nocturnal correction factor calculated using the NAR+1 value is 1.25 times the nocturnal correction factor using the NAR value, the true collision risk could be 25% higher than the predicted collision risk.

2.6.7.4 Single transit collision risk

I carried out analyses to quantify potential uncertainty in the single transit collision risk predictions due to variation in pitch angle and rotation speed. These involved calculating single transit collision risk values for each 1° increment in pitch angle between -5° and 90° and each 0.1 rpm increment in rotor speed between the minimum and maximum rotor speed values. I used the maximum rotor speed value for the pitch calculations and a pitch angle value of 0° for the rotor speed calculations.

[2] Band 2024's worked example includes using the root sum of squares to calculate the mean of the breeding and non-breeding season standard deviations. However, that procedure was not required for this model as the seasons were assessed separately.

2.6.7.5 Overall uncertainty

I used the quantitative uncertainty ranges from the analyses of sampling effects and nocturnal flight activity variation, and the ± 20% uncertainty range for single transit collision risk from Band (2024) to quantify the overall uncertainty. I did not include the uncertainty associated with distance effects because distance effects are not incorporated within the NatureScot methodology; however, this source of uncertainty is discussed separately.

Band (2024) uses the root sum of squares method to combine the uncertainties to obtain an overall uncertainty estimate. This method sum the squares of individual uncertainties and then takes the square root of that sum:

Equation F2: $E = \sqrt{(e_1^2 + e_2^2 + e_3^2 \ldots)}$

E = overall uncertainty ; e_1, e_2, e_3 … = individual uncertainties.

However, this method assumes that the uncertainties are additive. In fact, in a collision risk model they are multiplicative, because the components of the model are multiplied not summed. This means that the root sum of squares method underestimates the overall uncertainty. In addition, the statistical assumptions underlying the root sum of squares method are not well aligned with the types of uncertainty distributions generated by the collision risk model.

Instead of the root sum of squares approach, I used a multiplicative method to combine the individual uncertainties. However, for sampling effects and single transit collision risk uncertainties, which represent distributions of potential values, simple multiplication of the extreme limits would overestimate the uncertainty because it would assume that the extreme values of each factor would co-occur. Instead, I used a Monte Carlo procedure with 10,000 iterations to sample from the distributions representing these uncertainties. For each iteration, I sampled values from the simulation outputs representing the sampling effects and from a uniform distribution representing the ±20% uncertainty range in the single transit collision risk parameter. The resulting products formed a distribution of combined uncertainty multipliers, from which I used the 95% interval to define the limits of the combined uncertainty range for these two components.

The uncertainty associated with the nocturnal activity correction factor is a different type of uncertainty. It represents uncertainty about whether the classification of the degree of nocturnal flight activity is correct. Therefore, if it is wrong, it is always wrong so sampling a distribution of nocturnal correction factor uncertainties would not be appropriate. Instead, I multiplied the lower and upper limits derived from the combined sampling effects and single transit collision risk uncertainties by the lower and upper nocturnal correction factor multipliers as appropriate.

For comparison with collision risk models that follow the Band (2024) guidance, I also calculated overall uncertainty using the root sum of squares method.

2.7. COLLISION RISK ASSESSMENT

The significance of the predicted collision risk is a function of the size of the predicted collision risk, the size of the affected population, and the typical level of background mortality in the affected population. The same predicted collision risk will have larger impacts in small populations and/or populations with low levels of annual mortality, compared to large populations and/or populations with high levels of annual mortality. Therefore, the significance can be assessed by calculating the percentage increase in annual mortality that would be generated by the predicted collision risk.

A threshold level of a 1% increase in annual mortality has been suggested to determine whether the impact is nonnegligible (Percival, 2003). Note that this refers to the increase in absolute mortality not the increase in the percentage mortality rate. This 1% threshold is widely used in UK wind farms assessments as a threshold for assessing significance. However, this is likely to be a very conservative threshold, and in some cases, such as small populations with low mortality rates, biologically implausible.

I assessed the potential increase in annual mortality, as a percentage of the background annual mortality, for most species / populations, with a predicted risk that would result in at least one

collision within the 30 year lifespan of the wind farm. The species / populations with this level of risk that I did not assess were Buzzard, the non-breeding Black-headed Gull population and the spring and autumn Lesser Black-backed Gull populations. I did not assess Buzzard because this species has been rapidly increasing in Ireland and there are no recent national or county population estimates available. I did not assess the non-breeding Black-headed Gull population and the spring and autumn Lesser Black-backed Gull populations because suitable data on national or county population sizes is not available (Irish Wetland Bird Survey data does not produce reliable estimates for gull populations).

For each of the species / populations, I assessed the impact at the national scale. I also assessed the impact at regional and/or local scales where relevant population data was available or could be estimated. The wind farm site is on the border between County Offaly and County Tipperary, but the majority of the site is in Offaly. Therefore, I used data from County Offaly for the regional (county) scale.

The sources of the population data are listed in Table 2.7.

For Whooper Swan, Wigeon, Mallard, Golden Plover, Lapwing and Black-tailed Godwit, I used Irish Wetland Bird Survey data for the Little Brosna Callows for the local scale. This site is around 7 km from the wind farm site and is connected to the wind farm site by wetland habitat along the River Brosna. The wind farm site is likely to be well within the potential foraging range of Golden Plovers and Lapwing from the Little Brosna Callows. While it is beyond the Whooper Swan core foraging range distance from the Little Brosna Callows, as defined by SNH (2016), it seems likely that there is some degree of connectivity between the two areas for the local Whooper Swan population.

For Mallard, Little Egret and Grey Heron, there are national estimates available for both the breeding and non-breeding populations. These species were recorded throughout the year in the vantage point surveys. Their local breeding populations are likely to be resident, although the populations may be supplemented in the non-breeding season. Mallard and Grey Heron are poorly covered by the Irish-Wetland Bird Survey (the source for the non-breeding population estimate) as they are widespread outside the monitored sites. Therefore, while their national populations are likely to be larger in the non-breeding season, the estimates of their national breeding populations are larger than the estimates of their national non-breeding populations. Therefore, for Mallard and Grey Heron, I used the estimates of their breeding populations for the national population. For Little Egret, I used the estimates of its non-breeding population for the national population. This species is increasing in Ireland, and the estimate of its breeding population is probably out of date.

Sparrowhawk and Kestrel are widespread species that are not likely to show highly aggregated distribution patterns. I estimated the Offaly population sizes of these species using the Bird Atlas dataset from the National Biodiversity Data Centre[3]. This included hectad presence-absence data covering the whole of the Republic of Ireland, and tetrad data of relative abundance for samples of tetrads from most of the hectads. I used the hectad data to estimate the proportion of the Republic of Ireland breeding range of each species that occurs in Offaly. I then used the tetrad data to estimate the mean relative abundance of the species in Offaly as a percentage of its mean relative abundance throughout its range in the Republic of Ireland. I then used the product of these two factors to multiply the Republic of Ireland population figure to give an estimate for the Offaly population.

Kestrel has been red-listed due to a large decline in its breeding population. Therefore, its current population is likely to be considerably smaller than the estimate in Crowe et al. (2014), which was based on survey data from 2006-2010. I used the mean annual change (-2.50%) from the

[3] BirdWatch Ireland, Bird Atlas 2007 - 2011, National Biodiversity Data Centre, Ireland, accessed 07 September 2022, https://maps.biodiversityireland.ie/Dataset/220.

Countryside Bird Survey data[4] to calculate the decline in the Irish population from 2008 to 2024 and used the estimate for the 2024 population in the collision risk assessment calculations.

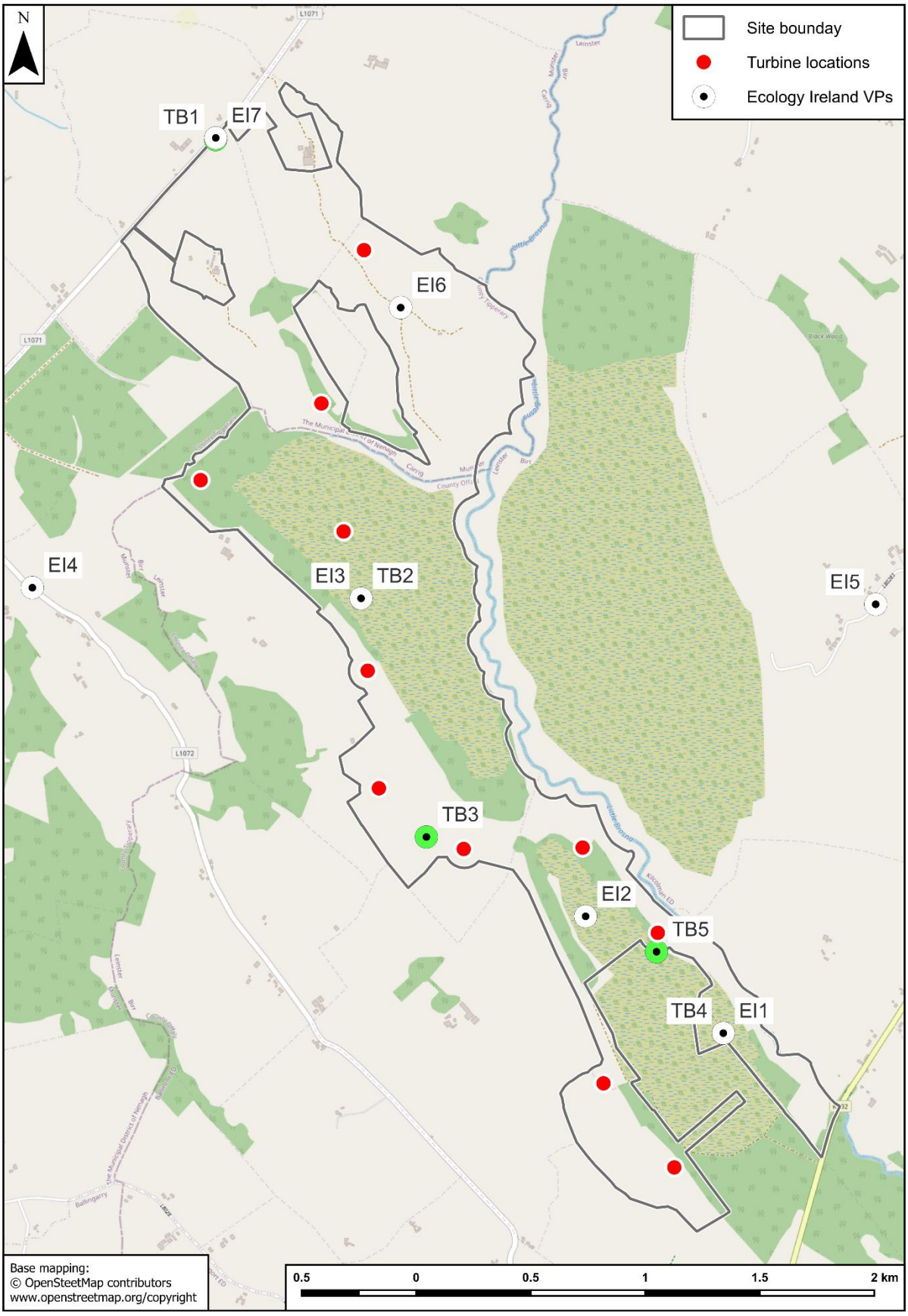
The background mortality rates that I used were derived from the adult survival rates on the BirdFacts website[5]. Where separate rates were given for males and females, I used the mean of the rates.

Table 2.7. Population data used for the collision risk assessment.

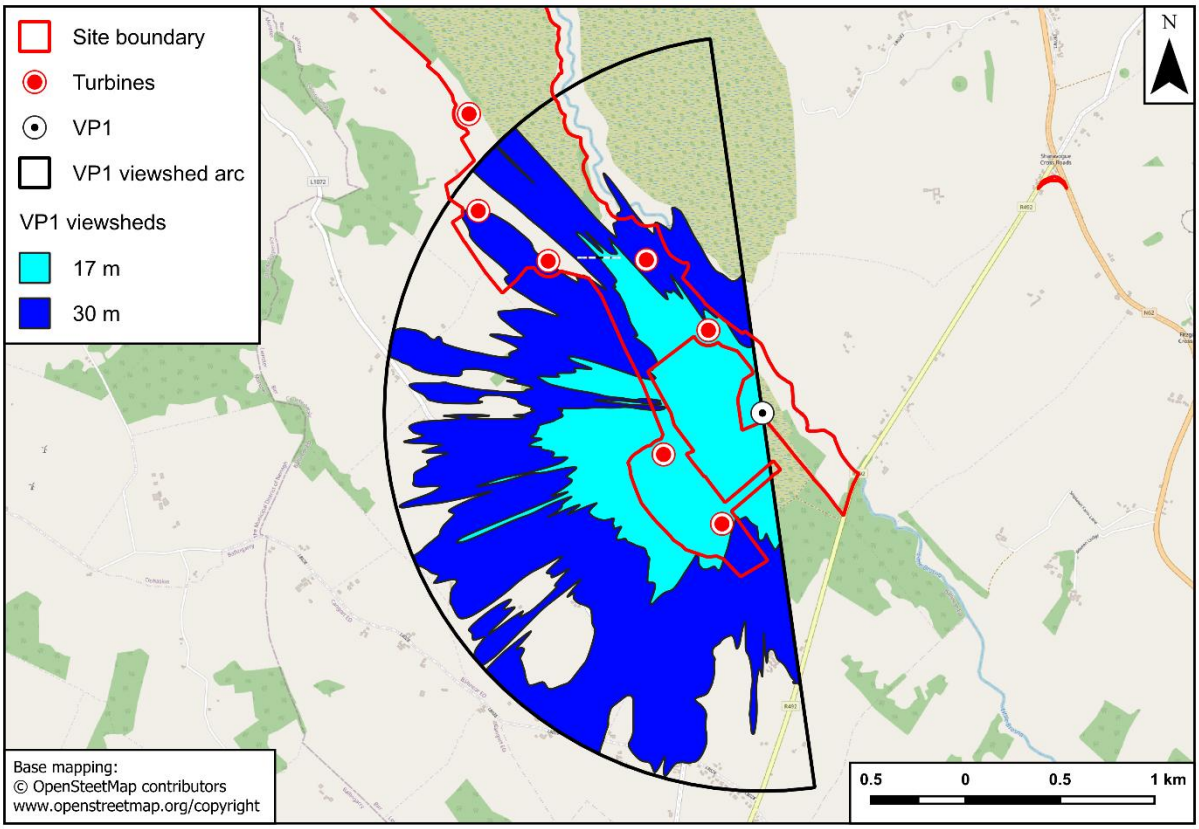
Species	Population	Scale	Geographic extent	Value	Units	Period / Source
Whooper Swan	winter	national	all-Ireland	19,111	individuals	1
		county	Offaly	1,506	individuals	1
		local	Little Brosna Callows	337	individuals	2
Wigeon	winter	national	all-Ireland	66,720	individuals	3
		local	Little Brosna Callows	6,452	individuals	2
Mallard	breeding	national	Republic of Ireland	15,400	pairs	4
		county	Offaly	546	individuals	5
	winter	national	all-Ireland	25,160	individuals	3
		local	Little Brosna Callows	96	individuals	6
Cormorant	breeding	national	all-Ireland	4,685	AON	7
		local	Lough Derg	272	AON	7
	non-breeding	national	all-Ireland	12,310	individuals	3
Little Egret	breeding	national	Republic of Ireland	375	pairs	4
	non-breeding	national	all-Ireland	1,340	individuals	3
Grey Heron	breeding	national	Republic of Ireland	3,087	pairs	4
		county	Offaly	102	individuals	5
	non-breeding	national	all-Ireland	2,490	individuals	3
Sparrowhawk	breeding	national	Republic of Ireland	17,580	individuals	8
		county	Offaly	358	individuals	5
Golden Plover	winter	national	all-Ireland	90,770	individuals	3
		local	Little Brosna Callows	9,247	individuals	2
Lapwing	winter	national	all-Ireland	81,580	individuals	3
		local	Little Brosna Callows	5,637	individuals	2
Black-tailed Godwit	non-breeding	national	all-Ireland	24,790	individuals	3
		local	Little Brosna Callows	3,553	individuals	2
Kestrel	breeding	national	Republic of Ireland	13,660	individuals	9
		county	Offaly	314	individuals	10

1 = 2020, Burke et al., 2021; 2 = 2018/19-2022/23, Burke et al., 2026; 3 = 2018-2023, Burke et al., 2026; 4 = 2008-2011, NPWS, undated; 5 = 2006-2011, derived from Crowe et al. (2014) and Bird Atlas data (see text); 6 = 2018/19-2022/23, mean annual Irish Wetland Bird Survey peak counts; 7 = 2015-2021, Burnell et al., 2023; 8 = 2006-2011, Crowe et al., 2014; 9 = 2006-2011, Crowe et al., 2014 and CBS change for 2008-2023; 10 = 2006-2011, derived from Crowe et al. (2014), Countryside Bird Survey change for 2008-2024 and Bird Atlas data (see text). Data were supplied by the Irish Wetland Bird Survey (I-WeBS), a scheme coordinated by BirdWatch Ireland under contract to the National Parks and Wildlife Service of the Department of Housing, Local Government and Heritage.

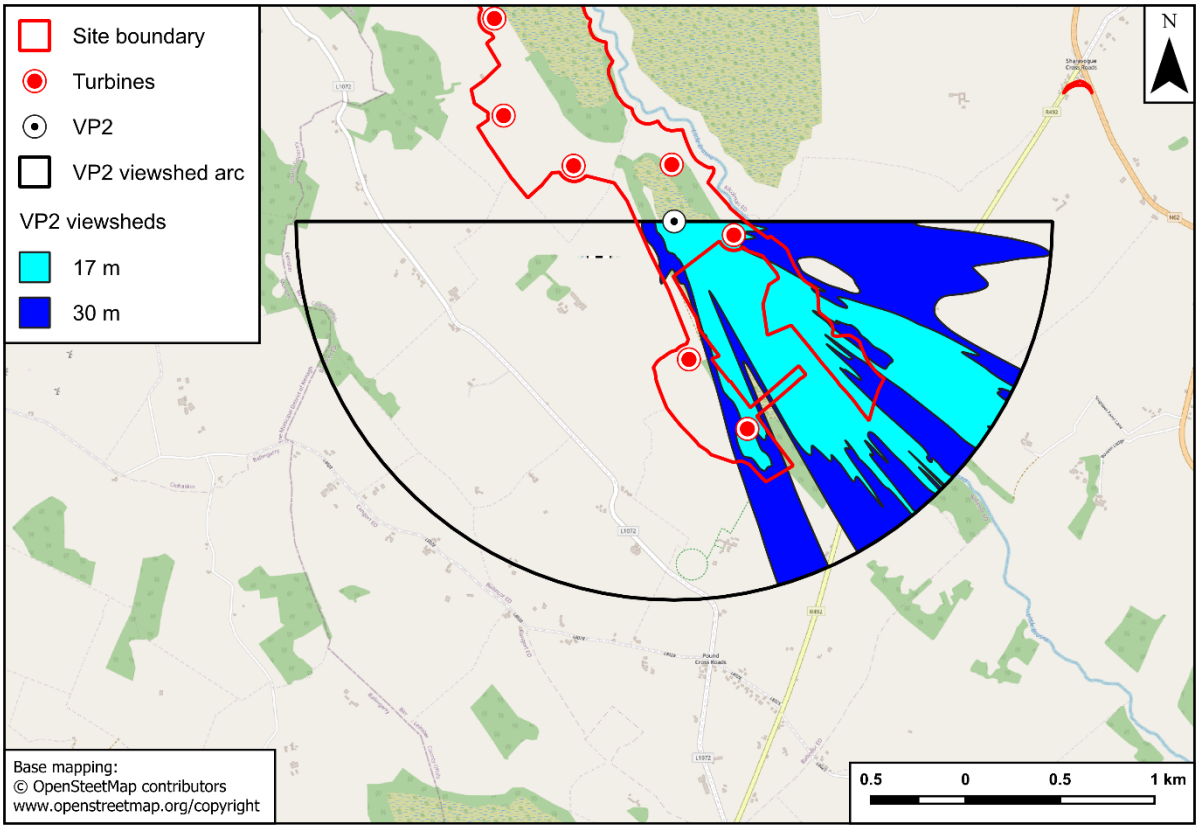
[4] https://c0cre470.caspio.com/dp/4bae3000b11f2454575141d6884b; accessed 01/04/2026.
[5] www.bto.org/understanding-birds/birdfacts; accessed 19/02/2024 and 05/07/2025.



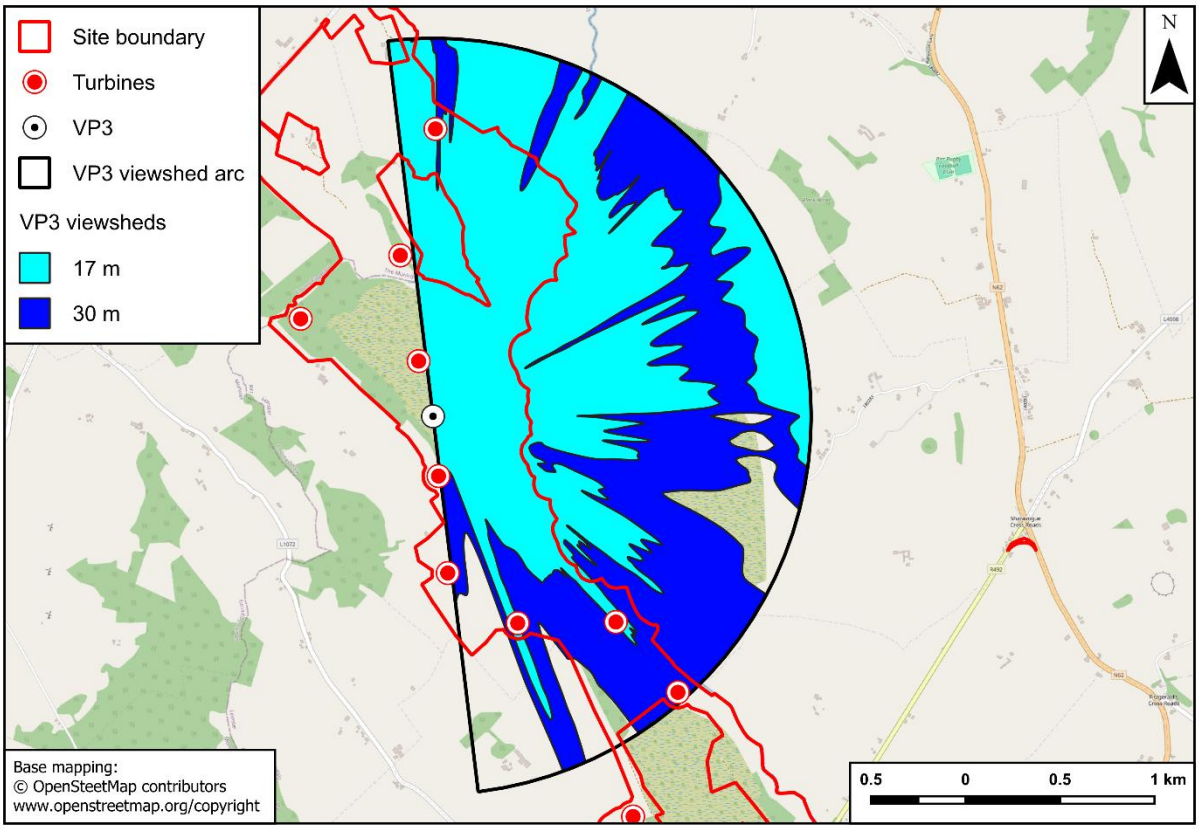
Map 2.1. Vantage point locations.



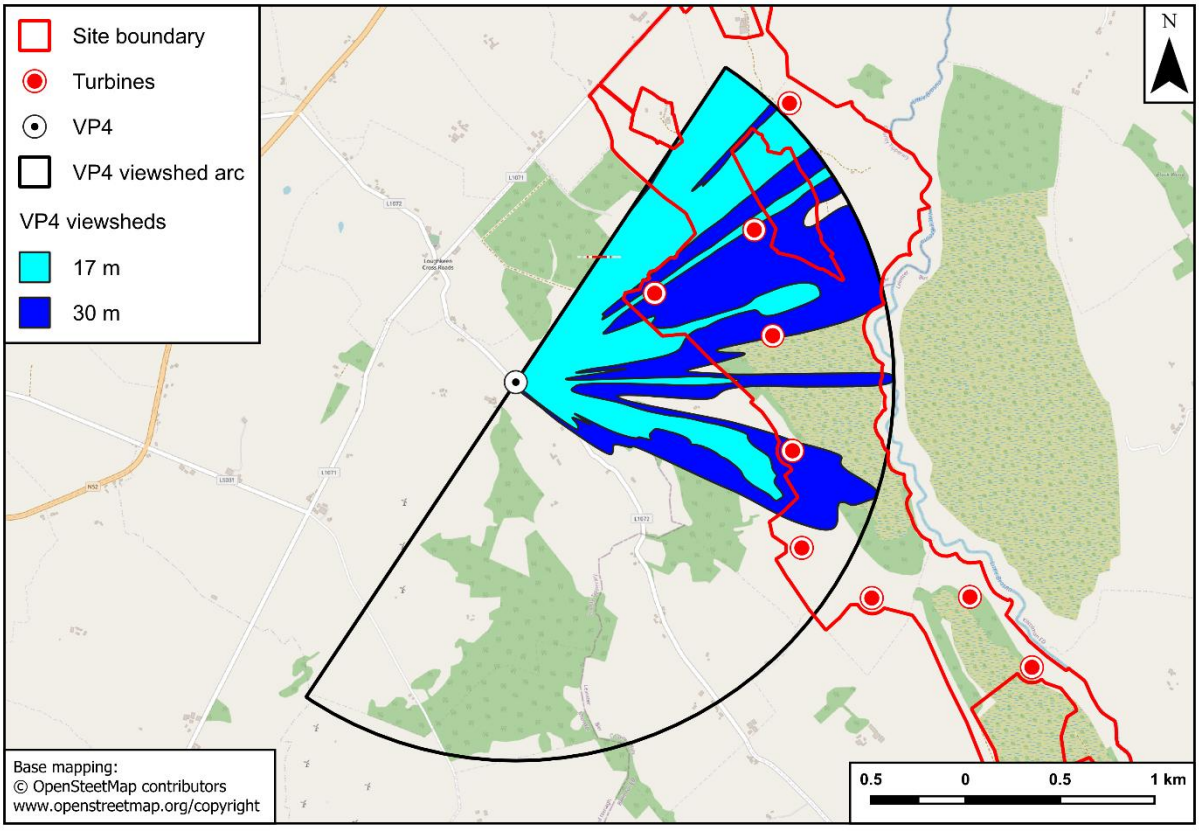
Map 2.2. Ecology Ireland VP1 viewsheds.



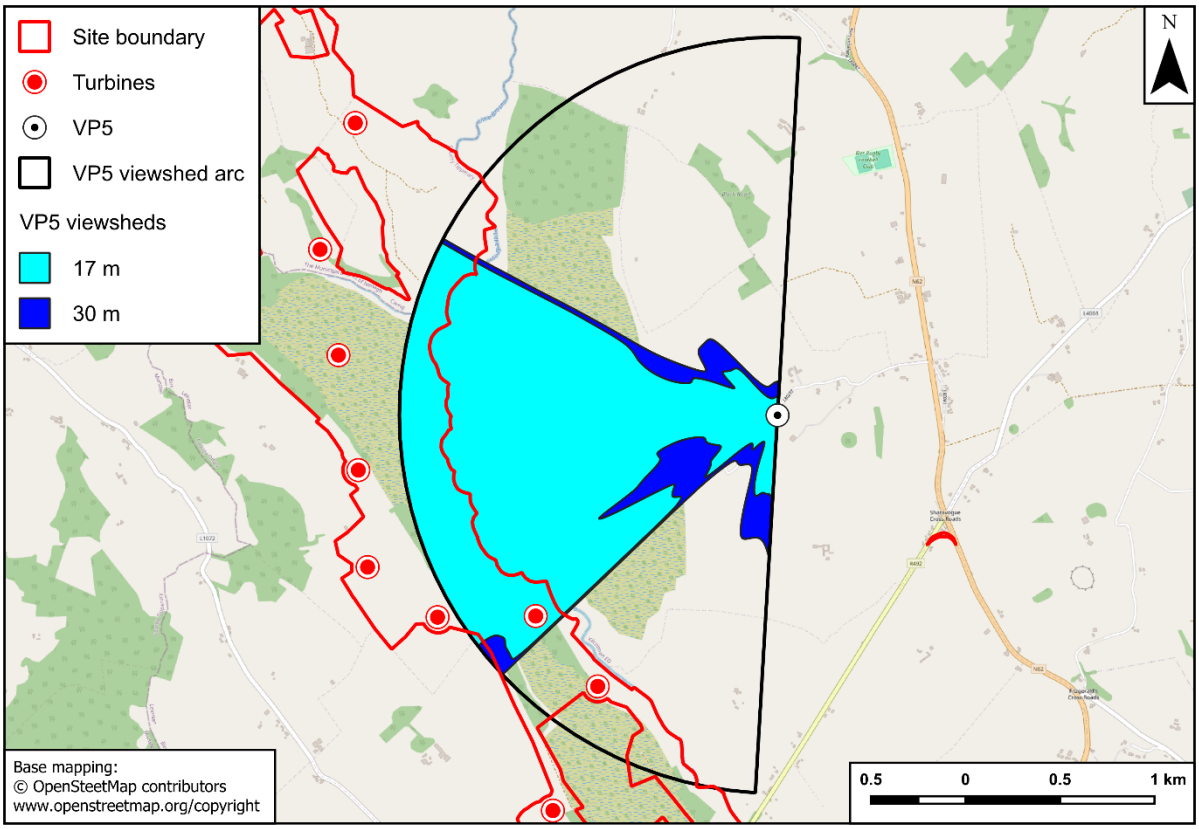
Map 2.3. Ecology Ireland VP2 viewsheds.



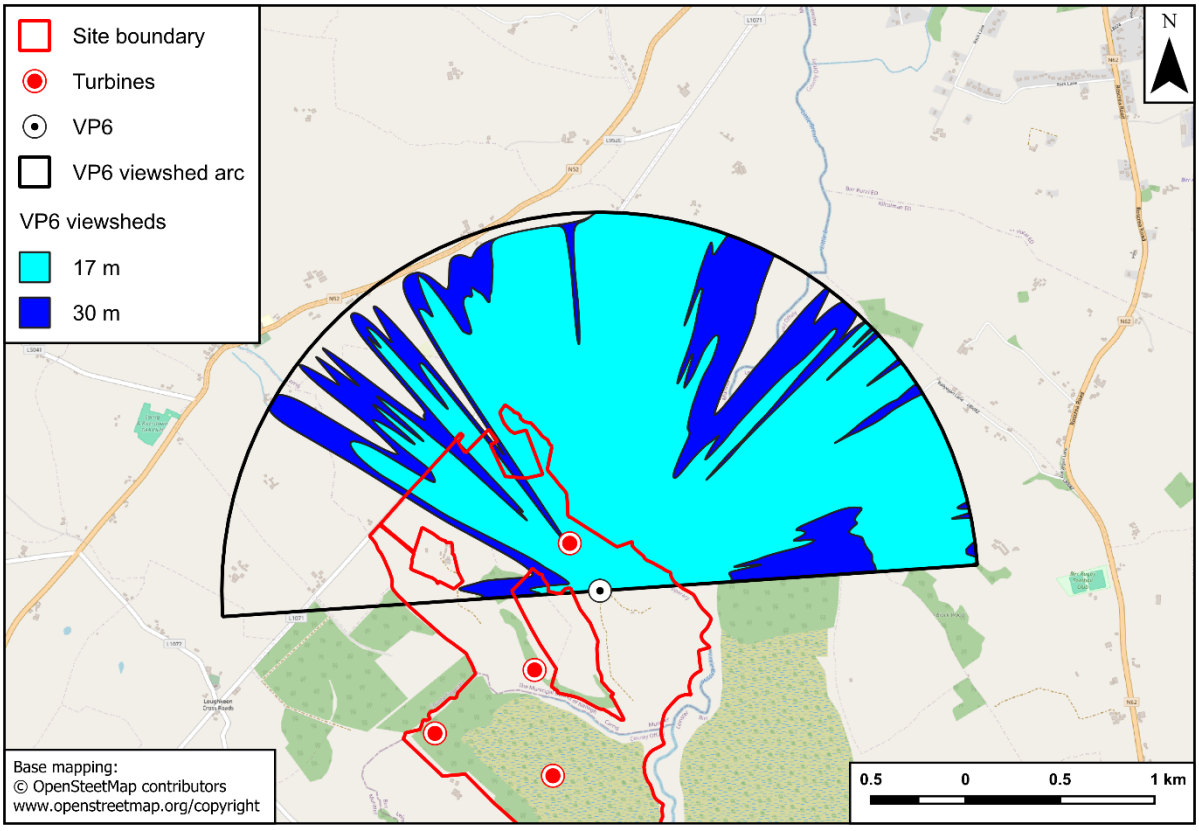
Map 2.4. Ecology Ireland VP3 viewsheds.



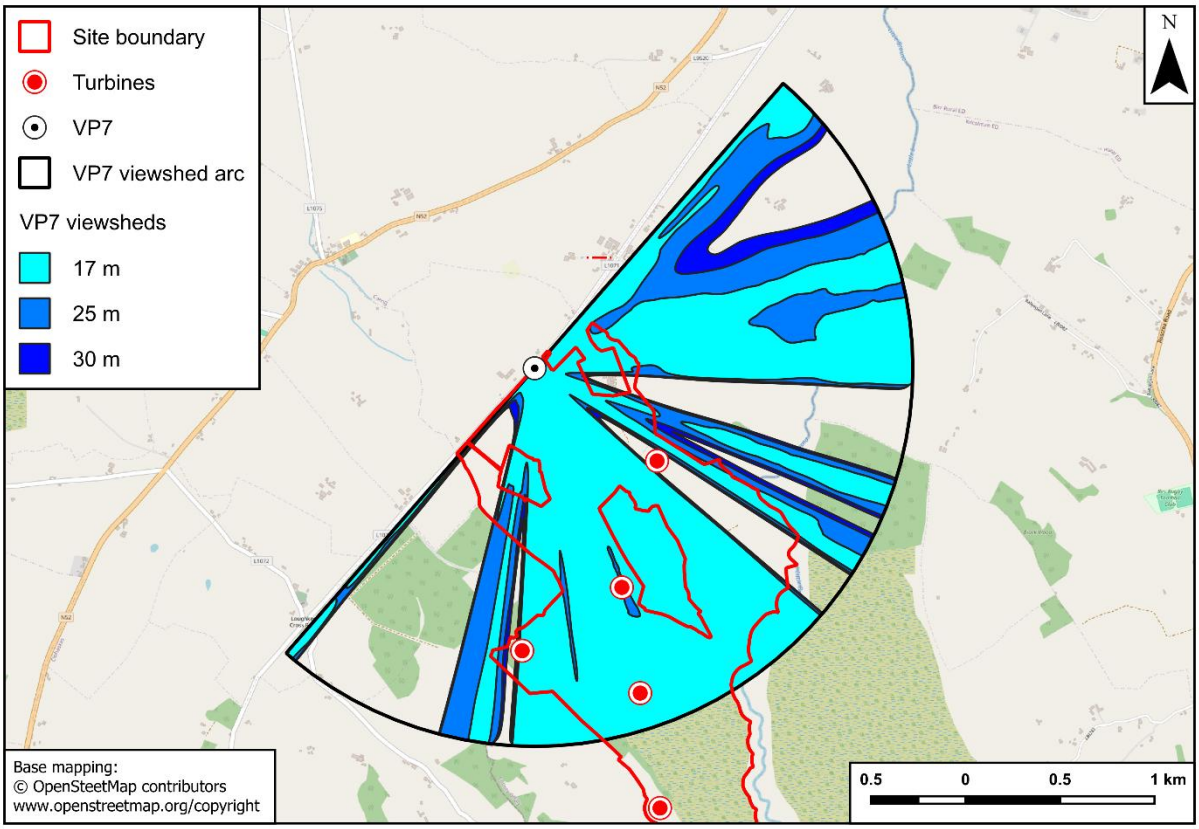
Map 2.5. Ecology Ireland VP4 viewsheds.



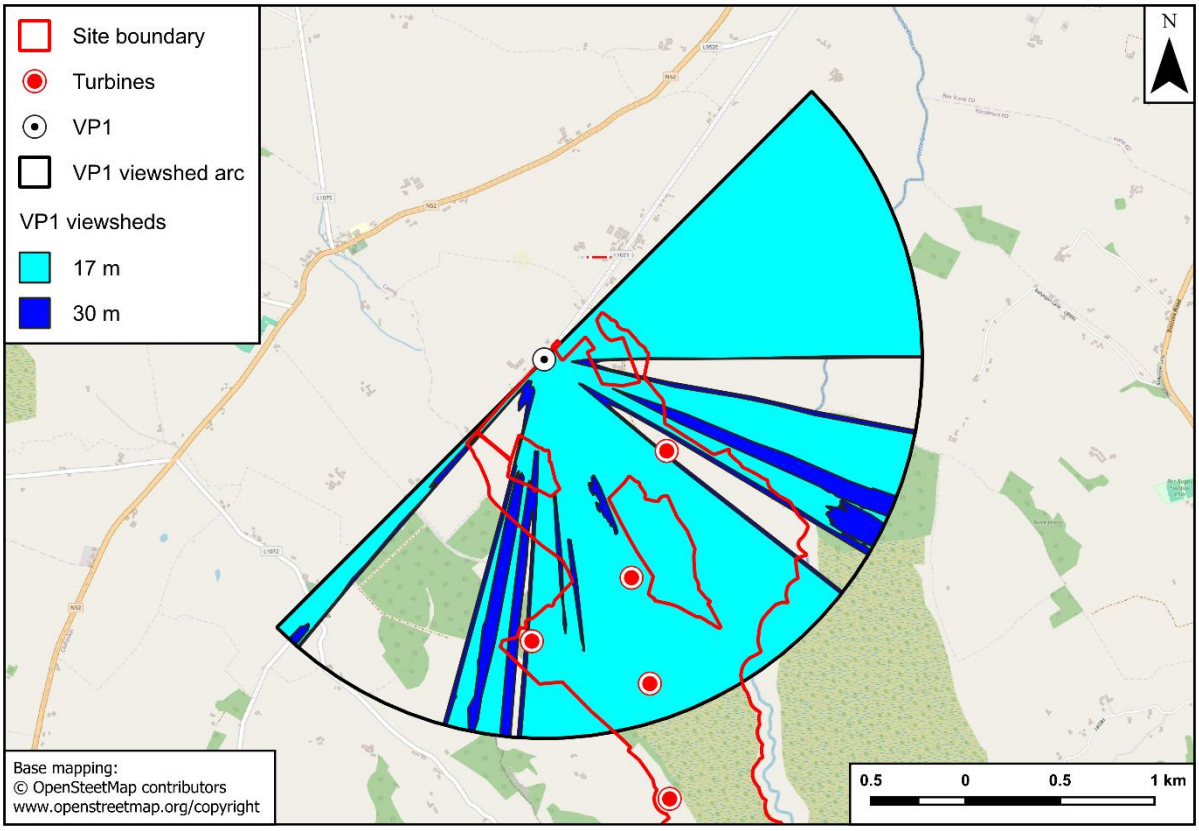
Map 2.6. Ecology Ireland VP5 viewsheds.



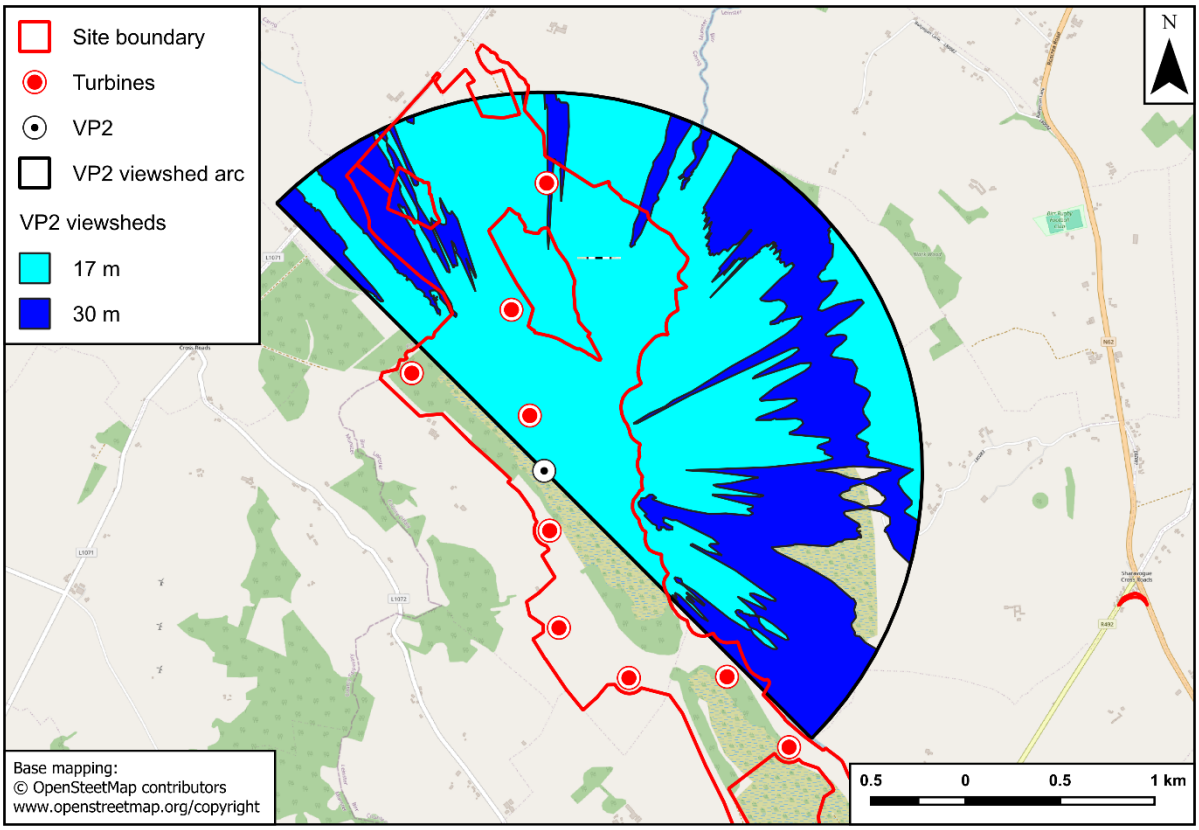
Map 2.7. Ecology Ireland VP6 viewsheds.



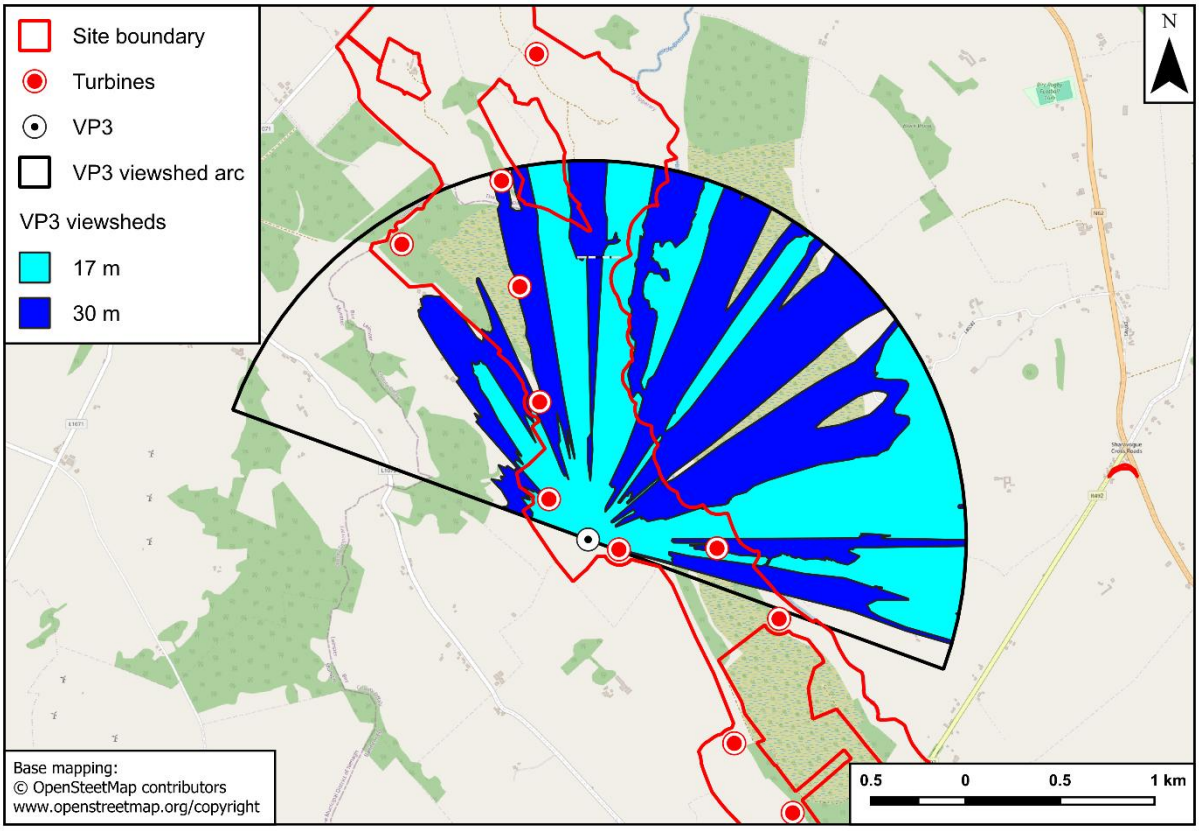
Map 2.8. Ecology Ireland VP7 viewsheds.



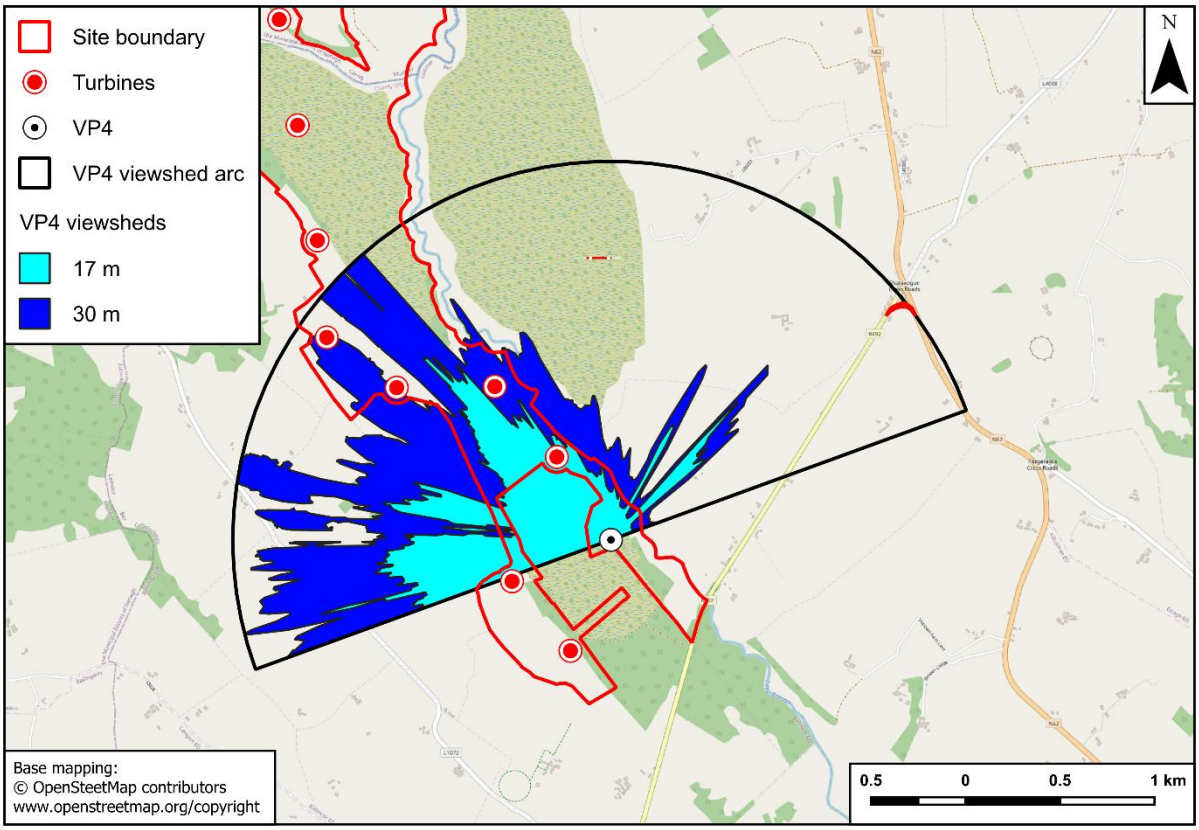
Map 2.9. TOBIN VP1 viewsheds.



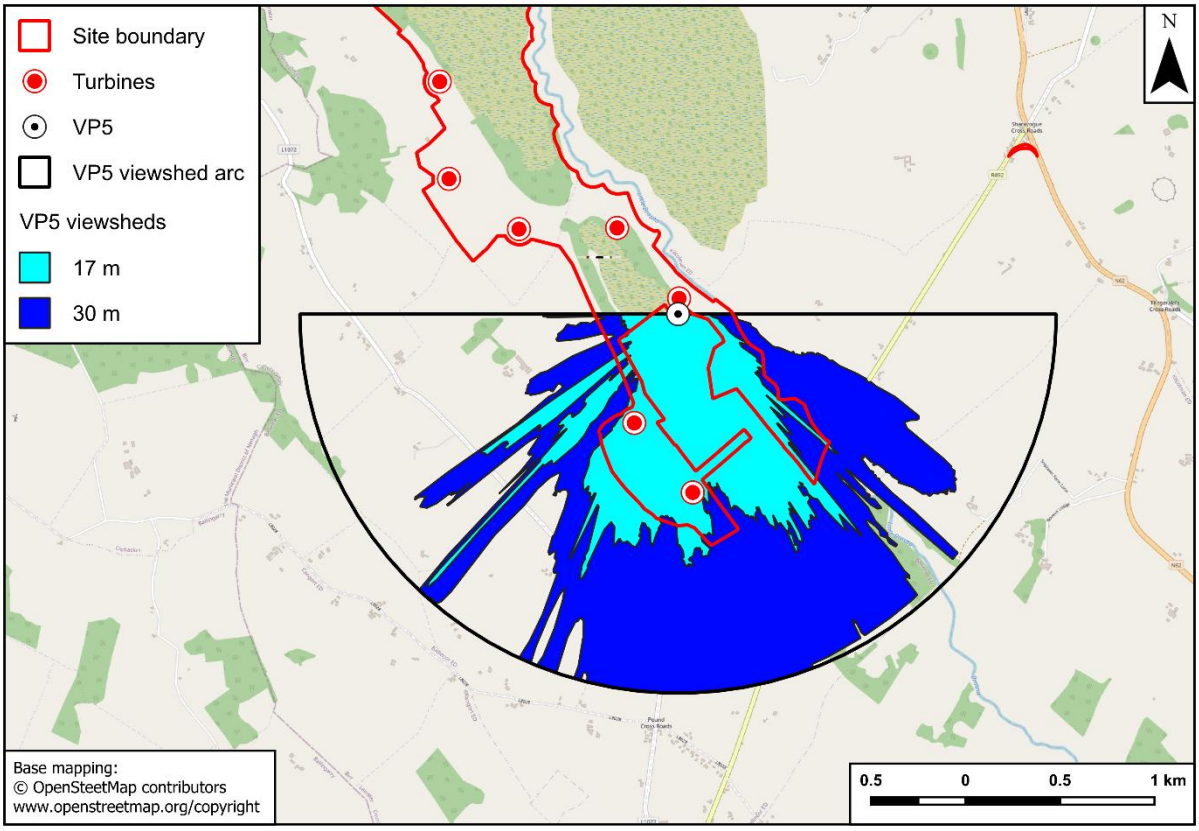
Map 2.10. TOBIN VP2 viewsheds.



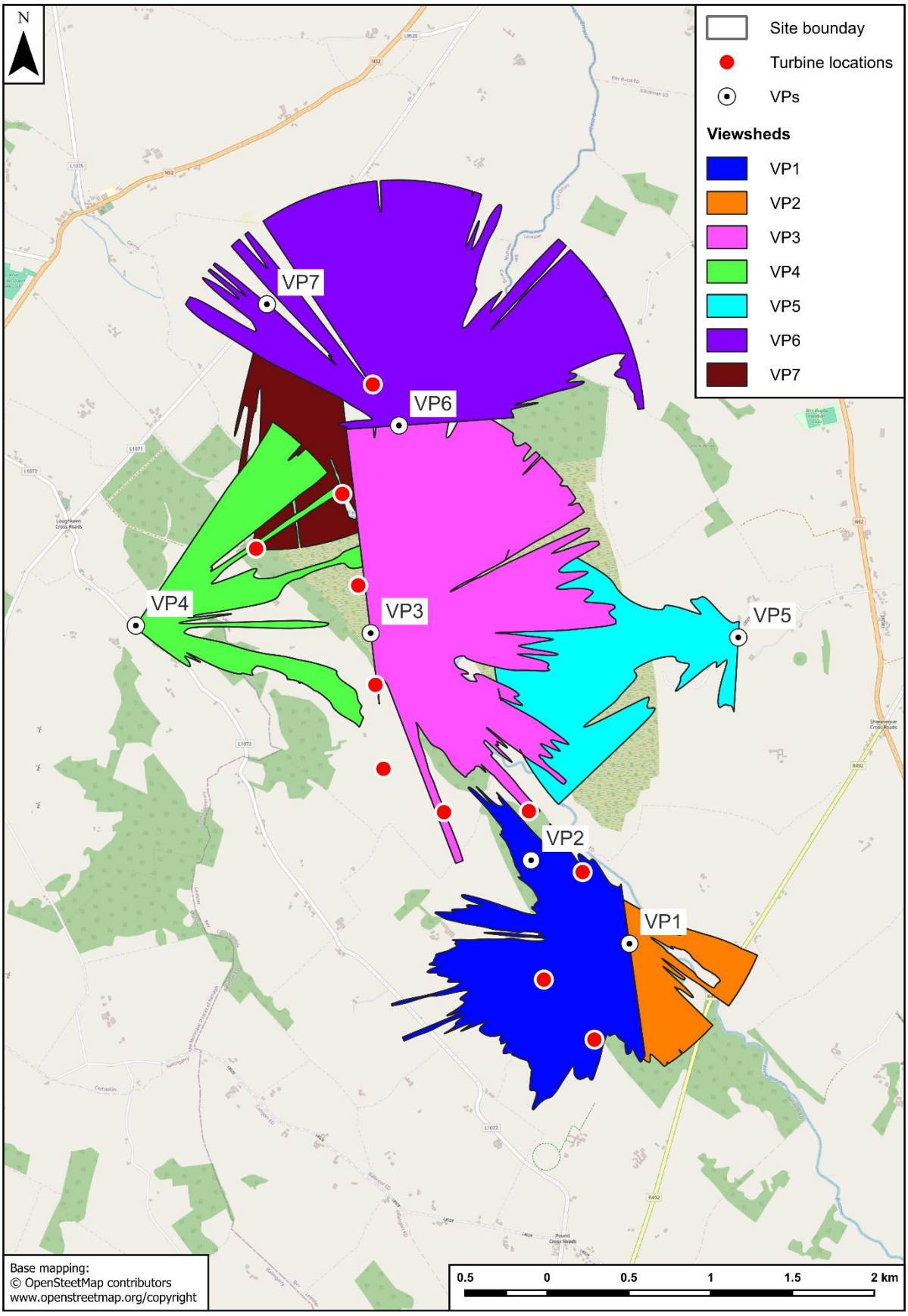
Map 2.11. TOBIN VP3 viewsheds.



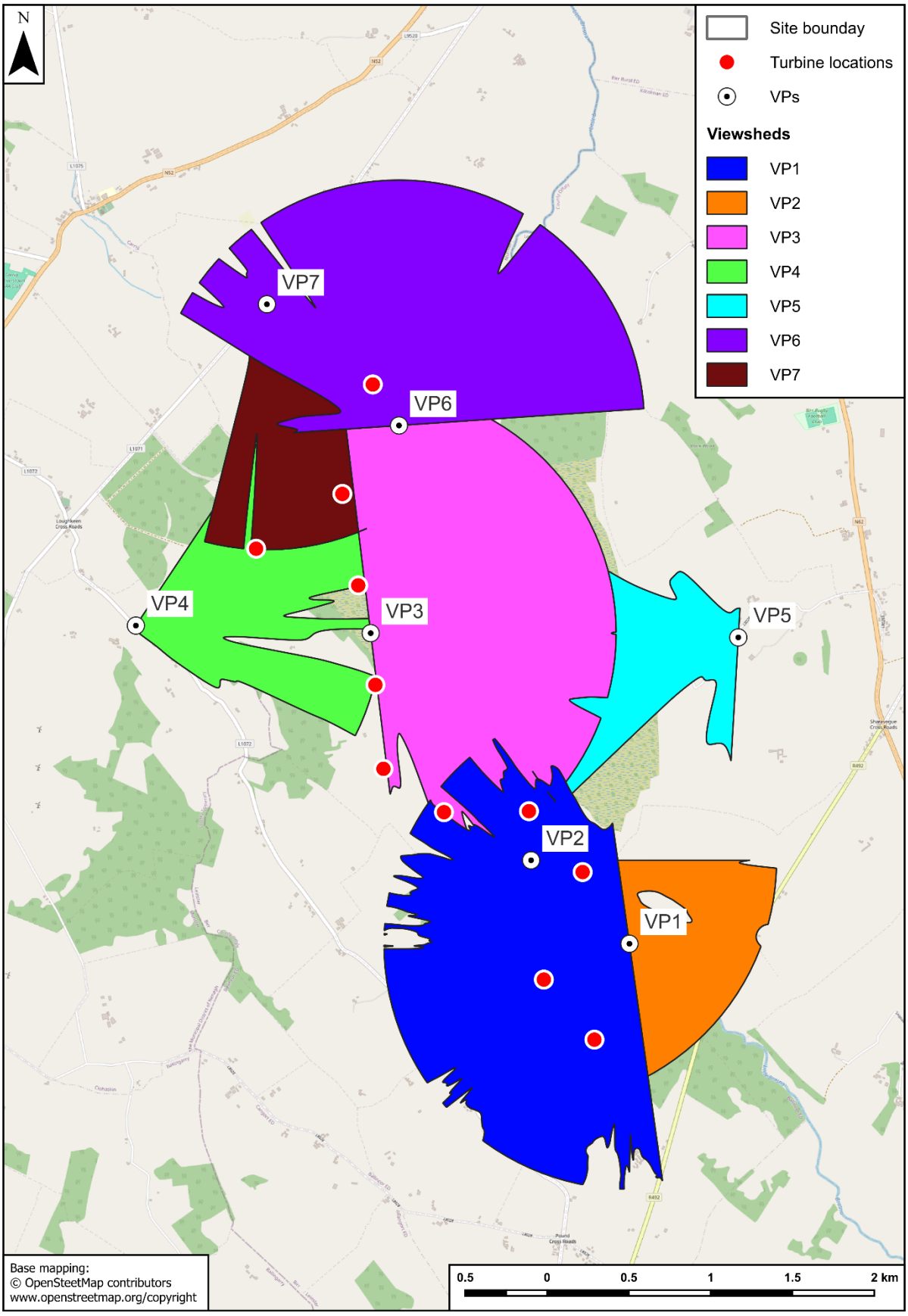
Map 2.12. TOBIN VP4 viewsheds.



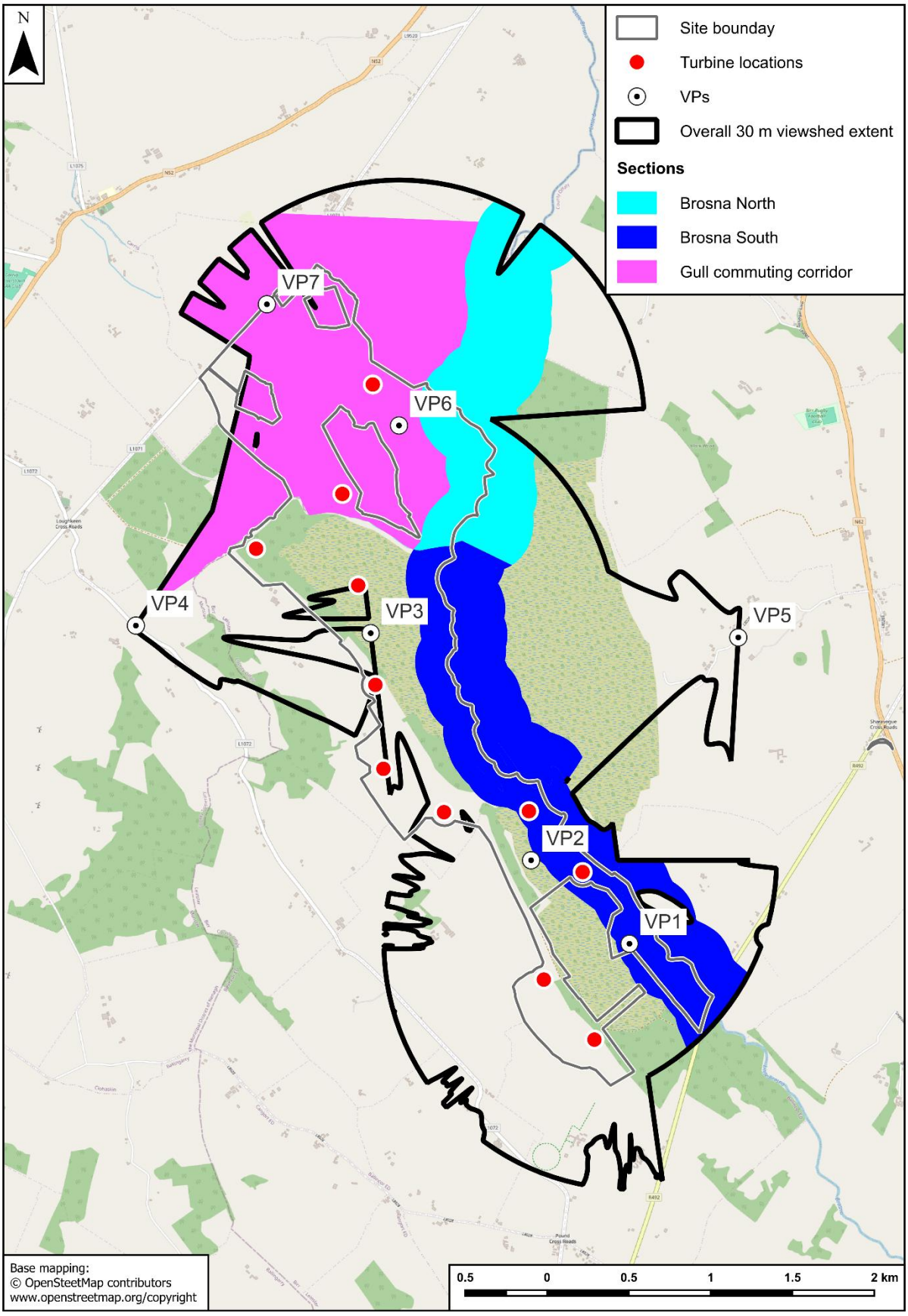
Map 2.13. TOBIN VP5 viewsheds.



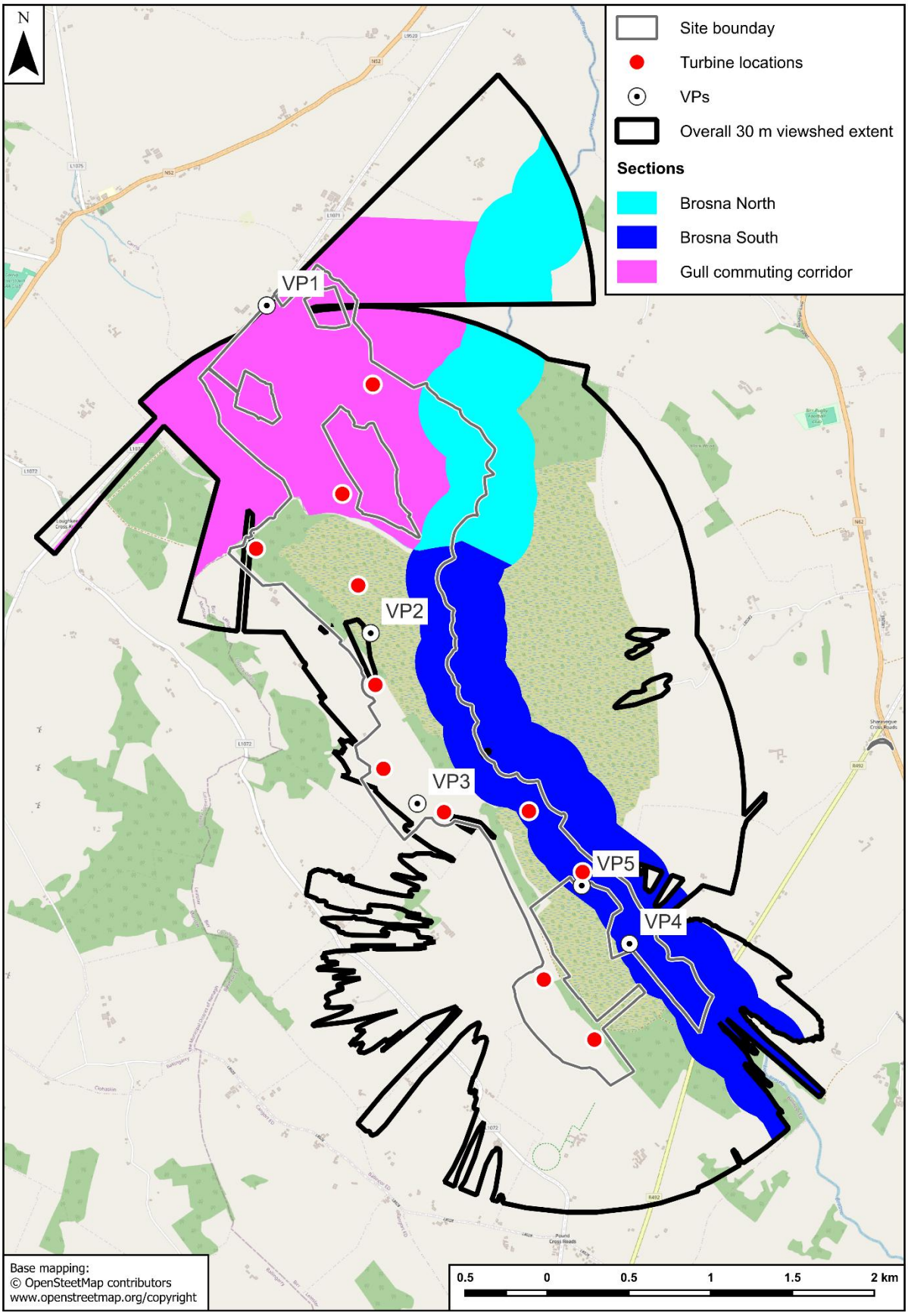
Map 2.14. 1.5 km Ecology Ireland 17 m viewsheds with overlaps removed, as used for the collision risk model.



Map 2.15. 1.5 km Ecology Ireland 30 m viewsheds with overlaps removed, as used for the collision risk model.



Map 2.16. Ecology Ireland viewshed sections used for the spatially-structured models.



Map 2.17. TOBIN viewshed sections used for the spatially-structured models.

3. REVIEW OF THE VANTAGE POINT SURVEY COVERAGE AND RESULTS

3.1. SPATIAL COVERAGE AND VIEWSHEDS

3.1.1. Overall viewshed coverage

3.1.1.1 Ecology Ireland

The overall coverage by the 1.5 km viewsheds with overlaps removed is shown in Map 3.1.

The viewshed coverage at 17 m above ground level included eight turbine locations, while the 30 m coverage included nine turbine locations. The two turbine locations not covered by the 30 m viewshed (T5 and T6) were within 25 m of the viewshed boundary. T5 was also within 25 m of the 17 m viewshed boundary, but T6 was around 200 m from the 17 m viewshed boundary. The other turbine location not covered by the 17 m viewshed (T4) was within 40 m of the viewshed boundary.

The 17 m viewshed coverage included 62% of the 500 m turbine buffer while the 30 m viewshed coverage included 85% of this buffer.

While there is incomplete coverage of the turbine locations and the 500 m buffer around the turbine locations, the gaps in coverage are small and there are not any significant areas lacking coverage.

3.1.1.2 TOBIN

The overall coverage by the TOBIN viewsheds is shown in Map 3.2.

The viewshed coverage at 17 m above ground level included eight turbine locations, while the 30 m viewshed coverage included ten turbine locations. The one turbine location not covered by the 30 m viewshed (T5) was around 10 m from the viewshed boundary and 35 m from the 17 m viewshed boundary. The other two turbine locations not covered by the 17 m viewshed were around 1 m (T7) or 15 m (T8) from the viewshed boundary.

The 17 m viewshed coverage included 68% of the 500 m turbine buffer while the 30 m viewshed coverage included 91% of this buffer.

While there is incomplete coverage of the turbine locations and the 500 m buffer around the turbine locations, the gaps in coverage are small and there are not any significant areas lacking coverage.

3.1.2. Survey effort

3.1.2.1 Ecology Ireland

The mapped flightlines included many that were outside the viewshed arcs, and, at some vantage points, there was a more or less 360° distribution of flightlines around the vantage points. This indicates that the surveyors spent some of the observation time watching areas outside the viewshed arcs. The percentages of the total flight durations corresponding to mapped flightlines within the viewshed arcs at each vantage point varied from 40% at VP6 to 92% at VP7 (Table 3.1). This appears to reflect the orientation of the viewshed arcs in relation to the wind farm site and patterns of bird activity: e.g., the viewshed arc for VP6 faced north away from the main part of the wind farm site and the flooded grasslands along the River Brosna, while VP5 and VP7 were located at the periphery / outside the wind farm site and their viewshed arcs faced the wind farm site.

Table 3.1. Distribution of mapped flight durations from the Ecology Ireland vantage point survey within and outside viewshed arcs at each vantage point.

VP	Total flight durations (seconds)		
	outside	within	percentage within
VP1	12,578	26,841	68%
VP2	20,482	16,083	44%
VP3	12,137	45,737	79%
VP4	18,280	25,615	58%
VP5	3,074	28,182	90%
VP6	28,831	19,534	40%
VP7	2,072	23,225	92%

Flight durations for flightlines that spanned both within and outside the viewshed arcs were split by the ratio of their lengths within and outside the viewshed arcs.

3.1.2.2 TOBIN

The flightlines recorded by the TOBIN vantage point survey were concentrated within the viewshed arcs. A small number of flightlines extended outside the arcs, mainly comprising flightlines that were tracked for a short distance past the boundary of the arc. The pattern of the mapped flightlines did not suggest that surveyors spent significant amounts of time watching areas outside the viewshed arcs.

3.2. VANTAGE POINT WATCHES

3.2.1. Concurrent watches

In the Ecology Ireland vantage point surveys, the majority of watches were carried out concurrently across multiple vantage points. Over 50% of the survey days included watches at all the vantage points, while another 20% included watches at all but one of the vantage points, and all survey days included watches at least two vantage points. On each survey day, all the vantage points watched were covered more or less concurrently with start/finish times not varying by more than ± 10–20 minutes between vantage points. As there were large overlaps between viewsheds, the predominance of concurrent watches created significant issues for the statistical independence of the flight activity sampled at each vantage point (see Section 2.4.2.2).

In the TOBIN vantage point surveys the vantage points were mainly surveyed on separate days in each month. There was only one day when multiple vantage points were surveyed on the same day. On that day TB1 and TB5 were surveyed, but these are at opposite ends of the site with no overlaps in their viewsheds, while the temporal overlap was only 45 minutes out of a total of 6 hours watches at each vantage point.

3.2.2. Durations

All the Ecology Ireland vantage point watches were continuous 6-hour watches without the 30-minute break after three hours recommended by the NatureScot survey guidance (NS 2025a). However, there was no evidence of a decline in recording rate after the first three hours of the watches (Figure 3.1).

3.2.3. Visibility

Both sets of vantage point surveys included some watches with reduced visibility where the full 2 km viewsheds at potential collision height were not fully visible. These comprised 11% of the Ecology Ireland watches and 7% of the TOBIN watches. The latter case comprised two 6-hour surveys (split into 3-hour watches). A repeat survey in good visibility was carried out to replace one of these surveys.

3.3. SPATIAL PATTERNS OF FLIGHT ACTIVITY

3.3.1. Distance effects

The analyses of the full Ecology Ireland dataset showed large reductions in flightline densities with distance from the vantage points (referred to hereafter as distance effects) for small (Group 1) and medium (Group 2) sized species but weak / inconsistent distance effects for large species (Group 3) (Figure 3.2). The peaks in flightline densities in the analysis of large species appear to be associated with the distances of the River Brosna from the vantage points in the viewsheds. When I repeated the analysis, but excluded flight activity that occurred in a 200 m wide corridor along the River Brosna, the large species showed a similar pattern of distance effects to the other groups but with a lower magnitude of decline (Figure 3.3).

The analyses of the TOBIN dataset showed similar patterns, but with wider confidence intervals due to the smaller sample size (Figure 3.4 and Figure 3.5)

The correction factors calculated from the weighted viewshed areas are shown in Table 3.2 and Table 3.3. These indicate the increase in collision risk that results from correcting for the distance effects. The NatureScot correction factors were derived using the theoretical maximum possible viewshed that complies with NatureScot guidance (NatureScot, 2025a). The Ballincor correction factors were derived using the actual viewsheds from the relevant datasets. The NatureScot correction factors allow comparison of the detectability effects across datasets. The Ballincor correction factors indicate the approximate values of the corrections for under-detection of distant flightlines that were applied in Stage F of the collision risk modelling. Note that for each species, the actual correction factor that was applied will vary depending on the species distribution between the vantage points included in the model.

The NatureScot correction factors had higher values because the NatureScot viewsheds are perfect semi-circles extending to 2 km from the vantage points, while most real viewsheds have some reduction in coverage in their more distant parts. The correction factors for the 17 m viewsheds were smaller than those for the 30 m viewsheds because the 17 m viewsheds had more reduced coverage in their more distant sections compared to the 30 m viewsheds.

The correction factors for the Ecology Ireland and TOBIN datasets are not directly comparable due to the differences in the groupings of species used for the analyses (see Section 2.5.2).

Table 3.2. Correction factors to adjust for under-detection of distant flightlines in the Ecology Ireland dataset.

Correction factor	Group1	Group2	Group3
NatureScot correction	4.21	3.24	2.26
Ballincor correction (17 m)	3.23	2.59	1.99
Ballincor correction (30 m)	3.73	2.93	2.13

The correction factors were calculated from the analyses that excluded flight activity within the 200 m Brosna corridor. Group1 = small species; Group2 = medium-sized species; Group3 = large species.

Table 3.3. Correction factors to adjust for under-detection of distant flightlines in the TOBIN dataset.

Correction factor	Group1	Group2
NatureScot correction	3.26	3.25
Ballincor correction (17 m)	2.65	2.55
Ballincor correction (30 m)	2.96	2.90

The correction factors were calculated from the analyses that excluded flight activity within the 200 m Brosna corridor. Group1 = small species; Group2 = large species.

3.3.2. Species-specific spatial structure

Eleven species showed clear spatial structure in the distribution of their flight activity: Mute Swan, Whooper Swan, Wigeon, Mallard, Cormorant, Little Egret, Grey Heron, Lapwing, Black-tailed Godwit, Black-headed Gull and Lesser Black-backed Gull (Map 3.3-Map 3.13). This was mainly associated with movement along the River Brosna, as well as with feeding on flooded fields

adjacent to the River Brosna, and a commuting corridor in the north-western section of the wind farm site for Black-headed Gull and Lesser Black-backed Gull.

Calculations of flight activity densities showed large differences between sections defined based on the patterns described above (Table 3.4). Most species showed much higher densities in the northern and/or southern parts of a 500 m wide corridor along the River Brosna, and, for the gulls, in a commuting corridor, compared to elsewhere in the survey area. The densities of Cormorant and Grey Heron were higher in the southern part of the Brosna corridor, compared to the northern part. For Whooper Swan, Wigeon and the gulls, the densities in the southern part of the Brosna corridor were not higher than elsewhere in the survey area. The gull densities were higher in the commuting corridor compared to the remainder of the survey area, with the exception of Lesser Black-backed Gull densities using the 30 m viewsheds.

Table 3.4. Mean flight activity densities at potential collision height (birds/km^2/month) in different sections of the survey area.

Species	Viewshed height	Brosna N	Brosna S	Commuting corridor	Remainder
Mute Swan	17 m	69	109	15	30
	30 m	10	48	9	10
Whooper Swan	17 m	901	161	22	191
	30 m	508	242	5	111
Wigeon	17 m	8,434	212	931	1,058
	30 m	4,512	40	464	423
Mallard	17 m	240	442	29	133
	30 m	186	285	14	70
Cormorant	17 m	538	1,520	45	328
	30 m	277	1,216	9	264
Little Egret	17 m	103	116	35	38
	30 m	2	8	0	2
Grey Heron	17 m	73	172	52	57
	30 m	62	113	16	40
Lapwing	17 m	7,845	1,483	1,259	1,363
	30 m	4,128	1,142	895	762
Black-tailed Godwit	17 m	10,573	10,973	109	3,377
	30 m	9,031	6,441	97	1,887
Black-headed Gull	17 m	3,106	215	4,010	632
	30 m	3,053	138	1,612	512
Lesser Black-backed Gull	17 m	4,575	3,330	1,581	1,333
	30 m	2,696	369	373	382

The high densities of Mute Swan, Whooper Swan, Wigeon, Mallard, Little Egret, Lapwing and Black-tailed Godwit in the northern part of the Brosna corridor were associated with birds feeding on flooded grassland adjacent to the western bank of the River Brosna in this section. The high densities of the gulls in this section may also have been similarly associated but they could also have reflected a commuting route along the River Brosna and through the commuting corridor. The high densities of various species in the southern part of the Brosna corridor are likely to have been largely due to commuting routes along the river, although, for Cormorant, they would also have been influenced by the presence of roost sites.

There are no turbine locations within, or close to, the northern part of the Brosna corridor. Therefore, this analysis suggested that the flight activity within this section should be excluded from the spatially-structured models. For Mute Swan, Mallard, Cormorant, Little Egret and Grey

Heron, the analysis suggested that the southern part of the Brosna corridor should be treated separately from the remainder of the site in the spatially-structured models. For Black-headed Gull and Lesser Black-backed Gull, the analysis suggested that the commuting corridor should be treated separately from the remainder of the site in the spatially-structured models.

3.3.3. Flight directions

The proportion of upwind flight activity recorded during the vantage point watches ranged from 0.38 for Hen Harrier to 0.57 for Little Egret (Table 3.5). For most species, the bootstrap confidence intervals overlapped 0.5, indicating no evidence of directional bias. Two species (Grey Heron and Buzzard) had confidence intervals that narrowly excluded 0.5, but the deviations were small (0.40–0.46) and the limits were very close to 0.5. Given the number of species examined, these marginal results may reflect sampling variation rather than genuine directional preferences.

Table 3.5. Length-weighted upwind flight proportions derived from mapped flightlines, with 95% cluster-bootstrap confidence intervals.

Species	Number of flights	Upwind proportion	Lower 95% CI	Upper 95% CI	Directional bias
Mute Swan	41	0.48	0.33	0.64	NO
Whooper Swan	42	0.43	0.27	0.58	NO
Mallard	122	0.52	0.45	0.59	NO
Cormorant	301	0.54	0.49	0.58	NO
Little Egret	108	0.57	0.49	0.65	NO
Grey Heron	126	0.40	0.32	0.48	YES
Hen Harrier	12	0.38	0.16	0.60	NO
Sparrowhawk	80	0.55	0.47	0.63	NO
Buzzard	260	0.46	0.43	0.49	YES
Golden Plover	51	0.43	0.34	0.52	NO
Lapwing	44	0.56	0.47	0.65	NO
Black-headed Gull	87	0.41	0.32	0.51	NO
Lesser Black-backed Gull	115	0.52	0.43	0.61	NO
Kestrel	230	0.51	0.47	0.55	NO
Merlin	30	0.55	0.36	0.74	NO
Peregrine	25	0.43	0.29	0.59	NO

Upwind proportions are weighted by flightline segment length. Confidence intervals were derived using a flight-level cluster bootstrap (5,000 replicates). Upwind = bearings of 135-315°. Downwind = bearings of 0-135° and 315-360°.

3.4. TEMPORAL PATTERNS OF FLIGHT ACTIVITY

3.4.1. Seasonal patterns

The recording rates of regularly occurring species across the nine seasons of vantage point surveys are compared in Table 3.6. The recording rates are used, rather than actual number of records, to standardise comparisons across seasons with variable survey effort.

Allowing for the level of variation that would be expected from sampling effects, the recording rates of most species were fairly consistent across the eight seasons of the vantage point surveys. However, there was a large increase in the Little Egret recording rate from winter 2022/23. The recording rates of several species were much higher in winter 2025/26, but this may reflect differences in the vantage point layout, rather than actual seasonal differences.

Table 3.6. Seasonal recording rate (records / 200 hours) of flightline records during the vantage point survey.

Species	2020 summer	2020/21 winter	2021 summer	2021/22 winter	2022/23 winter	2023 summer	2023/24 winter	2024 summer	2025/26 winter
Mute Swan	1	0	0	3	6	0	2	5	8
Whooper Swan	0	1	0	4	11	0	6	0	13
Wigeon	0	0	0	0	0	0	1	0	12
Mallard	3	0	3	3	8	12	11	5	24
Cormorant	25	38	5	66	40	13	16	27	91
Little Egret	0	1	0	0	7	2	6	1	15
Grey Heron	11	1	4	4	13	9	5	12	16
Sparrow-hawk	0	11	1	6	15	10	2	4	8
Buzzard	52	27	27	27	38	54	12	54	42
Golden Plover	0	8	0	2	8	2	6	1	24
Lapwing	0	16	0	4	8	0	2	0	20
Black-tailed Godwit	0	0	0	0	1	0	0	0	3
Black-headed Gull	0	7	4	1	17	2	4	0	30
Lesser Black-backed Gull	9	13	1	2	6	17	1	17	28
Kestrel	32	26	9	19	21	42	8	24	39
Merlin	0	4	0	2	3	1	1	2	1
Peregrine	0	2	0	1	3	2	3	3	6

The data in this table is derived from the Ecology Ireland vantage point survey records after processing against the 1.5 km viewsheds with overlaps removed, and all records from the TOBIN vantage point survey. Additional species recorded with a total of less than 10 records, or outside the Ecology Ireland 1.5 km viewsheds: White-fronted Goose, Teal, Pintail, Shoveler, Little Grebe, Moorhen, Curlew, Jack Snipe, Herring Gull, Great Black-backed Gull, Kingfisher, Unidentified swan, Unidentified goose, Unidentified wader, Unidentified gull. Black-tailed Godwit had a total of < 10 records but are included in this table because of the large collision risks that those records generated.

3.4.2. Monthly variation

The monthly recording rates of regularly occurring species are compared in Table 3.7. The recording rates are used, rather than actual number of records, to standardise comparisons across months with variable survey effort.

For species with low numbers of records, any apparent seasonal variation in recording rates may not be reliable, as this variation may just reflect random sampling effects. Of the more frequently recorded species, several show clear seasonal patterns of variation.

Whooper Swan and Golden Plover are winter visitors and their main seasonal occurrence patterns were typical for these species in Ireland: October–March for Whooper Swan and September–March for Golden Plover. Wigeon is also a winter visitor. It was recorded between November and February, which is shorter than its typical wintering period in Ireland (October–March) but reflected the low number of records. While Lapwing breeds in this part of Ireland, it was a winter visitor to the wind farm site (October–March[6]). Mute Swan, Cormorant, Little Egret and Black-headed Gull were recorded throughout the year but were more frequent in winter. Lesser Black-backed Gull was most frequent in autumn (July–October) while there was also a high recording rate in spring; these patterns are typical of the timings of its autumn post-breeding dispersal / migration and spring migration in Ireland.

[6] There was a single record in July but it was not included in the dataset used for the monthly analyses (see Section 2.5.5).

Table 3.7. Monthly recording rate (records / 40 hours) of flightline records during the vantage point survey.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mute Swan	1.4	0.9	0.3	0.0	0.2	0.0	0.0	0.6	1.4	0.4	0.2	1.4
Whooper Swan	2.3	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.2	2.3
Wigeon	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.5
Mallard	0.0	4.6	3.6	1.3	0.9	1.4	2.2	0.6	1.4	2.7	0.2	0.0
Cormorant	12.9	6.3	3.1	1.3	4.3	2.2	3.0	3.6	6.7	6.3	14.2	12.9
Little Egret	1.8	0.7	0.6	0.0	0.2	0.0	0.3	0.6	0.0	1.2	1.4	1.8
Grey Heron	1.4	2.8	1.9	0.7	2.8	1.7	0.8	2.5	1.4	2.0	0.7	1.4
Sparrowhawk	1.1	1.3	2.2	0.0	1.3	1.9	0.3	0.6	0.5	1.2	2.5	1.1
Buzzard	2.1	7.4	14.2	3.3	10.9	16.7	9.7	5.3	6.7	4.7	3.2	2.1
Golden Plover	1.6	2.2	3.3	0.0	0.0	0.0	0.0	0.0	1.4	0.8	1.6	1.6
Lapwing	0.5	2.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.7	3.9	0.5
Black-tailed Godwit	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Black-headed Gull	1.8	0.9	0.0	0.0	0.2	0.8	0.3	0.0	0.0	0.0	4.1	1.8
Lesser Black-backed Gull	0.7	0.6	2.2	0.0	0.9	1.1	3.6	5.0	3.8	6.7	3.0	0.7
Kestrel	2.3	3.9	6.7	2.0	4.1	8.1	8.3	3.6	7.1	3.9	3.0	2.3
Merlin	0.7	0.6	0.6	0.0	0.2	0.3	0.0	0.3	0.0	0.8	0.0	0.7
Peregrine	0.2	0.7	0.0	0.0	0.2	0.3	0.3	0.0	1.0	1.2	0.7	0.2

The data in this table is derived from the Ecology Ireland vantage point survey records after processing against the 1.5 km viewsheds with overlaps removed, and all records from the TOBIN vantage point survey. Additional species recorded with a total of less than 10 records, or outside the Ecology Ireland 1.5 km viewsheds: White-fronted Goose, Teal, Pintail, Shoveler, Little Grebe, Moorhen, Curlew, Jack Snipe, Herring Gull, Great Black-backed Gull, Kingfisher, Unidentified swan, Unidentified goose, Unidentified wader, Unidentified gull. Black-tailed Godwit had a total of < 10 records but are included in this table because of the large collision risks that those records generated.

3.4.3. Diel patterns

The diel distribution of the survey effort is compared to the diel distribution of total daylight hours in Table 3.8 and Table 3.9.

The Ecology Ireland survey effort was heavily concentrated in the middle of the day. In summer there was no survey coverage during the first hour after sunrise or the two hours before sunset, and only 15 minutes of survey effort (across all vantage points and survey seasons) in the 1–2 hour period after sunrise. In winter the survey effort in the hour after sunrise and in the two hours before sunset was lower than in the remainder of the daylight hours.

The TOBIN survey effort was more evenly distributed (Table 3.9). There was still a concentration in the middle of the day, which is hard to avoid for winter vantage point surveys. However, there was good coverage of the early morning and evening, including the hours before sunrise and after sunset, which are potentially important for commuting swans and geese (NS 2025a).

The variation in the diel recording rates of the species included in the collision risk assessment (Section 5) is summarised in Figure 3.6–Figure 3.8. However, the lack of Ecology Ireland survey effort in the early morning in summer and in the evening in both seasons (as described above) limits the usefulness of these analyses.

In winter, there were higher recording rates in the Ecology Ireland dataset of Mute Swan and Whooper Swan in the early morning, which could have been due to birds commuting from nocturnal roost sites. There was not sufficient survey effort to calculate recording rates for the

evening period in the Ecology Ireland dataset. The TOBIN dataset did not show higher recording rates in either the early morning or evening, although it had sufficient temporal coverage in both periods to detect such patterns if they existed.

Cormorant showed a more consistent pattern, with higher rates in the early morning and afternoon in both datasets and in the evening in the TOBIN dataset. This pattern is consistent with a typical pattern of Cormorants commuting from roost sites in a concentrated pattern in the morning with a more dispersed pattern of return to roost sites in the afternoon and evening once they had finished feeding for the day.

Table 3.8. Diel distribution of survey effort during the summer (April–September) vantage point surveys.

Hour	Daylight hours	VP minutes	VP minutes / daylight hour
Sunrise - 1	183	0	0
Sunrise	183	0	0
Sunrise + 1	183	15	0.1
Sunrise + 2	183	776	4.2
Sunrise + 3	183	2135	11.7
Sunrise + 4	183	5270	28.8
Sunrise + 5	183	7582	41.5
Sunrise + 6	282	12669	44.9
Solar Noon			
Sunset + 6	282	12227	43.3
Sunset + 5	183	3655	20
Sunset + 4	183	1268	6.9
Sunset + 3	183	219	1.2
Sunset + 2	183	0	0
Sunset + 1	183	0	0
Sunset	183	0	0
Sunset - 1	183	0	0

The Sunrise + 6 and Sunset – 6 hours included all the time between six hours after sunrise, or six hours before sunset, and solar noon. Sunrise and sunset times were calculated using the suncalc package (Thieurmel and Elmarhraoui, 2022) in R version 4.4.4 (R Core Team, 2024).

Table 3.9. Diel distribution of survey effort during the winter (October–March) vantage point surveys.

Hour	Daylight hours	VP minutes		VP minutes / daylight hour	
		Ecology Ireland	TOBIN	Ecology Ireland	TOBIN
Sunrise - 1	182	152	612	0.8	3.4
Sunrise	182	2326	942	12.8	5.2
Sunrise + 1	182	5917	1007	32.5	5.5
Sunrise + 2	182	7652	712	42.0	3.9
Sunrise + 3	317	13850	2274	43.7	7.2
Solar Noon					
Sunset + 3	317	12450	2256	39.3	7.1
Sunset + 2	182	4993	994	27.4	5.5
Sunset + 1	182	1984	956	10.9	5.3
Sunset	182	16	869	0.1	4.8
Sunset - 1	182	0	538	0.0	3.0

The Sunrise + 3 and Sunset – 3 hours included all the time between three hours after sunrise, or three hours before sunset, and solar noon. Sunrise and sunset times were calculated using the suncalc package (Thieurmel and Elmarhraoui, 2022) in R version 4.4.4 (R Core Team, 2024).

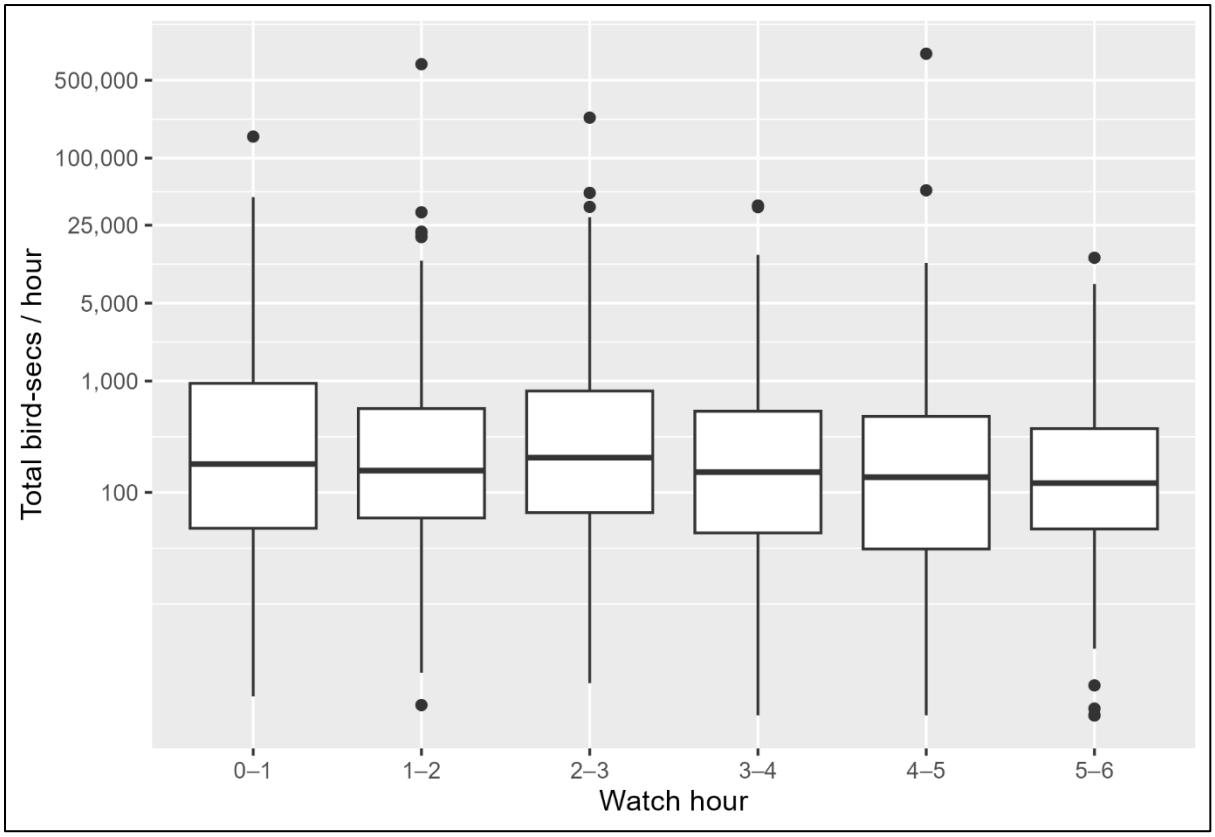


Figure 3.1. Flight activity recording rate per watch hour in 6-hour Ecology Ireland vantage point watches.

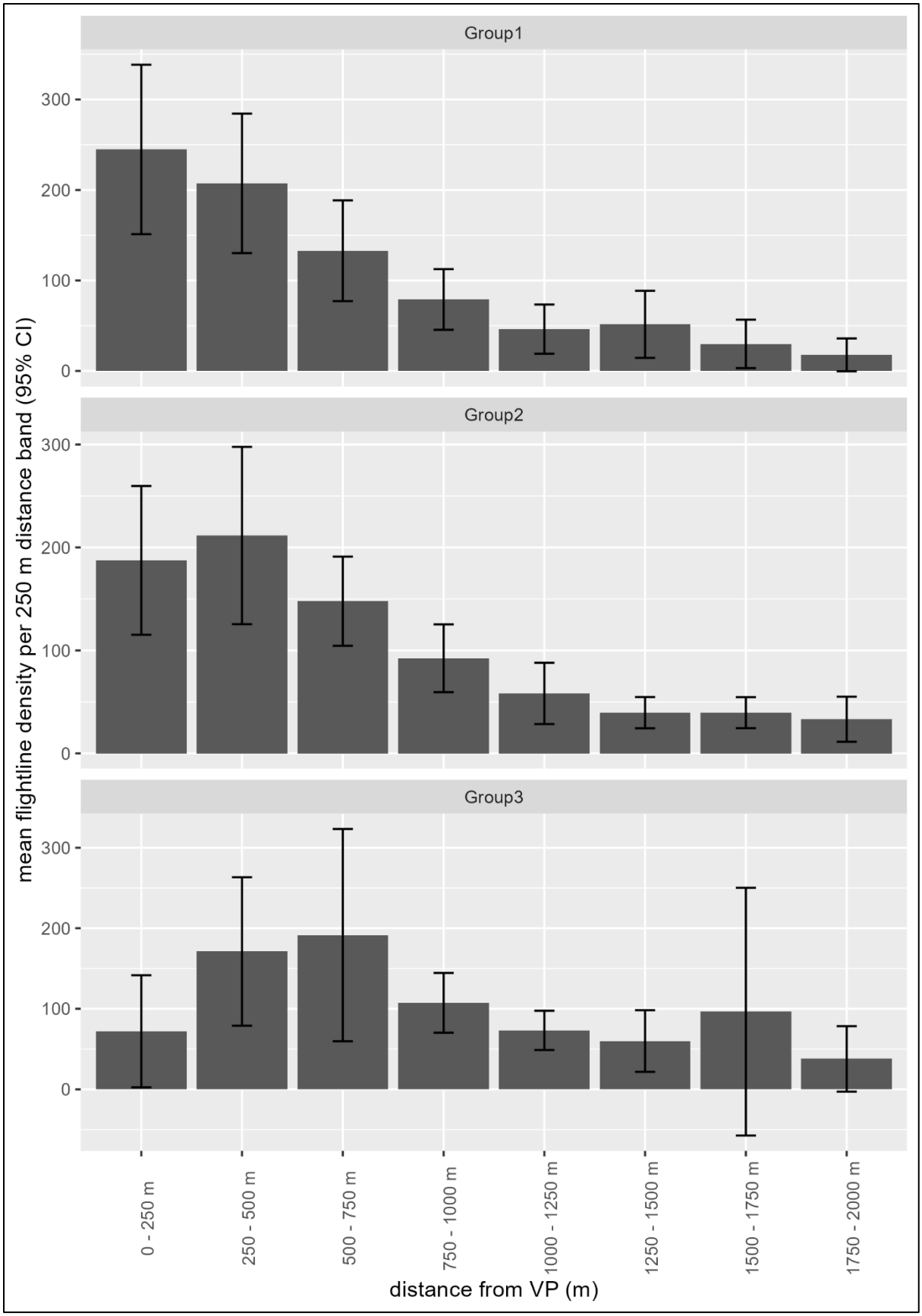


Figure 3.2. Relationship between flightline density and distance from vantage point location in the Ecology Ireland dataset for small (Group 1), medium (Group 2) and large (Group 3) species, including data from a 200 m wide corridor along the River Brosna.

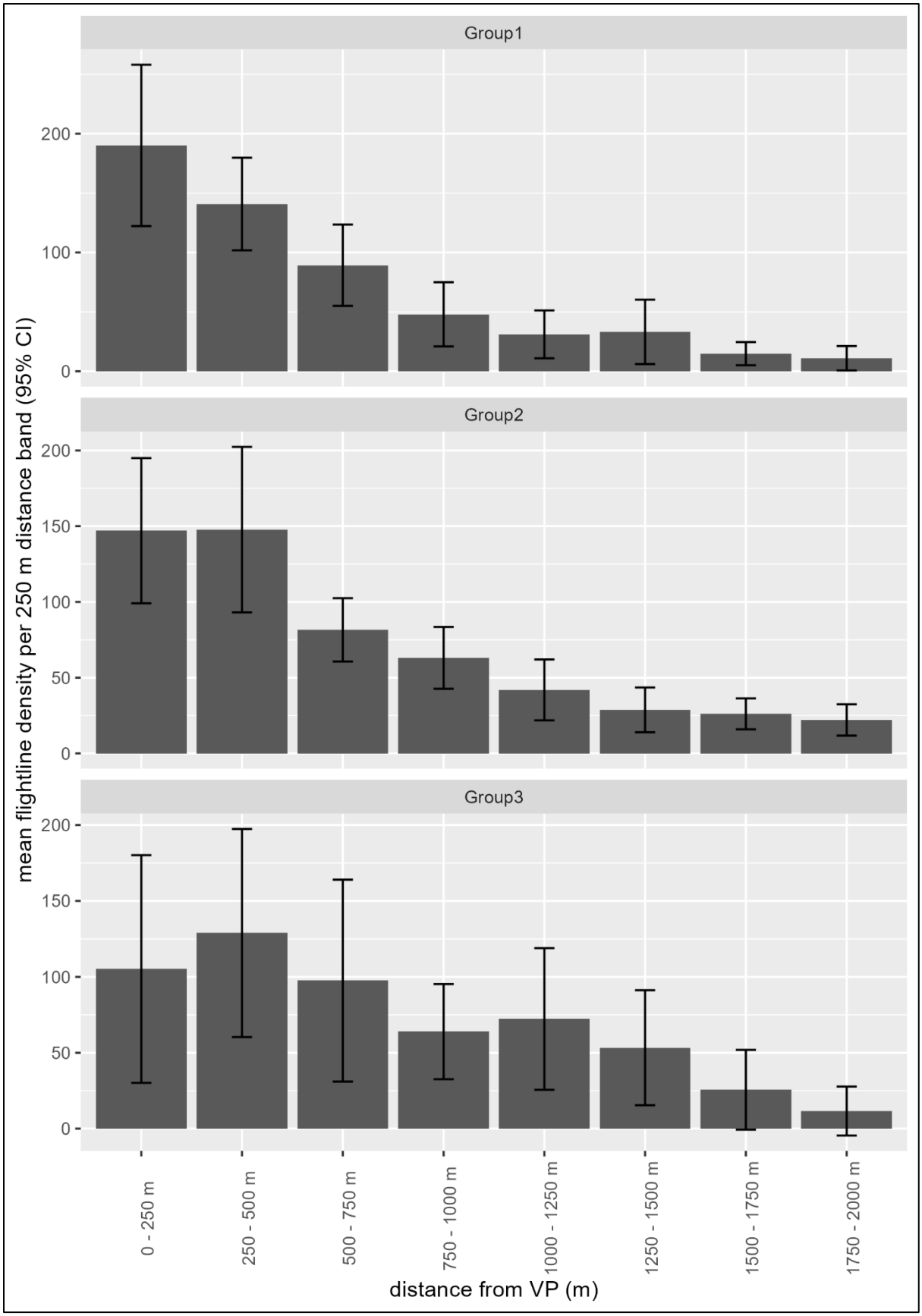


Figure 3.3. Relationship between flightline density and distance from vantage point location in the Ecology Ireland dataset for small (Group 1), medium (Group 2) and large (Group 3) species, excluding data from a 200 m wide corridor along the River Brosna.

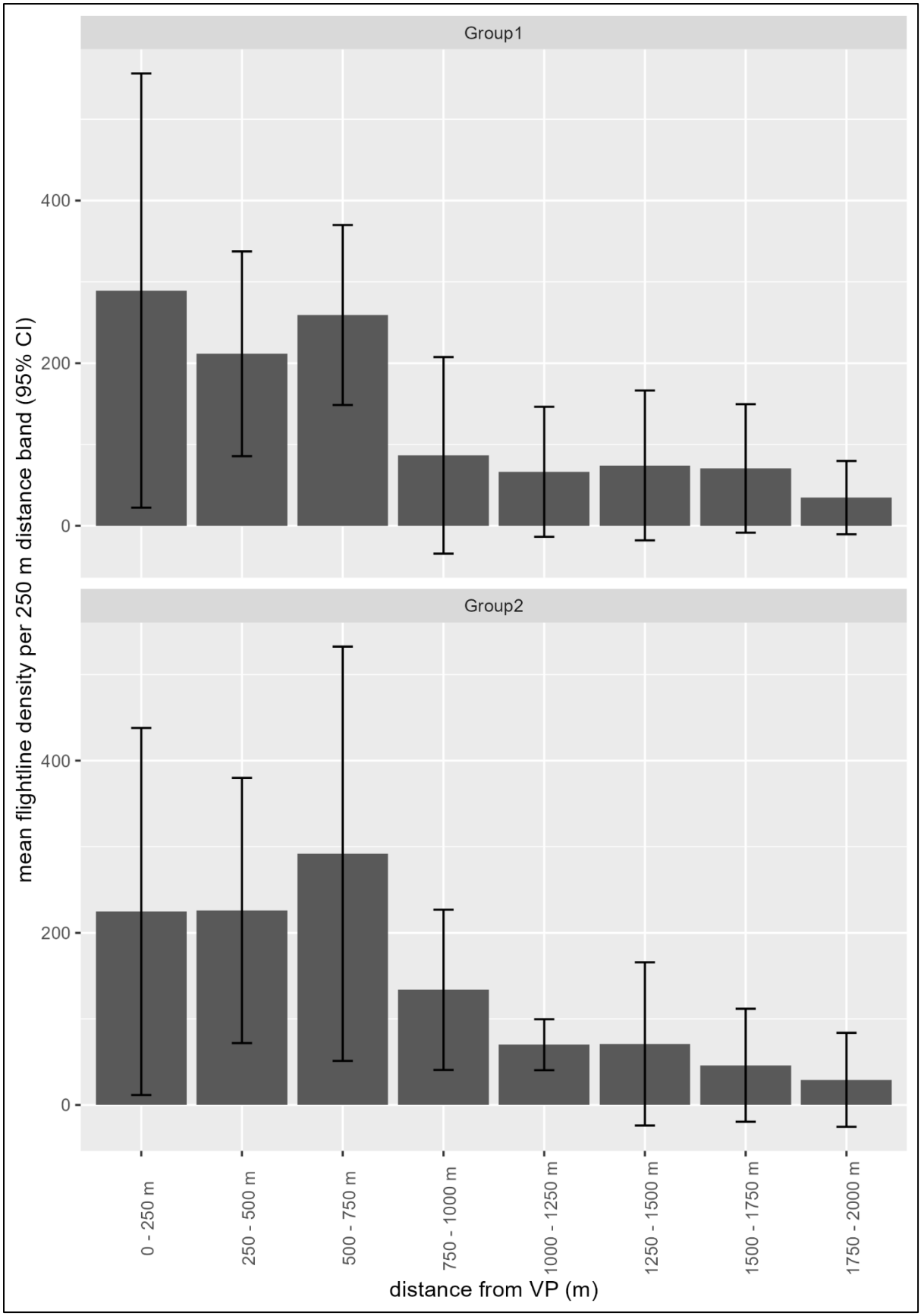


Figure 3.4. Relationship between flightline density and distance from vantage point location in the TOBIN dataset for small (Group 1) and large (Group 2) species, including data from a 200 m wide corridor along the River Brosna.

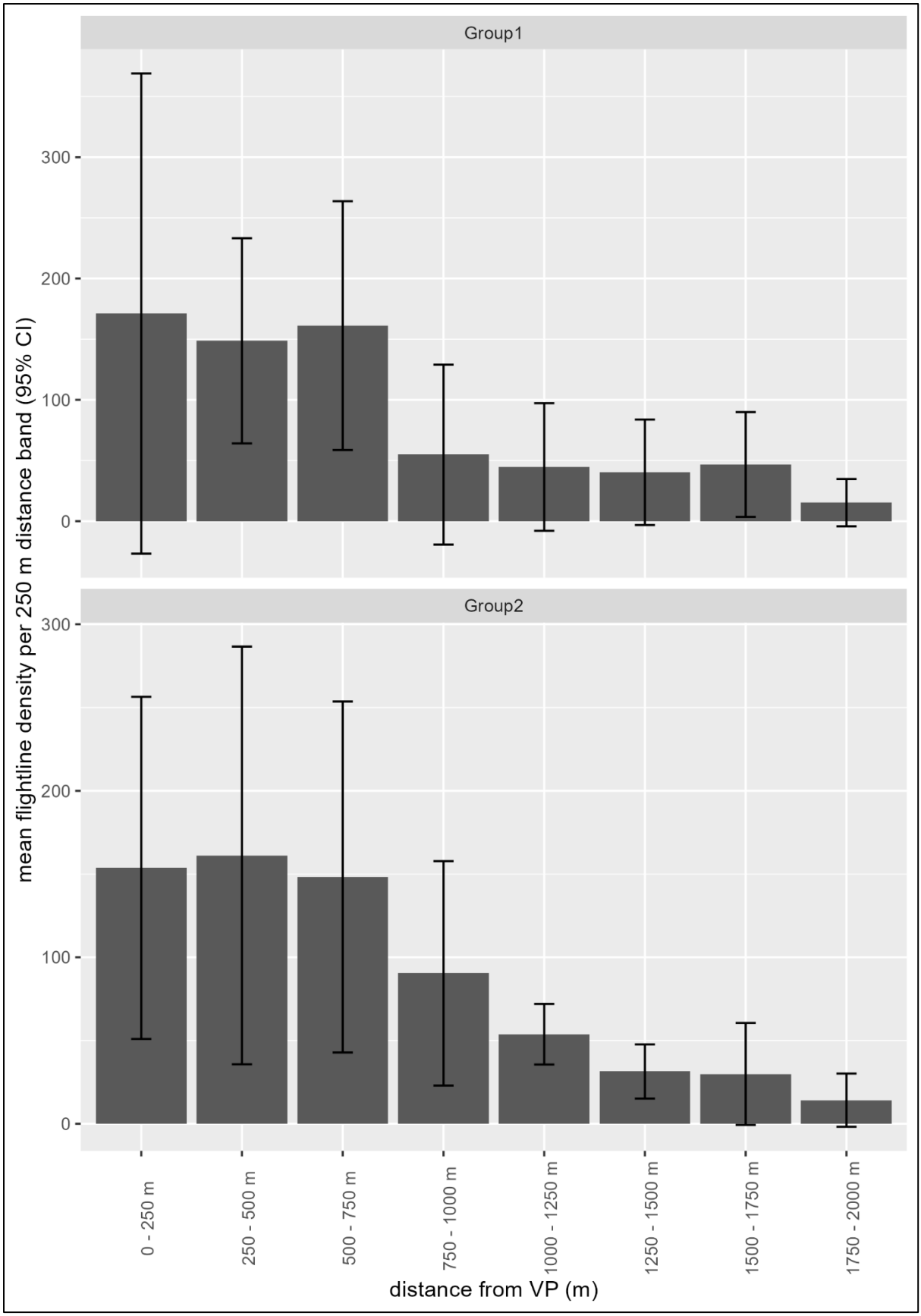
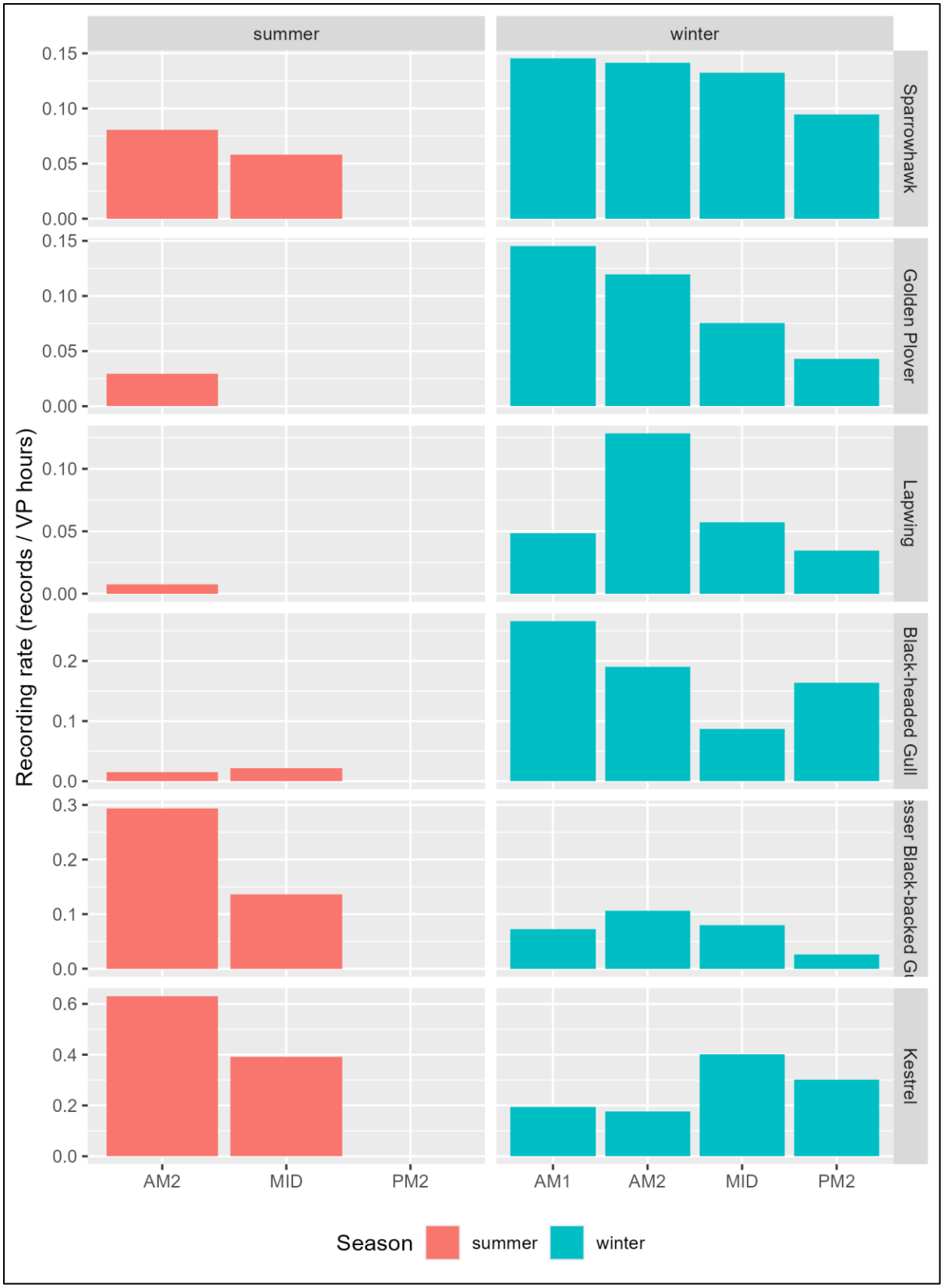


Figure 3.5. Relationship between flightline density and distance from vantage point location in the TOBIN dataset for small (Group 1) and large (Group 2) species, excluding data from a 200 m wide corridor along the River Brosna.

Summer: AM2 = 2 hours after sunrise to 6 hours after sunrise; MID = 6 hours after sunrise to 6 hours before sunset; PM2 = 6 hours before sunset to 2 hours before sunset. Winter: AM1 = 1 hour before sunrise to 1 hour after sunrise; AM2 = 1 hour after sunrise to 3 hours after sunrise; MID = 3 hours after sunrise to 3 hours before sunset; PM2 = 3 hours before sunset to 1 hour before sunset. There was not sufficient survey effort to calculate recording rates for the AM1 period in summer or for the PM1 period in both seasons.

Figure 3.6. Recording rates in the Ecology Ireland vantage point survey of Mute Swan, Whooper Swan, Mallard, Cormorant Little Egret and Grey Heron during the early morning, mid-morning, midday and mid-afternoon periods.



Summer: AM2 = 2 hours after sunrise to 6 hours after sunrise; MID = 6 hours after sunrise to 6 hours before sunset; PM2 = 6 hours before sunset to 2 hours before sunset. Winter: AM1 = 1 hour before sunrise to 1 hour after sunrise; AM2 = 1 hour after sunrise to 3 hours after sunrise; MID = 3 hours after sunrise to 3 hours before sunset; PM2 = 3 hours before sunset to 1 hour before sunset. There was not sufficient survey effort to calculate recording rates for the AM1 period in summer or for the PM1 period in both seasons.

Figure 3.7. Recording rates in the Ecology Ireland vantage point survey of Sparrowhawk, Golden Plover, Lapwing, Black-headed Gull, Lesser Black-backed Gull and Kestrel during the early morning, mid-morning, midday and mid-afternoon periods.

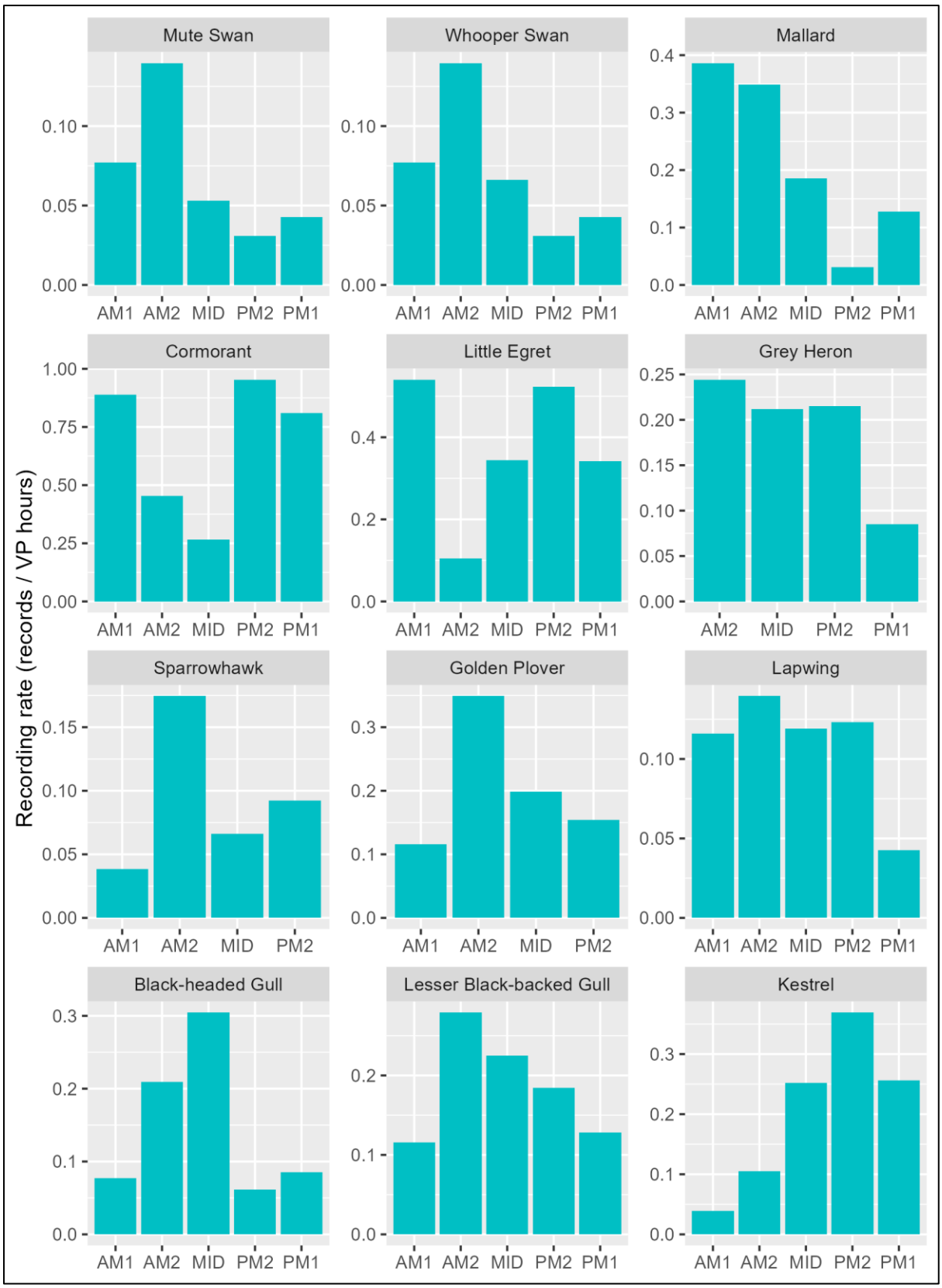
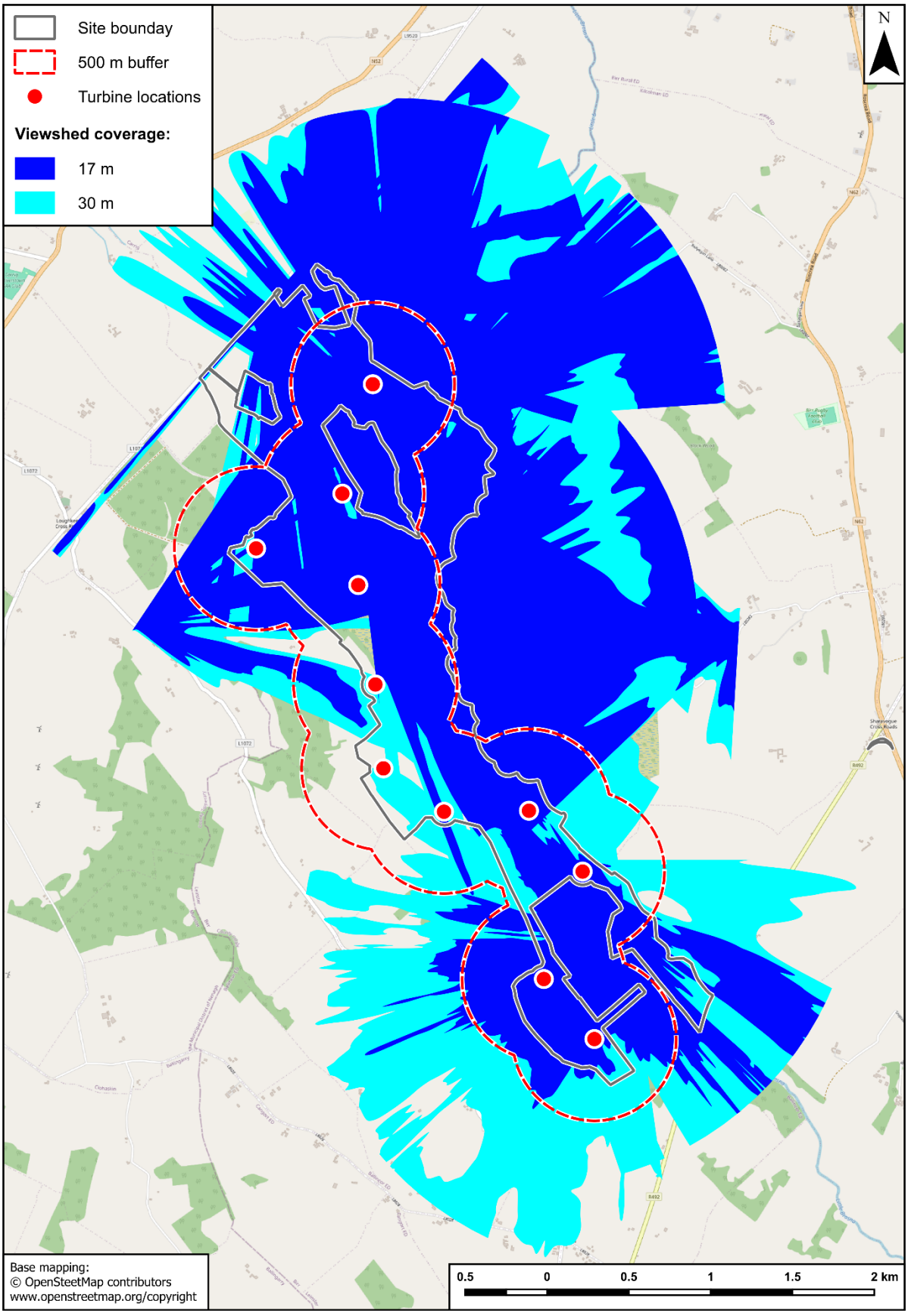
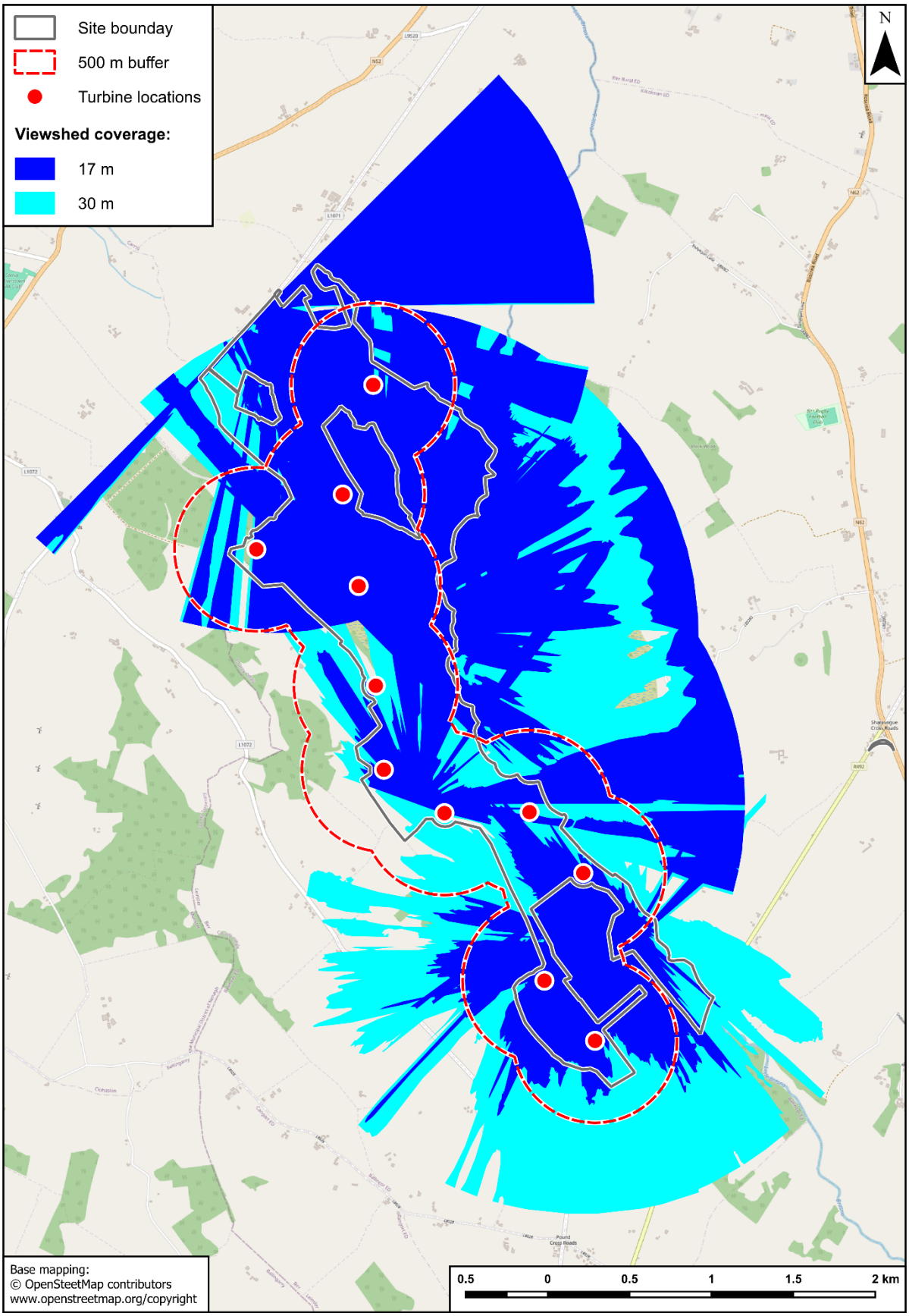


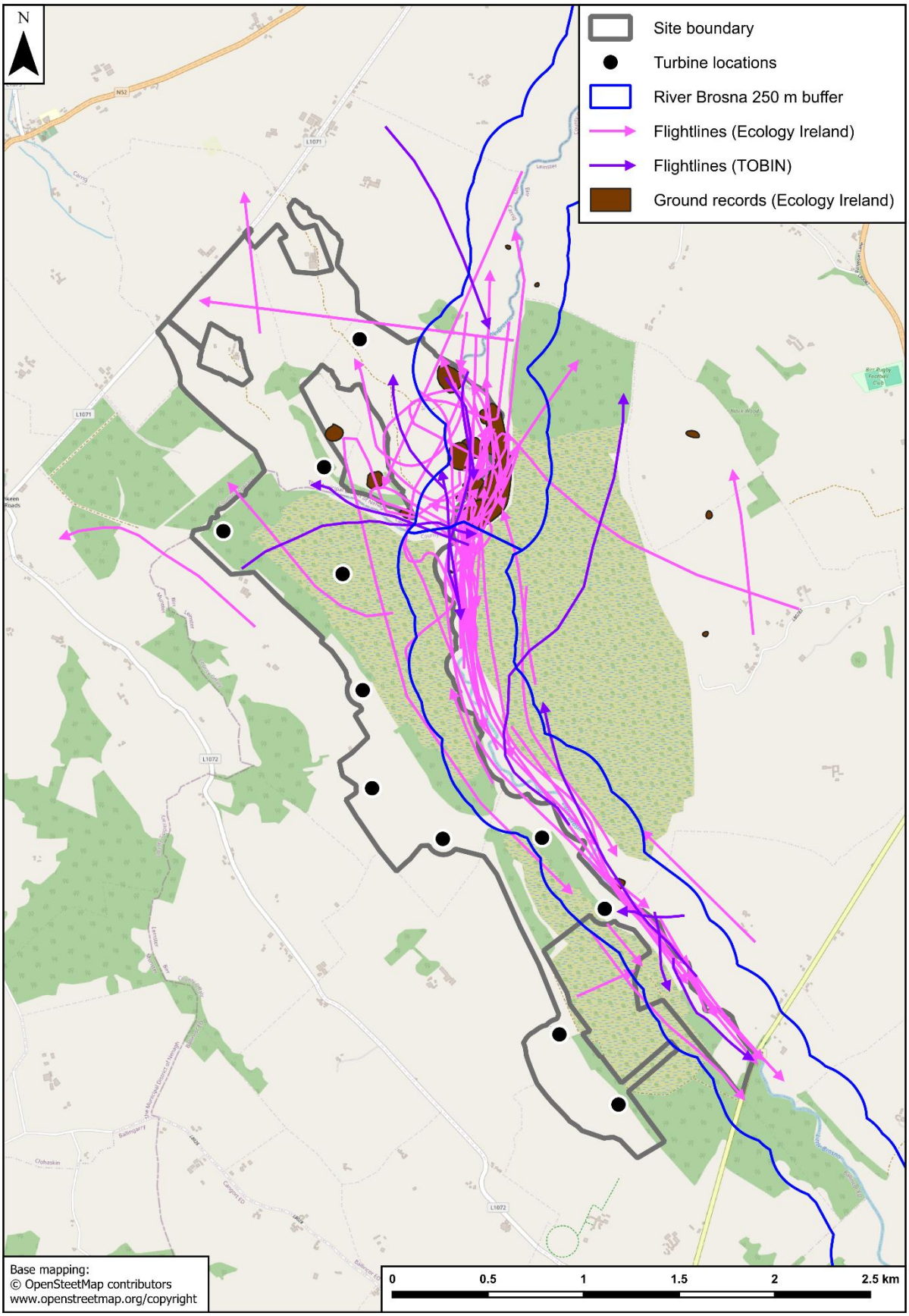
Figure 3.8. Winter recording rates in the TOBIN vantage point surveys during the early morning, mid-morning, midday and mid-afternoon and evening periods.



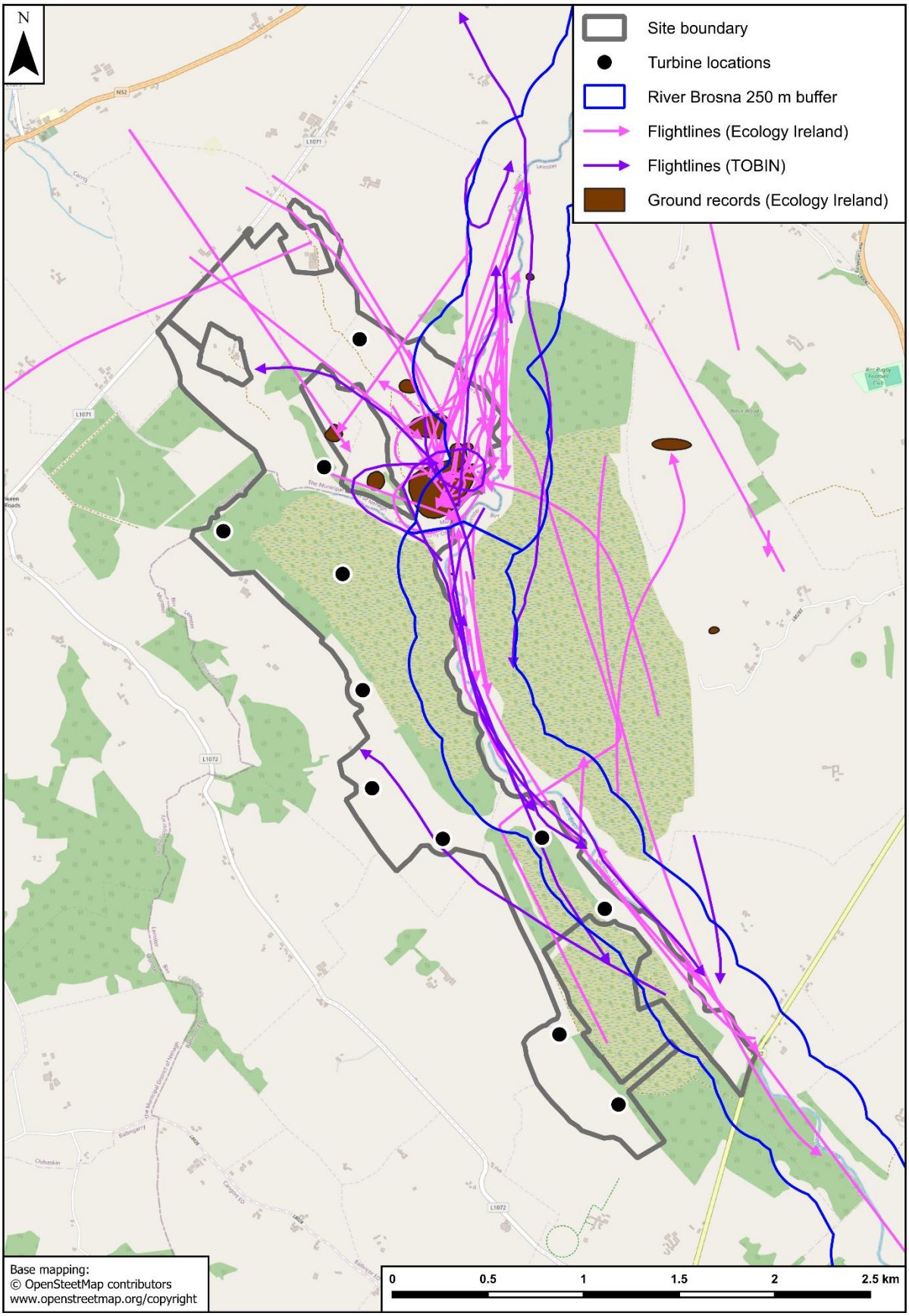
Map 3.1. Coverage of the Ecology Ireland 1.5 km viewsheds with overlaps removed at 17 m and 30 m above ground level.



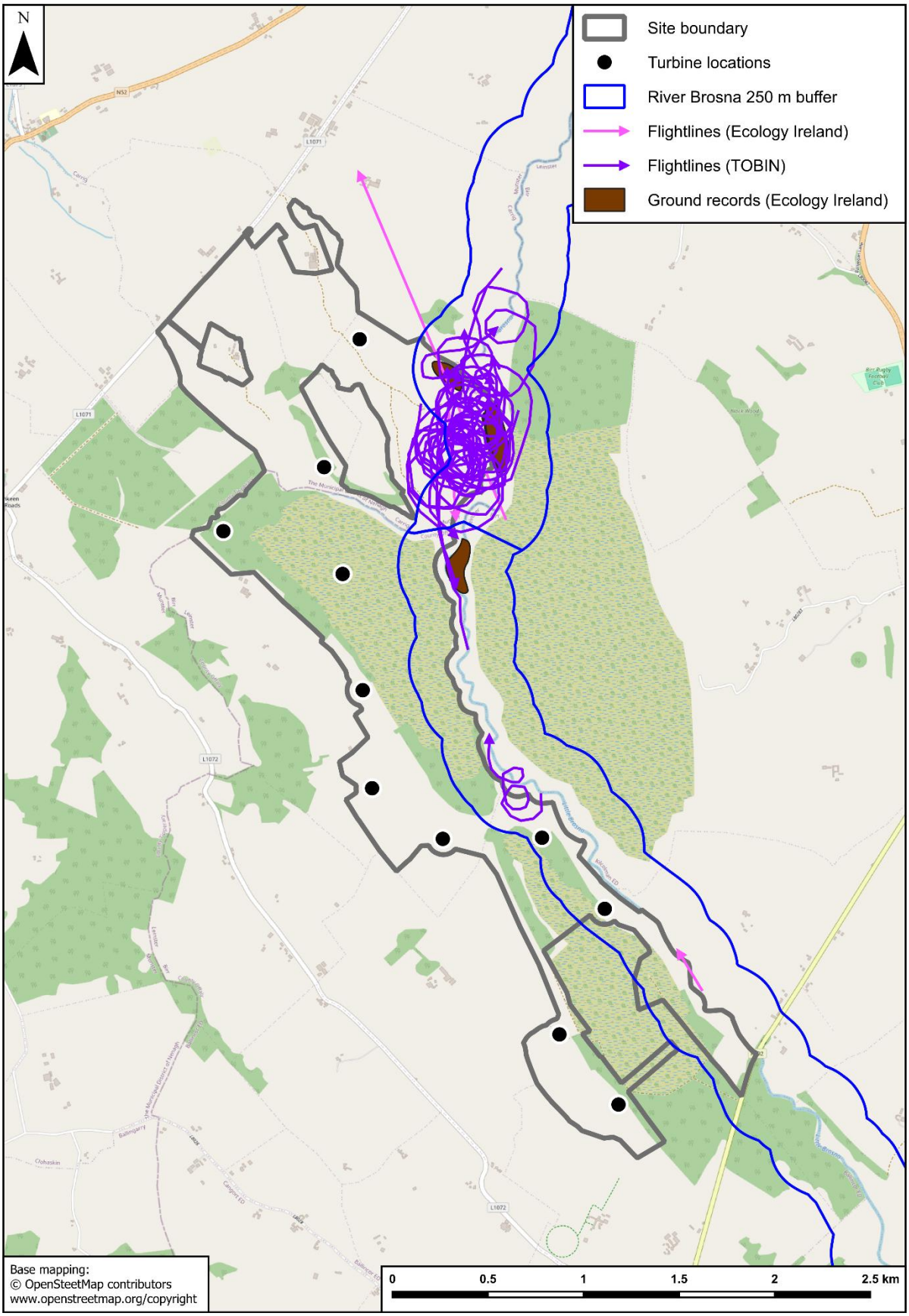
Map 3.2. Coverage of the TOBIN viewsheds at 17 m and 30 m above ground level.



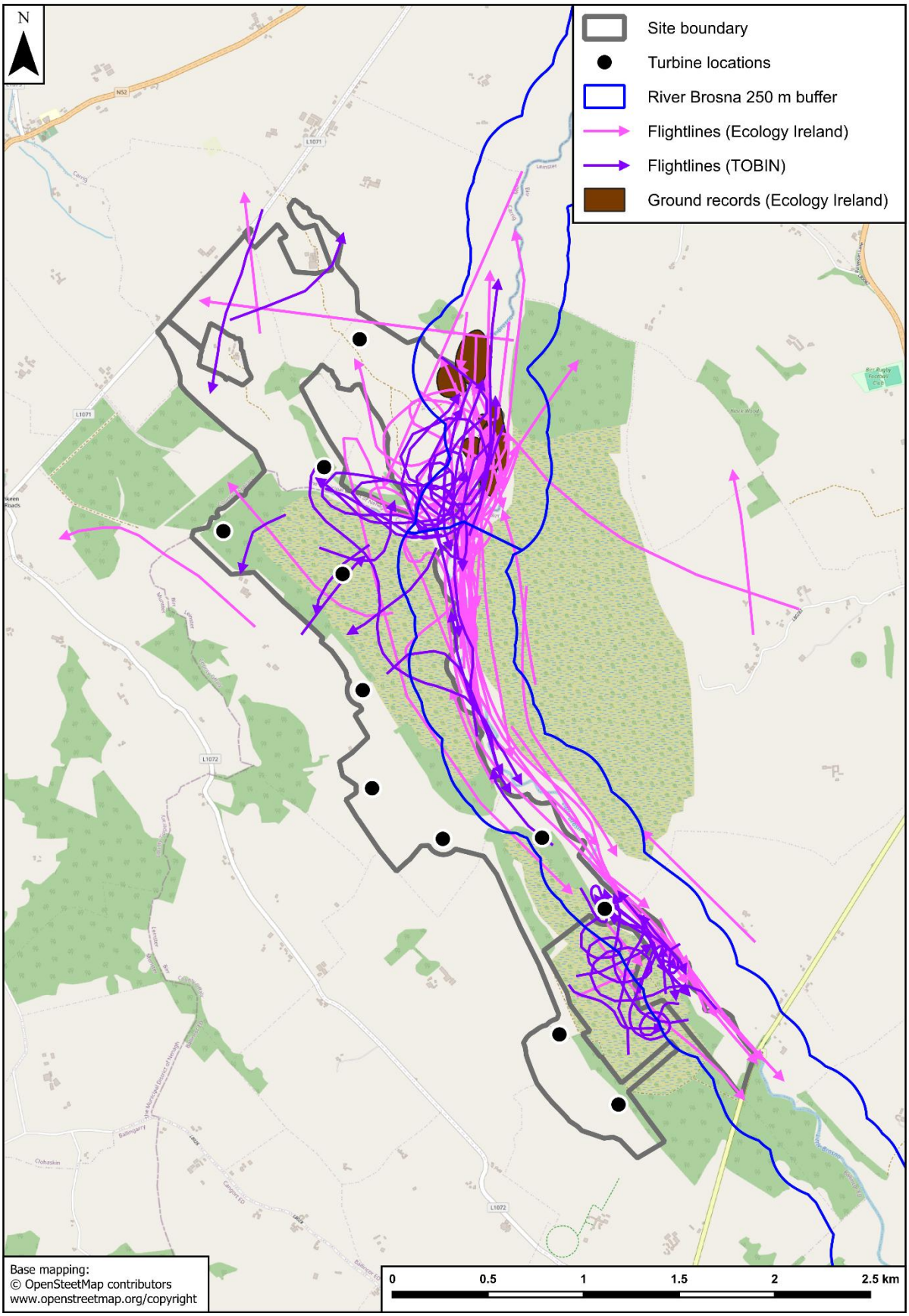
Map 3.3. Mute Swan flightlines.



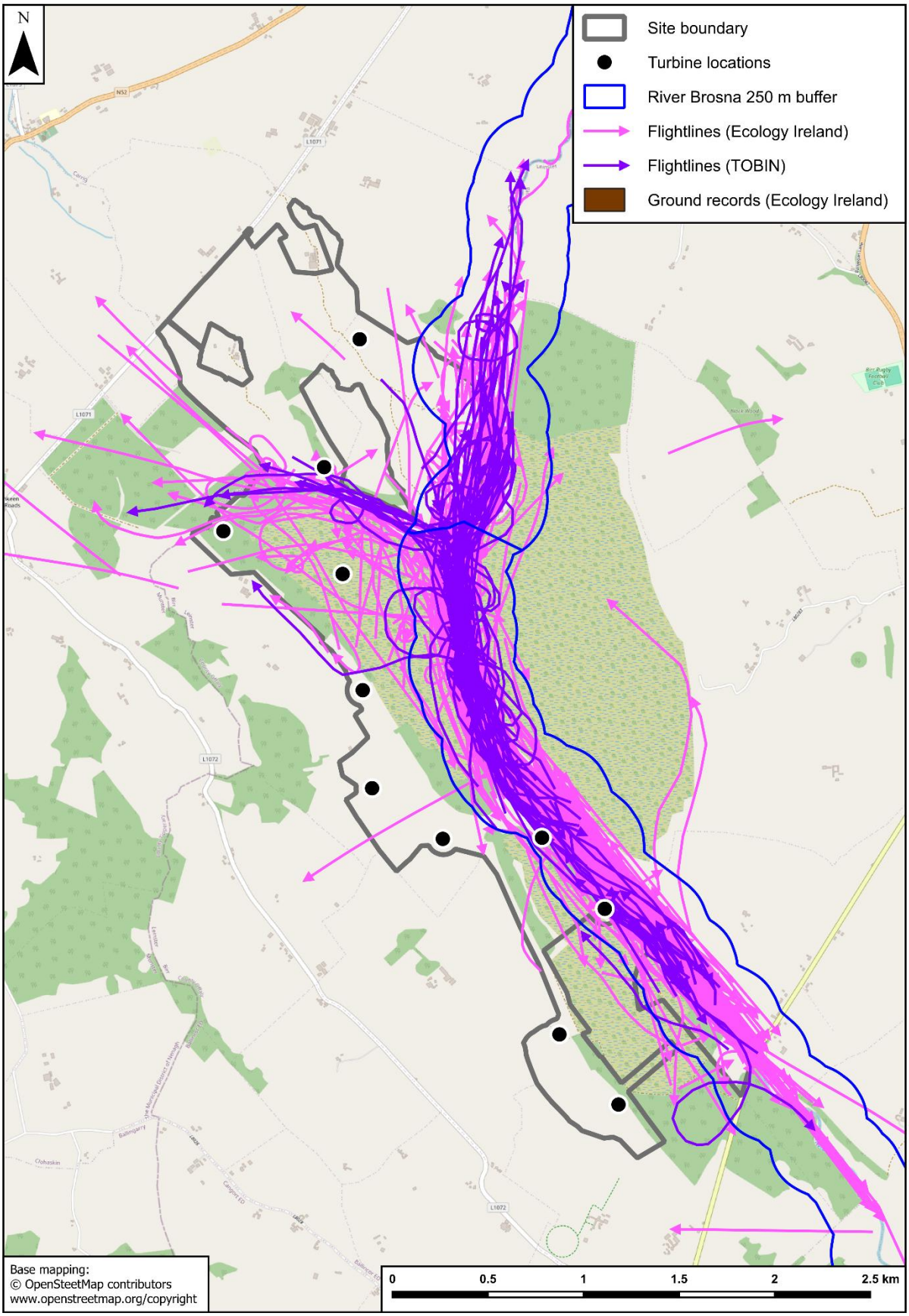
Map 3.4. Whooper Swan flightlines.



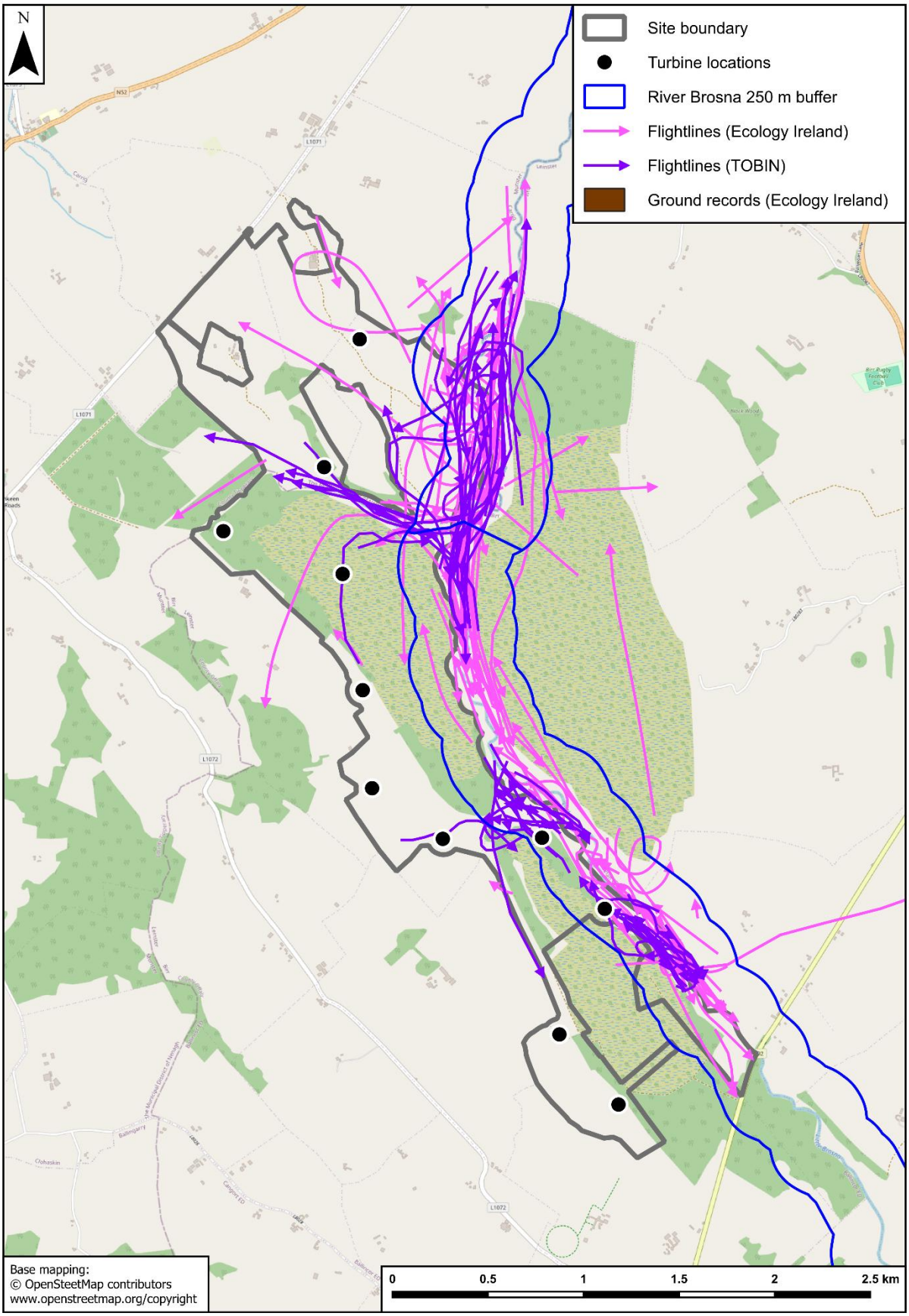
Map 3.5. Wigeon flightlines.



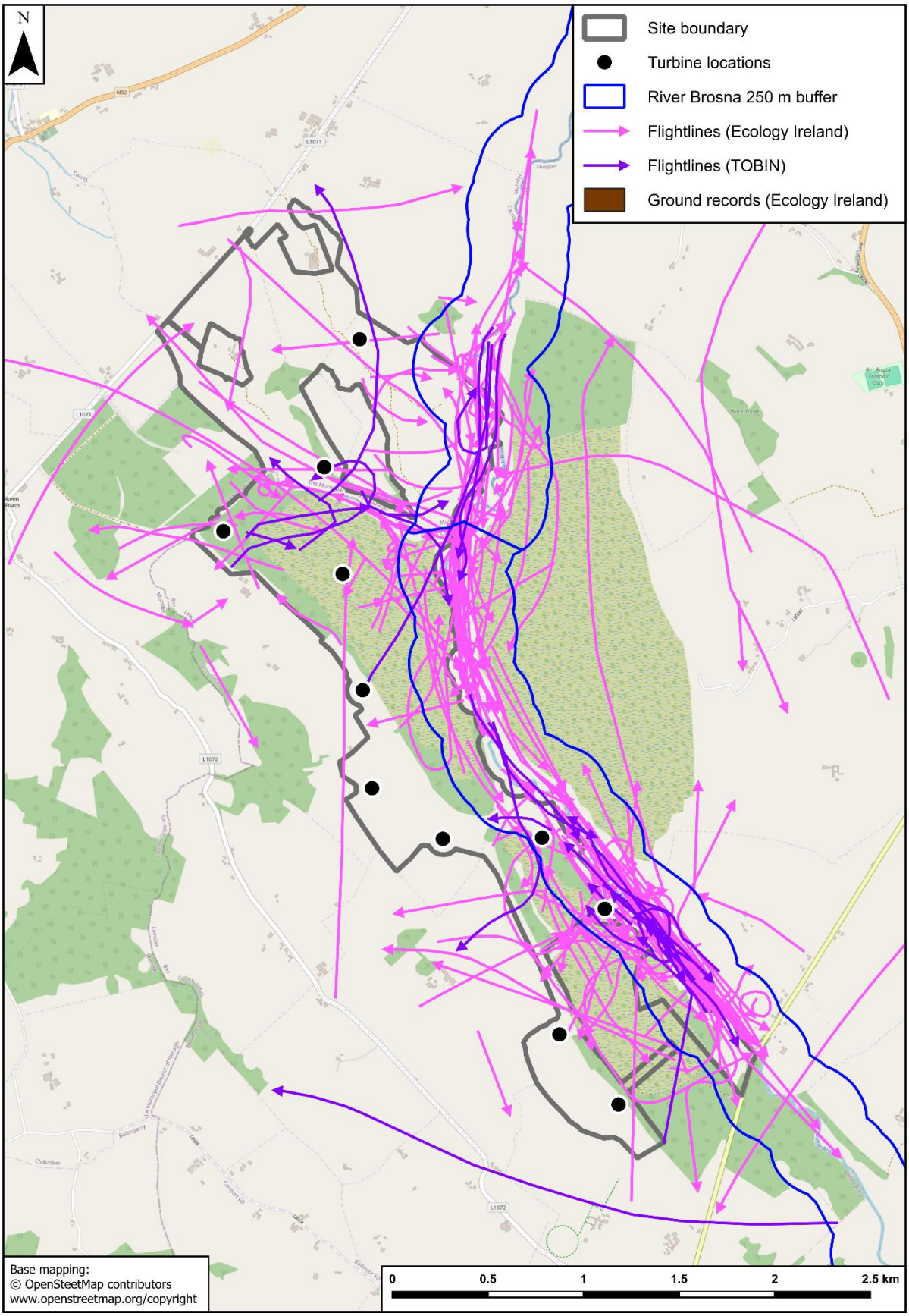
Map 3.6. Mallard flightlines.



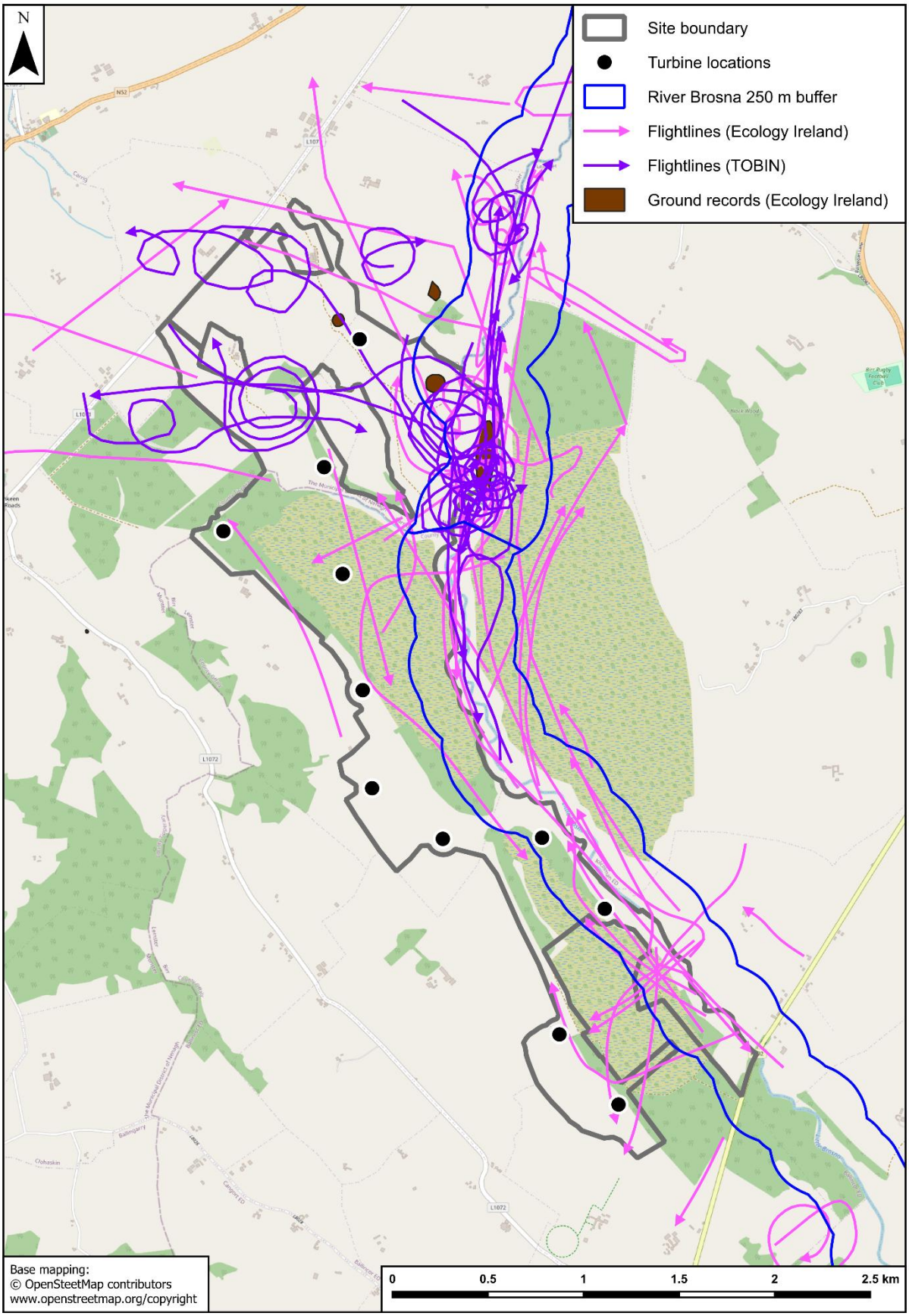
Map 3.7. Cormorant flightlines.



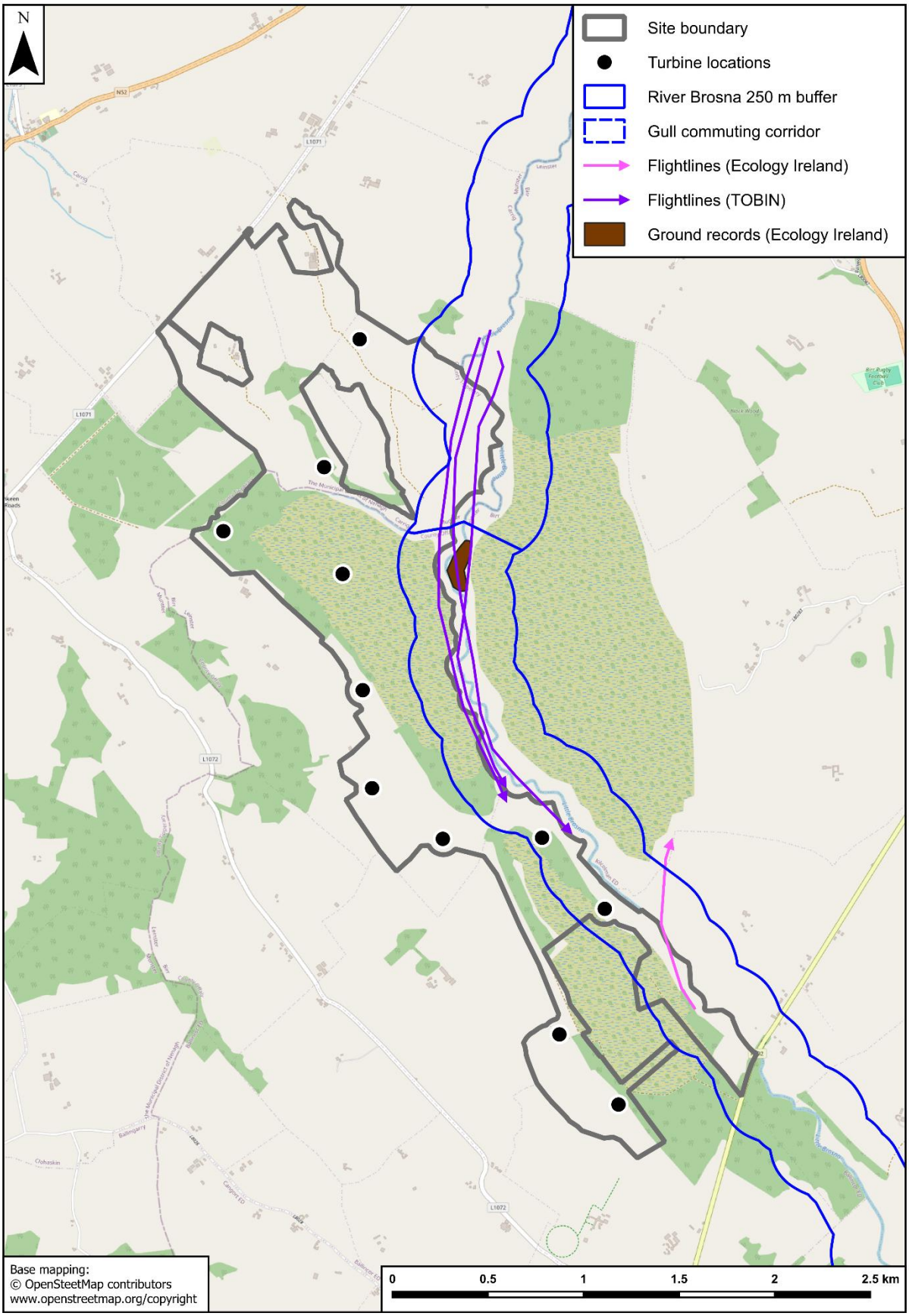
Map 3.8. Little Egret flightlines.



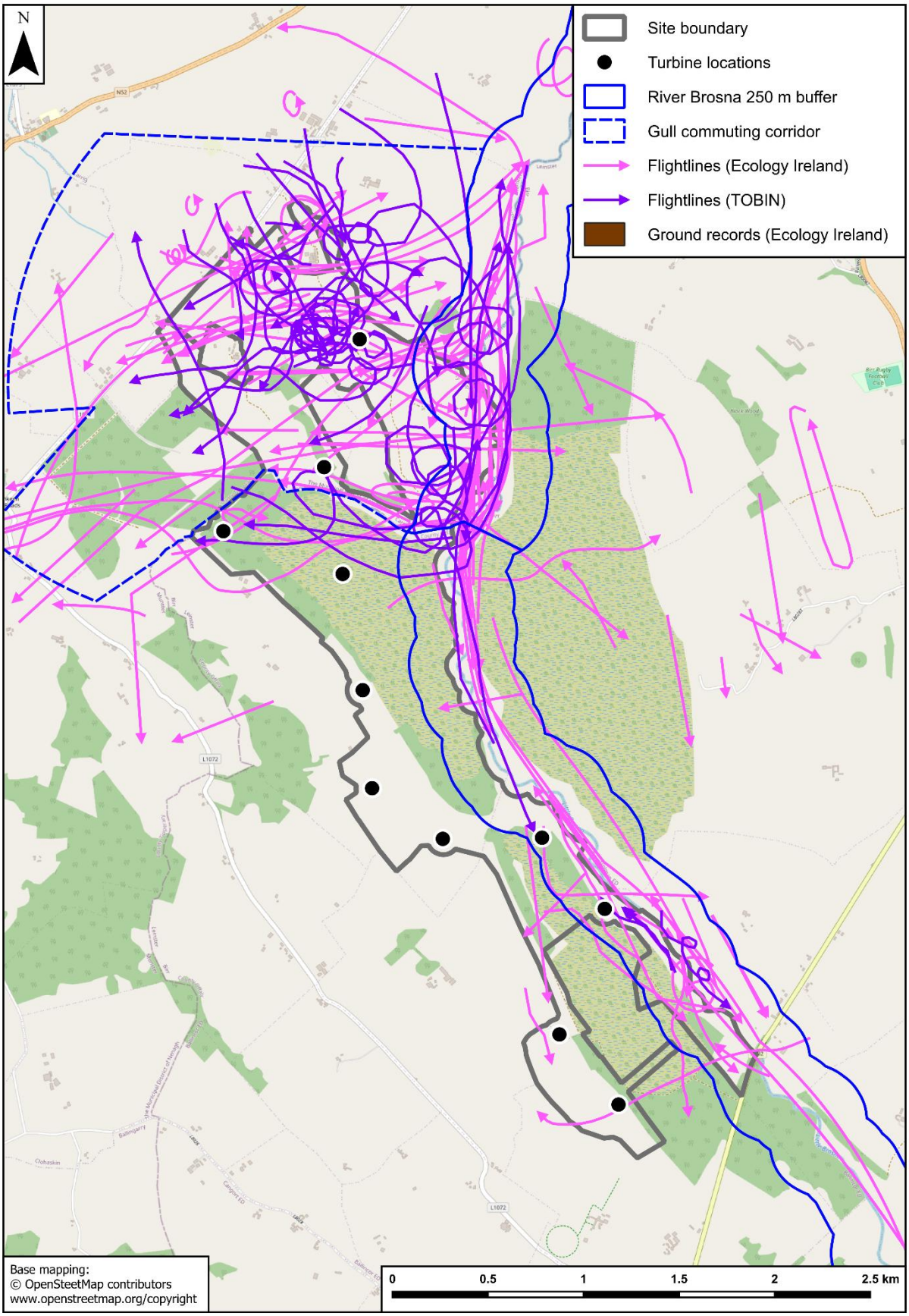
Map 3.9. Grey Heron flightlines.



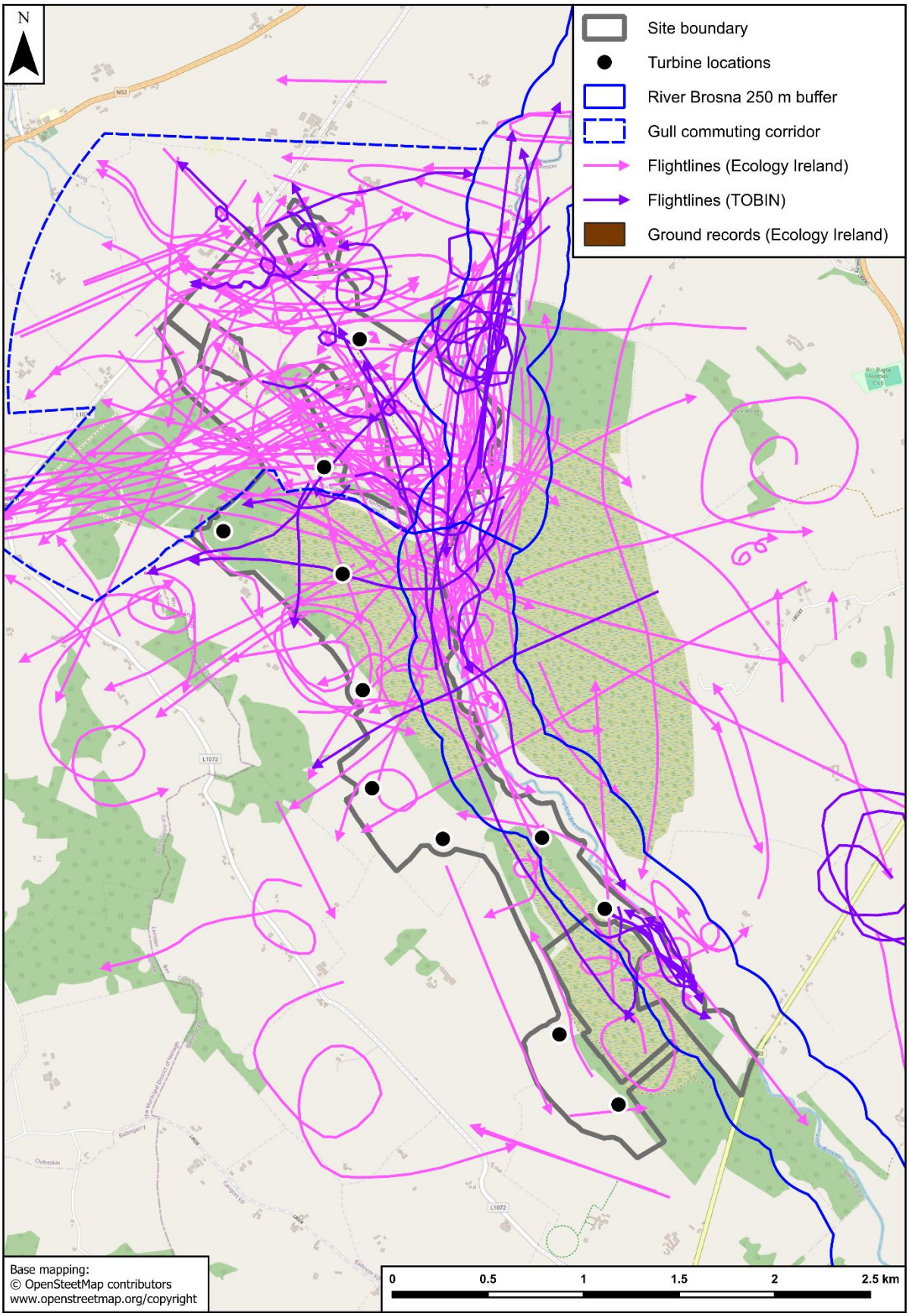
Map 3.10. Lapwing flightlines.



Map 3.11. Black-tailed Godwit flightlines.



Map 3.12. Black-headed Gull flightlines.



Map 3.13. Lesser Black-backed Gull flightlines.

4. COLLISON RISK MODELLING RESULTS

4.1. INTRODUCTION

The results from the sequential stages of the NatureScot collision risk model are described below. The detailed results tables for the intermediate stages are included in Appendix 1, with the final collision risk estimates used for the collision risk assessment presented in this chapter.

4.2. STAGE A: FLIGHT ACTIVITY

4.2.1. Flight activity densities

The monthly daytime flight activity densities calculated in Stage A of the collision risk model are shown in Table A1.1 and Table A1.2 in Appendix 1. These are the values that would be entered in the *Daytime bird density* row in the Stage A section of the NatureScot spreadsheet if the spreadsheet was being used for the modelling.

Table A1.1 shows the densities calculated using data from all the qualifying watches while Table A1.2 shows the densities calculated using only the watches that complied with the NatureScot vantage point survey guidance. The mean ratios of these densities were 1.25 (range 0.60–3.32) for the 17 m viewshed height and 1.14 (range 0.13–3.32) for the 30 m viewshed height. However, the extreme values were for species that only occurred occasionally. For the regularly occurring species, the range was 0.62–1.64.

For each species, the highest of the two density values was selected for the collision risk model. Overall, out of the 27 species analysed, the densities from all watches were selected for 6 species for the 17 m viewshed height, and 10 species for the 30 m viewshed height.

The daytime flight activity densities in Table A1.1 and Table A1.2 are weighted averages of the flight activity densities for each vantage point. These were calculated using the formula provided in the NatureScot guidance (Equation A2). The weightings included in the averaging generally did not have large effects on the mean densities (Table 4.1). The largest differences mainly occurred in species that had highly concentrated patterns of flight activity.

Table 4.1. Ratios of the weighted:unweighted daytime flight activity densities.

Model	Section	Viewshed height	Ratio	
			Mean	Range
unstructured		17 m	1.14	0.54-2.18
unstructured		30 m	1.11	0.56-2.02
structured	Brosna S	17 m	1.21	0.85-1.88
structured	Brosna S	30 m	1.11	0.88-1.60
structured	Commuting corridor	17 m	1.32	1.05-1.60
structured	Commuting corridor	30 m	1.12	0.97-1.26
structured	Other	17 m	1.21	0.78-1.92
structured	Other	30 m	1.05	0.49-1.98

The flight activity densities calculated by the spatially-structured models for the sections defined to represent high concentrations of flight activity were factors of 2-64 times higher than the densities in the remainder of the survey area (Table 4.2).

Table 4.2 does not include the Brosna N section, as this section did not have any turbines so was not included in the collision risk model. The densities of Whooper Swan, Wigeon and Black-tailed Godwit in Table 4.2 are 2–65 times lower than their densities in the Brosna N section in Table 3.4.

Table 4.2. Mean flight activity densities at potential collision height (birds/km^2/month) in the different sections used for the spatially-structured models.

Species	Viewshed height	Brosna S	Commuting corridor	Other
Mute Swan	17 m	135		3
	30 m	54		4
Whooper Swan	17 m			421
	30 m			236
Wigeon	17 m			196
	30 m			69
Mallard	17 m	1,254		48
	30 m	1,055		20
Cormorant	17 m	1,724		32
	30 m	1,351		21
Little Egret	17 m	159		13
	30 m	57		4
Grey Heron	17 m	297		92
	30 m	193		52
Lapwing	17 m			661
	30 m			362
Black-tailed Godwit	17 m	8,333		30
	30 m	4,831		18
Black-headed Gull	17 m		5,622	442
	30 m		2,047	372
Lesser Black-backed Gull	17 m		1,979	1,460
	30 m		472	211

The Brosna N section is not included in this table, as this section did not have any turbines so was not included in the collision risk model.

4.2.2. Daylight and nighttime hours

The daylight and nighttime hours per month calculated in Stage A of the collision risk model are shown in Table A1.3 in Appendix 1. These are the values that would be entered in the *Daylight hours per month* and *Nighttime hours per month* rows in the Stage A section of the NatureScot spreadsheet.

4.3. STAGE B: TRANSITS

4.3.1. Nocturnal correction factors

The nocturnal correction factors for species with nocturnal activity rankings greater than one are shown in Table A1.4 in Appendix 1. These represent the correction for nocturnal flight activity that is applied by $f_{night} \times t_{night}$ term in Equation B1. That is the formula that generates the *Projected number of rotor transits* values in the Stage B section of the NatureScot spreadsheet.

4.3.2. Transits

The monthly number of predicted transits calculated in Stage B of the collision risk model are shown in Table A1.5 in Appendix 1. These are the values that are produced in the *Projected number of rotor transits row* in Stage B section of the NatureScot spreadsheet.

4.4. STAGE C: SINGLE TRANSIT COLLISION RISK

4.4.1. Single transit collision risk values

The single transit collision risk values calculated in Stage C of the collision risk model are shown in Table A1.6 in Appendix 1. These are the values that are produced in the *Single transit risk* rows in the Stage C section of the NatureScot spreadsheet.

All the single transit collision risk values used in the collision risk model were calculated using flapping flight (see Section 2.6.4). The single transit collision risks generated by gliding flight were a mean of 98% lower (range 96-99%).

The upwind and downwind single transit collision risks were the same with a pitch angle of 0° but the upwind risks were around 2.0-2.1 times higher (range 1.5-2.6) with pitch angles of 15° and 30°.

The single transit collision risks calculated with a pitch angle of 15° were a mean of 1.05-1.06 times higher than those calculated with a pitch angle of 0° (range 0.98-1.18). The values calculated with a pitch angle of 30° were a mean of 1.34-1.37 times higher than those calculated with a pitch angle of 0° (range 1.10-1.74).

4.4.2. Interpretation of single transit collision risk values

Single transit collision risk values are often misinterpreted. They represent the probability of a collision on a single transit of the rotor airspace. While they contribute to the calculation of the predicted collision risk, they should not be interpreted as providing any information about the likely magnitude of the predicted collision risk. The predicted transits have a much larger influence on the predicted collision risk and a species with a relatively high single transit collision risk may have a very low predicted collision risk if the number of predicted transits is low.

4.5. STAGE D: NON-AVOIDANCE COLLISION RISK

The non-avoidance collision risk values calculated in Stage D of the collision risk model are shown in Table A1.7 in Appendix 1. These are the values that are produced in the *Collision rates before avoidance row* in the Stage D section of the NatureScot spreadsheet.

4.6. STAGE E: COLLISION RISK AFTER AVOIDANCE

4.6.1. Monthly collision risks

The monthly collision risk after avoidance values calculated in Stage E of the collision risk model are shown in Table A1.8 in Appendix 1. These are the values that are produced in the *Collision rates allowing for avoidance rows in the Stage E* section of the NatureScot spreadsheet.

The values in Appendix 1 are shown rounded to two decimal places (following the formatting of the NatureScot spreadsheet). Note that for some cells, non-zero collision risks < 0.005 are shown as 0.00 due to the rounding. The annual / seasonal collision risks used for the collision risk assessment were calculated from the unrounded monthly collision risks.

4.6.2. Collision risks used for the collision risk assessment

The predicted annual/seasonal collision risks used for the collision risk assessment are shown in Table 4.3. These are the collision risks that were generated by the most suitable avoidance rate for each species using the single transit collision risk values for a pitch angle of 15°.

The output from the NatureScot spreadsheet means that collision risks less than 0.005 (less than 0.01 when rounded to two decimal places) are shown as zero. Therefore, only species/seasons with rounded collision risks ≥ 0.01 are included in Table 4.3.

Table 4.3. Collision risks used for the collision risk assessment.

Species	Season	Avoidance rate	Collisions / year		
			N149	N163	V150
Mute Swan	non-breeding	0.995	0.01	0.02	0.01
Whooper Swan	winter	0.995	0.02	0.05	0.02
White-fronted Goose	all year	0.998	0.00	0.01	0.00
Wigeon	winter	0.980	1.4	2.4	1.4
Teal	all year	0.980	0.00	0.01	0.00
Mallard	all year	0.980	0.56	0.68	0.58
Pintail	all year	0.980	0.01	0.01	0.01
Cormorant	breeding	0.980	0.10	0.12	0.11
	non-breeding	0.980	0.32	0.44	0.33
Little Egret	breeding	0.980	0.01	0.00	0.01
	non-breeding	0.980	0.01	0.05	0.01
Grey Heron	all year	0.980	0.10	0.17	0.11
White-tailed Eagle	all year	0.950	0.02	0.04	0.02
Hen Harrier	all year	0.990	0.01	0.02	0.01
Sparrowhawk	all year	0.980	0.11	0.17	0.11
Buzzard	all year	0.980	1.4	1.7	1.4
Golden Plover	winter	0.996	7.9	9.4	8.1
Lapwing	winter	0.980	1.4	1.6	1.4
Curlew	all year	0.980	0.02	0.02	0.02
Black-tailed Godwit	non-breeding	0.980	3.3	4.7	3.4
Black-headed Gull	non-breeding	0.992	0.31	0.43	0.32
Common Gull	all year	0.992	0.00	0.01	0.00
Lesser Black-backed Gull	autumn	0.995	0.02	0.05	0.02
	spring	0.995	0.01	0.13	0.01
	winter	0.995	0.05	0.04	0.05
Kestrel	all year	0.950	1.4	2.9	1.5
Merlin	all year	0.980	0.00	0.01	0.00
Peregrine	all year	0.980	0.02	0.03	0.02

Collision risks are shown rounded to two significant figures, or to two decimal places if < 0.1. Other species/seasons with collision risk < 0.005 collisions/year: Shoveler, Lapwing (summer), Lesser Black-backed Gull (breeding) and Herring Gull.

4.7. STAGE F: ASSESSING UNCERTAINTY

4.7.1. General

The NatureScot guidance lists three broad categories to consider:

- *uncertainty or variability in flight activity data, including imprecision on flight height estimates and lack of knowledge about night-time behaviour;*
- *uncertainty due to the limitations of the collision model, including the variability of bird dimensions and flight speed, the simplification in shape of a bird and turbine blades; and*
- *uncertainty arising from turbine options yet to be decided, in number, size and speed. These options should include a 'worst case' in terms of the option likely to present greatest bird collision risk.*

In addition, the discussion about Stage F in the NatureScot guidance also refers to the influence of sampling effects and natural variability in bird populations. Other factors that should also be

considered are the effects of sampling biases, behavioural effects, and uncertainty about avoidance rates. There are also some issues with aspects of the NatureScot guidance and the design of the NatureScot spreadsheet.

4.7.2. Uncertainty or variability in flight activity data

4.7.2.1 Sampling effects

The results of the simulations that examined the influence of sampling effects are summarised in Figure 4.1. No simulations were carried out for Wigeon or Black-tailed Godwit due to the low number of records in the dataset that was used to parameterise the simulation.

For most species, uncertainty decreased substantially when the number of survey seasons represented in the simulation increased from one to two, with smaller reductions as additional seasons were added. This indicates that most of the reduction in sampling uncertainty occurred when survey coverage increased from one to two seasons, with additional seasons producing only modest reductions in the simulation interval. This suggests that the principal source of uncertainty arises from within-season sampling variability rather than the number of seasons included in the dataset. A strong year effect could still exist, and this type of variation was not included in the simulations. Therefore, the true potential uncertainty due to sampling effects is likely to fall somewhere between the extremes of the one-year and four/five-year ranges shown in Figure 4.1. For this assessment, I have used the two-year ranges to quantify the potential uncertainty due to sampling effects.

I used the simulation ranges to calculate under-estimation and over-estimation ratios. The under-estimation ratios indicated the potential effect if the vantage point survey happened to sample low levels of flight activity relative to the overall distribution of flight activity across the season: e.g., an under-estimation ratio of 3 indicates that the true collision risk is three times higher than the collision risk estimated from the vantage point survey data. The over-estimation ratios indicate the potential effect if the vantage point survey happened to sample high levels of flight activity relative to the overall distribution of flight activity across the season: e.g., an over-estimation ratio of 0.5 indicates that the true collision risk is only half the value of the collision risk estimated from the vantage point survey data. The range from the over-estimation ratio to the under-estimation ratio provides an indication of the uncertainty due to sampling effects around the predicted collision risk.

Table 4.4 shows the uncertainty ranges calculated from the simulations. The species with the largest uncertainty ranges were species with low record rates (Mallard and Sparrowhawk). Golden Plover and Lapwing also had relatively large uncertainty ranges, reflecting their variable patterns of flight activity.

Table 4.4 also shows the uncertainty ranges calculated from Band (2024)'s relative error method. Apart from Sparrowhawk, these ranges were always higher than the ranges calculated from the simulations. This reflected high variability in the monthly flight activity densities. While months outside the seasonal occurrence periods were excluded, the remaining months still included some with zero, or very low flight activity densities. These may have represented true monthly variation, sampling error, or a combination of both. The relative error method also produces symmetric errors, which due to their large values usually resulted in lower limits of the uncertainty range below zero, which is biologically implausible. This reflects the right-skewed nature or bird flight activity, which makes errors based on the normal distribution inappropriate.

Overall, the monthly relative-error method appears poorly suited to flight activity data from vantage point surveys because monthly values aggregate across daily variation. As a result, the method can either inflate uncertainty if days with high levels of activity were aggregated in some months and days with low activity in other months , or understate uncertainty where short-duration peaks are smoothed by monthly aggregation. The frequent occurrence of negative lower bounds further indicates that the approach imposes an inappropriate symmetric error structure on a non-negative and strongly skewed variable.

Table 4.4. Potential uncertainty ranges due to sampling effects in the flight activity data.

Species	Season	Simulation method range	Relative error method range	
			N163	N149 / V150
Whooper Swan	winter	0.56–2.29	0.00–4.63	0.00–4.32
Wigeon	winter		0.00–5.48	0.00–5.59
Mallard	all year	0.51–3.03	0.00–9.02	0.00–10.54
Cormorant	breeding	0.58–2.19	0.00–4.47	0.00–4.17
	non-breeding	0.79–1.32	0.00–4.57	0.00–5.28
Little Egret	non-breeding	0.55–2.47	0.00–6.18	0.00–5.66
Grey Heron	all year	0.55–2.27	0.00–5.54	0.00–5.45
Sparrowhawk	all year	0.47–3.34	0.00–3.16	0.00–3.43
Golden Plover	winter	0.54–2.47	0.00–5.44	0.00–5.27
Lapwing	winter	0.53–2.45	0.00–4.96	0.00–5.16
Black-tailed Godwit	all year		0.00–9.18	0.00–9.38
Kestrel	all year	0.66–1.66	0.00–3.54	0.00–2.62

The simulation method ranges are from the two-year simulations. No uncertainty ranges were calculated from the simulation method for Black-tailed Godwit and Wigeon because there were too few records to model. The uncertainty ranges from the relative error method are shown separately for the N163 and the N149 / V150 turbines.

4.7.2.2 Nocturnal flight activity

The effects on the nocturnal correction factors of increasing or decreasing the nocturnal activity rankings by one unit caused potential variation in the predicted collision risks of around 10-30% (Table 4.5).

Table 4.5. Variation in nocturnal correction factors generated by decreasing or increasing the nocturnal activity rankings by one unit, and the range of effects on the predicted collision risks generated by this variation.

Species	Season	Nocturnal correction factors calculated using			Range of effects on collision risk
		NAR-1	NAR	NAR+1	
Whooper Swan	winter	1.00	1.27	1.55	0.79-1.21
Wigeon	winter	1.25	1.51	1.76	0.83-1.17
Mallard	all year	1.17	1.34	1.51	0.87-1.13
Cormorant	breeding	1.00	1.00	1.15	1.00-1.15
	non-breeding	1.00	1.00	1.37	1.00-1.37
Little Egret	non-breeding	1.00	1.35	1.71	0.74-1.26
Grey Heron	all year	1.00	1.24	1.48	0.81-1.19
Sparrowhawk	all year	1.00	1.00	1.24	1.00-1.24
Golden Plover	winter	1.00	1.35	1.71	0.74-1.26
Lapwing	winter	1.00	1.38	1.77	0.72-1.28
Black-tailed Godwit	all year	1.00	1.24	1.48	0.81-1.19
Kestrel	all year	1.00	1.00	1.24	1.00-1.24

For species with minimum or maximum nocturnal correction factors the NAR-1 or NAR+1 value is the same as the NAR value.

4.7.2.3 Natural variability

Species populations show natural variability from year to year due to stochastic effects and external factors (such as cold winters), while some populations may show longer term increasing or decreasing trends.

If the usage of the wind farm site tracks the population variation, the collision risk will change but the significance of the collision risk should remain the same as the population against which the

risk is assessed will increase or decrease in line with the changes in the collision risk. However, for territorial species, population increases may cause expansion into unoccupied habitat rather than increased occurrence within already occupied habitat.

Even if the population remains the same, there may be variation in usage of the wind farm site due to habitat changes within the site. Unlike many wind farm sites that are dominated by commercial forestry, such habitat changes may not have large long-term effects on the usage of the site over the lifetime of the project. However, for several waterbird species, there may be large annual variation driven by flooding patterns associated with water levels in the Little Brosna River.

4.7.2.4 Attraction

While wind farms are generally considered to cause displacement impacts to sensitive bird populations, there are some circumstances where development of a wind farm could cause increased bird activity within a site. This would result from habitat changes associated with the wind farm development that make the area more suitable for certain species. For example, placement of turbines in closed-canopy forestry creates open habitat that could potentially attract bird species that did not use the closed-canopy forestry. However, in this case, the proposed turbines will mainly be located in open bog or agricultural land, and no habitat changes of a nature and scale sufficient to significantly alter patterns of bird flight activity are likely to occur.

4.7.2.5 Sampling biases

Sampling biases could arise if the survey effort has uneven spatial, seasonal or diel coverage in relation to factors that affect species occurrence.

Spatial coverage

Uneven spatial coverage is difficult to avoid in vantage point surveys of large wind farm sites due to overlapping viewsheds and the under-detection of distant flightlines. The analyses of distance effects (Section 3.3.1) showed large declines in flightline densities with distance from vantage points. These effects were larger for smaller species and were consistent with patterns that I have recorded from vantage point survey datasets across multiple wind farm sites (Gittings, 2024 and unpublished data). Therefore, it is likely that, as with most vantage point survey datasets, there were large degrees of under-detection of flightlines in the more distant parts of the viewsheds.

The species-specific correction factors calculated from the weighted viewshed areas and the distribution of flight activity between the vantage points are shown in Table 4.6. These quantify the degree to which the predicted collision risk should be increased to account for under-detection of distant flightlines.

The larger species generally had smaller correction factors, reflecting the results of the distance effects analyses. However, the factors also reflect species-specific differences in how flight activity is distributed across viewsheds, as each viewshed's correction factor depends on the proportion of its area within different distance bands. This was particularly important for this project, where the Ecology Ireland viewsheds were refined to remove overlapping areas between vantage points, ensuring that flight activity was not double-counted. As a result, some viewsheds had a reduced proportion of their area in the nearest distance bands.

Correction factors were consistently higher for the 30 m viewshed analyses, as these included relatively greater contributions from more distant areas.

These correction factors do not take account of species-specific variation in flight behaviour and may over-estimate the under-detection effects in some cases. In particular, for species like Golden Plover and Lapwing, where extended flight activity by large flocks, usually contributes most of the collision risk, it seems likely that observers will detect most such activity even when it is distant from the vantage point.

Table 4.6. Correction factors to adjust for under-detection of distant flightlines.

Species	Season	Correction factors	
		Viewshed height 17 m	Viewshed height 30 m
Whooper Swan	winter	1.52	1.80
Wigeon	winter	2.65	2.88
Mallard	all year	1.85	1.97
Cormorant	breeding	1.52	1.69
	non-breeding	1.48	1.65
Little Egret	non-breeding	1.77	2.23
Grey Heron	all year	1.51	1.70
Sparrowhawk	all year	2.66	2.78
Golden Plover	winter	2.94	3.09
Lapwing	winter	2.68	2.88
Black-tailed Godwit	all year	1.51	1.86
Kestrel	all year	2.73	2.81

Temporal coverage

The survey effort was not distributed uniformly across the survey months (Table 2.2). However, the minimum survey effort required by the NatureScot guidelines was completed at each of the original Ecology Ireland vantage points in each month. Two additional vantage points were added midway through the survey period and met the minimum seasonal effort requirements in three of the four seasons that they were surveyed. The TOBIN surveys added additional winter coverage.

The diel distribution of the Ecology Ireland survey effort was concentrated in the middle of the day, with limited coverage in the early morning and evening. This may have resulted in some under-detection of Whooper Swan and/or Cormorant flight activity.

Whooper Swan showed higher levels of flight activity in the early morning in the Ecology Ireland surveys and, if this was due to commuting flights from roosts, it is likely that they would also have shown higher levels of flight activity in the evening. However, the TOBIN surveys, which had good coverage in the early morning and evening did not detect higher rates of Whooper Swan flight activity at these times.

Cormorant showed higher levels of flight activity in the early morning, afternoon and evening in the TOBIN surveys, and this pattern was supported by the Ecology Ireland surveys where they covered the relevant periods.

Flight heights

Observer error in flight height estimation is a potential source of significant uncertainty for most collision risk models.

The limited information on flight heights recorded in the Ecology Ireland vantage point surveys is likely to have caused some over-estimation of the predicted collision risks. I used the maximum flight heights to identify records for inclusion in the collision risk model (see Section 2.4.3.3). When the maximum flight height was greater than or equal to the viewshed height, I used the full duration value recorded for the record. However, there were a significant number of records where the lower part of the height range was below the viewshed height. For these records, only part of the recorded flight duration will have been at potential collision height.

In the TOBIN surveys, inclusion of all activity within the 0–20 m height band for the N163 turbine (ground clearance 17 m) also likely resulted in a significant overestimate of activity at collision height. A similar, though smaller, effect was also likely from the inclusion of activity within the 20–50 m height band for the N149 and V150 turbines (ground clearance 30 m) (see Section 2.4.3.4).

These approaches introduced a precautionary margin that reduced the risk of flight height estimation errors leading to the exclusion of flights from the collision risk model, and in the case of the TOBIN surveys for the N163 turbine, effectively eliminated this risk.

4.7.2.6 Behavioural effects

The equation for calculating predicted transits (Equation B1) includes the mean bird flight speed as part of the numerator. However, for Kestrel, a significant proportion of their flight activity will typically involve hovering birds. The flight speed of a hovering Kestrel is close to zero (a small amount of drift in position will often occur during long bouts of hovering). Therefore, using the mean flight speed for Kestrel (10.1 m/sec; Alerstam et al., 2007) in Equation 1 to predict transits of hovering Kestrel is clearly inappropriate and will result in highly inflated estimates.

In the collision risk model for the Castlebanny Wind Farm (Gittings, 2020), I used data collected during the vantage point survey on the duration of hovering flight, and the mean number of hovering positions per second, to calculate separate predicted transits for hovering Kestrels, with the standard collision risk model only used for direct Kestrel flight activity. This resulted in a predicted collision risk that was less than half the value of the collision risk that would have been generated by using the standard model for all Kestrel flight activity.

4.7.3. Uncertainty due to collision risk model limitations

4.7.3.1 Stage A

The weighted averaging procedure used to calculate mean flight activity densities in Stage A (Equation A2) assumes that longer durations of vantage point surveys and large viewsheds will produce more reliable estimates. This will be true for longer durations of vantage point surveys. However, in general, there is likely to be an increased risk of under-detection of all flightlines in larger viewsheds. More specifically, larger viewsheds usually have higher proportions of their survey area occupied by the more distant parts of the viewshed, which is likely to result in increased under-detection of distant flightlines.

In this collision risk model, viewshed areas were adjusted for detectability based on the results of the distance analysis (see Section 2.5.2), and these adjusted areas were then used in the weighted averaging. This adjustment was necessary because the removal of overlaps from the Ecology Ireland viewsheds resulted in some viewsheds losing much of the area closest to the vantage points. Consequently, similar nominal viewshed areas had markedly different detection characteristics between vantage points. This approach also largely addressed the issue identified above.

Another issue with the weighted averaging procedure is that the penalty imposed on a vantage point with a smaller viewshed and/or lower survey effort increases with the number of vantage points. This is a mathematical property of the formula, but it is somewhat counter-intuitive. When a weaker vantage point contributes a larger proportion of the available data (as occurs when there are few vantage points), its potential influence on the overall estimate is greater and it would therefore be reasonable for it to be down-weighted more strongly. Conversely, when many vantage points are available, the influence of any single vantage point is inherently reduced.

In principle, this issue could be addressed by allowing the exponent in the weighting formula to vary with the number of vantage points. The NatureScot procedure uses weights proportional to $\sqrt{(t_iA_i)}$, which corresponds to the general relationship $w_i \propto (t_iA_i)^{0.5}$, where w is the weighting, t is the survey effort and A is the viewshed area. A more flexible formulation would be $w_i \propto (t_iA_i)^{\alpha}$, where the exponent α varies with the number of vantage points. Under such an approach, α could decrease toward 0.5 as the number of vantage points increases (approaching the current procedure when many vantage points are available), but increase toward 1 when the number of vantage points is small, thereby placing greater weight on vantage points with higher survey coverage when the dataset is more limited.

4.7.3.2 Stage B

Monthly calculations

Stage B calculates transits separately for each month. By combining Equations A1 and B1, it can be seen that the predicted transits are proportional to the ratio of the total daylight hours to the vantage point survey effort (t_{day} / t). As vantage point survey effort is usually more or less constant between months the ratio will vary between months, with the highest values in mid-winter and the lowest values in mid-summer.

If variation in the distribution of flight activity densities between months reflects real differences in flight activity, the variation in the t_{day} / t ratio will not affect the reliability of the predicted collision risk. However, in practice, the variation in flight activity densities between months is likely to include a large component that is due to sampling effects. This means that calculating transits separately for each month is likely to exacerbate the influence of sampling effects on the degree of uncertainty around the predicted collision risk. The effects will be reduced for species with non-zero nocturnal flight activity included in the model.

A better procedure would be to calculate flight activity densities for groups of months where there are unlikely to be real differences in flight activity: e.g., across the entire winter period for wintering species. This is the procedure that I have followed in previous collision risk modelling. In fact, the worked example that is provided in Annex 1 of the NatureScot guidance uses this procedure. However, it is not possible to implement this method using the NatureScot spreadsheet. Therefore, as I have tried to implement the calculation procedures in the NatureScot spreadsheet, I have used the monthly calculation of predicted transits, despite the above issues.

4.7.3.3 Stage C

Pitch angle

The relationships between single transit collision risks and pitch angles are shown in Figure 4.2-Figure 4.4 for a selection of the species included in the collision risk model. The single transit collision risk values showed little variation up to pitch values of around 10-20°, after which they increased sharply with increasing pitch. The transition point was related to flight speed: the start of the increase in single transit collision risk with pitch angle occurred at around 6-7° in the species with the slowest flight speeds (Hen Harrier and Kestrel), and at around 15-20° in the species with the fastest flight speeds (Mallard and Wigeon). This reflects the influence of flight speed on the duration of rotor transit and therefore the probability of blade encounter.

The final collision risk predictions used a pitch angle of 15°. Monitoring data from an onshore Irish wind farm indicates that lower pitch angles may be typical. Conversely the NatureScot collision risk modelling guidance (NS 2024) refers to pitch angles of 15–30° as typical.

The single transit collision risks with a pitch angle of 0° were on average 0.96 times those at 15° (range 0.85–1.02), while those calculated at 30° were 1.26 times than those at 15° (range 1.11–1.47).

Rotation speed

The relationships between single transit collision risks and rotation speeds are shown in Figure 4.5 for a selection of the species included in the collision risk model.

The effects of variation in rotation speed generally increased with body size because larger birds present a larger frontal area and therefore have a greater probability of intersecting the swept path of the blades during a transit. However, species with slower flight speeds (Merlin, Sparrowhawk, Kestrel and Little Egret) showed larger increases relative to body size. Slower flight speeds lengthen the time that a bird spends passing through the rotor-swept disc, increasing the number of blade passages encountered during a transit and therefore enhancing the effect of increasing blade rotation speed.

The collision risk model used the maximum rotation speed so the uncertainty in single transit collision risk due to variation in rotation speed can only decrease the collision risk. The risk values at the minimum rotation speed were a mean of 83-85%% (range 72–94% to 74–96%), depending on turbine model, of the risk values at the maximum rotation speed.

Overall effects

There are a number of other sources of potential uncertainty in the calculations of single transit collision risks. Band (2024) notes that "having regard for the various simplifications in the model, and the potential sources of under- and over-estimation …, it is judged that [Stage C] of the model should be regarded as indicative of collision probability within around ± 20%".

The extreme ends of the results of the sensitivity analyses reported here would exceed the ± 20% uncertainty range. However, these extremes are not likely to be typical, and the more likely variation is within that uncertainty range.

4.7.3.4 Stage E

The avoidance rates that are applied in the Stage E of the collision risk model have large effects, causing 20-fold to 500-fold decreases in the predicted collision risk. However, the evidence for most avoidance rates used in collision risk modelling for onshore wind farms is very limited, while there are also conceptual issues about the way that the model applies avoidance rates to large flocks.

Species avoidance rates

I applied the default avoidance rate of 98% when species-specific avoidance rates were not available. In most cases, the latter were higher: 99% for Hen Harrier, 99.2% for Black-headed Gull and Common Gull, 99.5% for Mute Swan, Whooper Swan and Lesser Black-backed Gull and Herring Gull, 99.6-99.8% for Golden Plover, and 99.8% for White-fronted Goose. Increasing the avoidance rate from 98% to 99% halves the predicted collision risk, while increasing the avoidance rate from 98% to 98.8% causes a 10-fold reduction in the predicted collision risk.

The exception were Kestrel and White-tailed Eagle, which have recommended avoidance rate of 95% (NatureScot, 2025b). This causes a 2.5-fold increase in the collision risk compared to the default avoidance rate of 98%.

The evidence for the Kestrel avoidance rate is weak. The avoidance rate is described as being based on: "sufficient evidence from flight behaviour (including hovering) and collision monitoring studies for vulnerability to collisions". The cited source (Whitfield and Madders, 2006) is, in fact, a review of avoidance rates for Red Kite. The information on Kestrel is derived from an analysis which finds a significant correlation between the "numbers of individuals seen" against numbers of carcasses found for 16 raptor species at a single wind farm in Spain. Kestrel is a large outlier above the regression line, and this appears to be the only empirical evidence that has been used by Scottish Natural Heritage to support the 95% avoidance rate for Kestrel. However, even taken at face value, all this analysis does is indicate that Kestrel has a lower avoidance rate than other raptor species, but it does not provide any quantitative data that can be used to estimate the avoidance rate. More seriously, this analysis does not account for behavioural and ecological differences between species that may affect the relationship between bird activity and collisions. It is also subject to the perennial problem with analyses of collision rates: the small absolute numbers of collisions which means that random sampling error may have significant effects.

Large flocks

The NatureScot collision risk model scales predicted risk directly with the number of birds recorded, implicitly treating a single flock of 100 birds as equivalent to 100 independent single-bird passages. This assumes that the probability of avoidance by each bird is independent and unaffected by flocking behaviour. However, for a cohesive flock, collision risk and avoidance behaviour are unlikely to be independent among individuals, so the model may not fully reflect how risk arises from such events.

In simple terms, for a large flock the outcome is unlikely to reflect many independent collision risks; instead, it is more likely to be driven by a single event in which either most birds avoid the turbines or multiple birds are affected together.

In principle, this type of scenario would be better represented by an event-based collision model. Although such a model could, in principle, distinguish between collective and individual avoidance, there is unlikely to be sufficient empirical evidence to parameterise these separately. A more practical adaptation would be to retain a single overall avoidance term while treating large flocks as discrete events, rather than as large numbers of independent bird transits, thereby avoiding the need to assume independence among individuals within flocks. Such an approach would separate the frequency of large-flock events from the number of birds involved in each event and would allow for correlated avoidance behaviour within flocks.

4.7.4. Uncertainty due to turbine options

This collision risk model is based on fixed turbine models so there is no uncertainty due to turbine options.

4.7.5. Overall uncertainty

Table 4.7 shows the overall uncertainty factors generated by sampling effects from the simulation model and the uncertainties about the nocturnal activity ranking and the single transit collision risks, combined using the multiplicative method (the simulation/multiplicative uncertainties). It also shows the range of uncertainty these factors create around the central estimate of the annual collision risks from Table 4.3.

The uncertainty factors generated by sampling effects from the relative error method and the uncertainties about the nocturnal activity ranking and the single transit collision risks, combined using the root sum of squares (the relative error/root sum of squares uncertainties) are shown in Table 4.8.

In both cases the overall uncertainties are dominated by the sampling effects uncertainties, although the influence of these are greater in the relative error/RSS uncertainties where the overall uncertainties are almost identical to the sampling effects uncertainties

The uncertainty due to distance effects is not included in the overall uncertainty estimates in Table 4.7 and Table 4.8 because distance effects are not included in the NatureScot methodology. Also, the correction factors were not species-specific, and were likely to be significant over-estimates for some species (e.g., Golden Plover and Lapwing; see Section 4.7.2). This uncertainty would double the upper end of the collision risk range by a factor of around 1.5–3 times.

Uncertainty due to limited knowledge of avoidance rates is also not included in these estimates. The variation in the predicted collision risks with avoidance rates of 95%, 98%, 99% and 99.5% is shown in Table 4.9. This table includes some additional species/seasons to those included in Table 4.3 that had non-zero collision risks rounded to two decimal places at avoidance rates lower than the recommended avoidance rate.

Other factors that may cause additional uncertainty are uneven diel coverage which may have caused under-estimation of Cormorant and (possibly) Whooper Swan collision risk (see Section 4.7.2.5), and precautionary approaches to the assignment of flight heights, which may have caused general overestimation of collision risks (see Section 4.7.2.5).

Table 4.7. Overall uncertainty factors and collision risk ranges, using the uncertainty factors from the simulation model and the multiplicative method for combining uncertainties (the simulation/multiplicative uncertainties).

Species	Season	Turbine	Uncertainty factors	Collision risk	
				central estimate	range
Whooper Swan	winter	N149	0.46–2.97	0.02	0.01–0.07
		N163	0.46–2.97	0.05	0.02–0.13
		V150	0.46–2.97	0.02	0.01–0.07
Wigeon	winter	N149	0.44–4.14	1.36	0.59–5.62
		N163	0.44–4.14	2.44	1.06–10.09
		V150	0.44–4.14	1.39	0.61–5.74
Mallard	all year	N149	0.48–3.64	0.56	0.27–2.04
		N163	0.48–3.64	0.68	0.33–2.48
		V150	0.48–3.64	0.58	0.28–2.09
Cormorant	breeding	N149	0.60–2.69	0.10	0.06–0.28
		N163	0.60–2.69	0.12	0.07–0.32
		V150	0.60–2.69	0.11	0.06–0.29
	non-breeding	N149	0.71–2.00	0.32	0.23–0.64
		N163	0.71–2.00	0.44	0.31–0.88
		V150	0.71–2.00	0.33	0.24–0.66
Little Egret	non-breeding	N149	0.43–3.30	0.01	0.00–0.03
		N163	0.43–3.30	0.05	0.02–0.17
		V150	0.43–3.30	0.01	0.00–0.03
Grey Heron	all year	N149	0.46–2.87	0.10	0.05–0.30
		N163	0.46–2.87	0.17	0.08–0.48
		V150	0.46–2.87	0.11	0.05–0.31
Sparrowhawk	all year	N149	0.53–4.39	0.11	0.06–0.48
		N163	0.53–4.39	0.17	0.09–0.74
		V150	0.53–4.39	0.11	0.06–0.50
Golden Plover	winter	N149	0.42–3.31	7.91	3.34–26.21
		N163	0.42–3.31	9.42	3.98–31.21
		V150	0.42–3.31	8.08	3.42–26.76
Lapwing	winter	N149	0.40–3.35	1.37	0.55–4.58
		N163	0.40–3.35	1.57	0.63–5.25
		V150	0.40–3.35	1.41	0.56–4.72
Black-tailed Godwit	all year	N149	0.43–4.21	3.32	1.41–13.95
		N163	0.43–4.21	4.67	1.99–19.67
		V150	0.43–4.21	3.39	1.45–14.27
Kestrel	all year	N149	0.64–2.23	1.45	0.92–3.23
		N163	0.64–2.23	2.93	1.86–6.52
		V150	0.64–2.23	1.50	0.95–3.35

The overall uncertainty factors were derived from the 95% limits of a Monte Carlo permutation of the simulation model sampling effects and single transit collision risk uncertainty factors multiplied by the nocturnal correction factor uncertainty factors. No sampling effects uncertainty factors were calculated for Wigeon and Black-tailed Godwit (see Section 4.7.2.1); the overall uncertainty factors for these species used the maximum sampling effects uncertainty factors from the species modelled.

Table 4.8. Overall uncertainty factors and collision risk ranges, using the uncertainty factors from the relative error method and the root sum of squares method for combining uncertainties (the relative error/RSS uncertainties).

Species	Season	Turbine	Uncertainty factors	Collision risk	
				central estimate	range
Whooper Swan	winter	N149	0.00–4.65	0.05	0.00–0.21
		N163	0.00–4.33	0.02	0.00–0.10
		V150	0.00–4.33	0.02	0.00–0.10
Wigeon	winter	N149	0.00–5.48	2.44	0.00–13.37
		N163	0.00–5.59	1.36	0.00–7.60
		V150	0.00–5.59	1.39	0.00–7.75
Mallard	all year	N149	0.00–9.02	0.68	0.00–6.15
		N163	0.00–10.55	0.56	0.00–5.92
		V150	0.00–10.55	0.58	0.00–6.06
Cormorant	breeding	N149	0.00–4.47	0.12	0.00–0.53
		N163	0.00–4.18	0.10	0.00–0.43
		V150	0.00–4.18	0.11	0.00–0.44
	non-breeding	N149	0.00–4.59	0.44	0.00–2.01
		N163	0.00–5.30	0.32	0.00–1.71
		V150	0.00–5.30	0.33	0.00–1.76
Little Egret	non-breeding	N149	0.00–6.19	0.05	0.00–0.31
		N163	0.00–5.67	0.01	0.00–0.04
		V150	0.00–5.67	0.01	0.00–0.05
Grey Heron	all year	N149	0.00–5.55	0.17	0.00–0.93
		N163	0.00–5.45	0.10	0.00–0.57
		V150	0.00–5.45	0.11	0.00–0.59
Sparrowhawk	all year	N149	0.00–3.19	0.17	0.00–0.54
		N163	0.00–3.45	0.11	0.00–0.38
		V150	0.00–3.45	0.11	0.00–0.39
Golden Plover	winter	N149	0.00–5.45	9.42	0.00–51.41
		N163	0.00–5.29	7.91	0.00–41.83
		V150	0.00–5.29	8.08	0.00–42.71
Lapwing	winter	N149	0.00–4.97	1.57	0.00–7.79
		N163	0.00–5.17	1.37	0.00–7.07
		V150	0.00–5.17	1.41	0.00–7.28
Black-tailed Godwit	all year	N149	0.00–9.19	4.67	0.00–42.93
		N163	0.00–9.39	3.32	0.00–31.12
		V150	0.00–9.39	3.39	0.00–31.83
Kestrel	all year	N149	0.00–3.56	2.93	0.00–10.41
		N163	0.00–2.65	1.45	0.00–3.85
		V150	0.00–2.65	1.50	0.00–3.99

The overall uncertainty factors were derived by the root sum of squares method from relative error method sampling effects uncertainty factors and the single transit collision risk and nocturnal correction factor uncertainty factors.

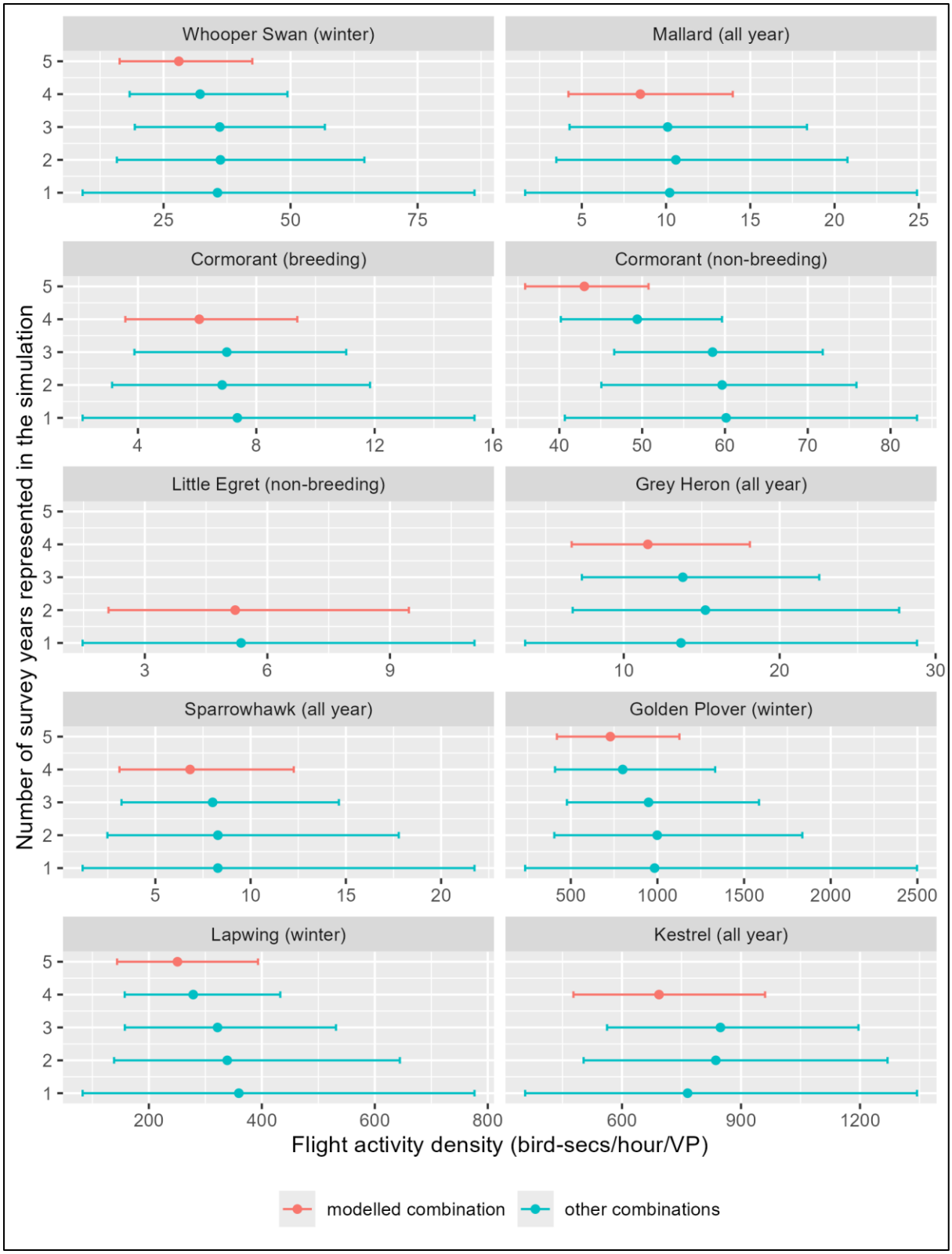
Table 4.9. Potential variation in central estimates of predicted collision risks due to uncertainty about avoidance rates.

Species	Season	Turbine	Predicted collision risk with avoidance rates of			
			95%	98%	99%	99.5%
Mute Swan	breeding	N149	0.02	0.01	0.00	0.00
		N163	0.01	0.01	0.00	0.00
		V150	0.02	0.01	0.00	0.00
	non-breeding	N149	0.06	0.03	0.01	0.01
		N163	0.20	0.08	0.04	0.02
		V150	0.07	0.03	0.01	0.01
Whooper Swan	winter	N149	0.22	0.09	0.04	0.02
		N163	0.45	0.18	0.09	0.05
		V150	0.23	0.09	0.05	0.02
White-fronted Goose	all year	N149	0.09	0.03	0.02	0.01
		N163	0.13	0.05	0.03	0.01
		V150	0.09	0.04	0.02	0.01
Wigeon	winter	N149	3.39	1.36	0.68	0.34
		N163	6.09	2.44	1.22	0.61
		V150	3.46	1.39	0.69	0.35
Teal	all year	N163	0.01	0.01	0.00	0.00
Mallard	all year	N149	1.40	0.56	0.28	0.14
		N163	1.70	0.68	0.34	0.17
		V150	1.44	0.58	0.29	0.14
Pintail	all year	N149	0.02	0.01	0.00	0.00
		N163	0.02	0.01	0.00	0.00
		V150	0.02	0.01	0.00	0.00
Cormorant	breeding	N149	0.26	0.10	0.05	0.03
		N163	0.30	0.12	0.06	0.03
		V150	0.27	0.11	0.05	0.03
	non-breeding	N149	0.81	0.32	0.16	0.08
		N163	1.09	0.44	0.22	0.11
		V150	0.83	0.33	0.17	0.08
Little Egret	breeding	N149	0.03	0.01	0.01	0.00
		V150	0.03	0.01	0.01	0.00
	non-breeding	N149	0.02	0.01	0.00	0.00
		N163	0.13	0.05	0.03	0.01
		V150	0.02	0.01	0.00	0.00
Grey Heron	all year	N149	0.26	0.10	0.05	0.03
		N163	0.42	0.17	0.08	0.04
		V150	0.27	0.11	0.05	0.03
White-tailed Eagle	all year	N149	0.02	0.01	0.00	0.00
		N163	0.04	0.01	0.01	0.00
		V150	0.02	0.01	0.00	0.00
Hen Harrier	all year	N149	0.05	0.02	0.01	0.01
		N163	0.10	0.04	0.02	0.01
		V150	0.05	0.02	0.01	0.01

Species	Season	Turbine	Predicted collision risk with avoidance rates of			
			95%	98%	99%	99.5%
Sparrowhawk	all year	N149	0.28	0.11	0.06	0.03
		N163	0.42	0.17	0.08	0.04
		V150	0.29	0.11	0.06	0.03
Buzzard	all year	N149	3.39	1.35	0.68	0.34
		N163	4.23	1.69	0.85	0.42
		V150	3.50	1.40	0.70	0.35
Golden Plover	winter	N149	98.92	39.57	19.78	9.89
		N163	117.81	47.12	23.56	11.78
		V150	101.01	40.40	20.20	10.10
Lapwing	winter	N149	3.42	1.37	0.68	0.34
		N163	3.91	1.57	0.78	0.39
		V150	3.52	1.41	0.70	0.35
Curlew	all year	N149	0.05	0.02	0.01	0.00
		N163	0.05	0.02	0.01	0.01
		V150	0.05	0.02	0.01	0.00
Black-tailed Godwit	all year	N149	8.29	3.32	1.66	0.83
		N163	11.68	4.67	2.34	1.17
		V150	8.48	3.39	1.70	0.85
Black-headed Gull	non-breeding	N149	1.95	0.78	0.39	0.20
		N163	2.71	1.09	0.54	0.27
		V150	2.01	0.80	0.40	0.20
Common Gull	all year	N149	0.02	0.01	0.00	0.00
		N163	0.03	0.01	0.01	0.00
		V150	0.02	0.01	0.00	0.00
Lesser Black-backed Gull	autumn	N149	0.20	0.08	0.04	0.02
		N163	0.47	0.19	0.09	0.05
		V150	0.20	0.08	0.04	0.02
	breeding	N149	0.03	0.01	0.01	0.00
		N163	0.02	0.01	0.00	0.00
		V150	0.03	0.01	0.01	0.00
	spring	N149	0.06	0.03	0.01	0.01
		N163	1.33	0.53	0.27	0.13
		V150	0.07	0.03	0.01	0.01
	winter	N149	0.48	0.19	0.10	0.05
		N163	0.41	0.16	0.08	0.04
		V150	0.49	0.20	0.10	0.05
Herring Gull	all year	N149	0.01	0.00	0.00	0.00
		V150	0.01	0.00	0.00	0.00
Kestrel	all year	N149	1.45	0.58	0.29	0.14
		N163	2.93	1.17	0.59	0.29
		V150	1.50	0.60	0.30	0.15
Merlin	all year	N149	0.01	0.00	0.00	0.00
		N163	0.03	0.01	0.01	0.00
		V150	0.01	0.00	0.00	0.00

Species	Season	Turbine	Predicted collision risk with avoidance rates of			
			95%	98%	99%	99.5%
Peregrine	all year	N149	0.06	0.02	0.01	0.01
		N163	0.08	0.03	0.02	0.01
		V150	0.06	0.02	0.01	0.01

Additional species/seasons are included in this table because they had non-zero collision risks rounded to two decimal places at avoidance rates lower than the recommended avoidance rate.



Points show mean simulated flight activity densities and horizontal bars show 95% simulation intervals (2.5–97.5 percentiles) derived from 10,000 simulation runs. The results for the number of years used in the collision risk model for each species are shown in red. For most species the simulation interval decreases substantially between one and two seasons, with smaller reductions thereafter.

Figure 4.1. Simulation intervals for flight activity density estimated from vantage point survey data under different numbers of surveyed years.

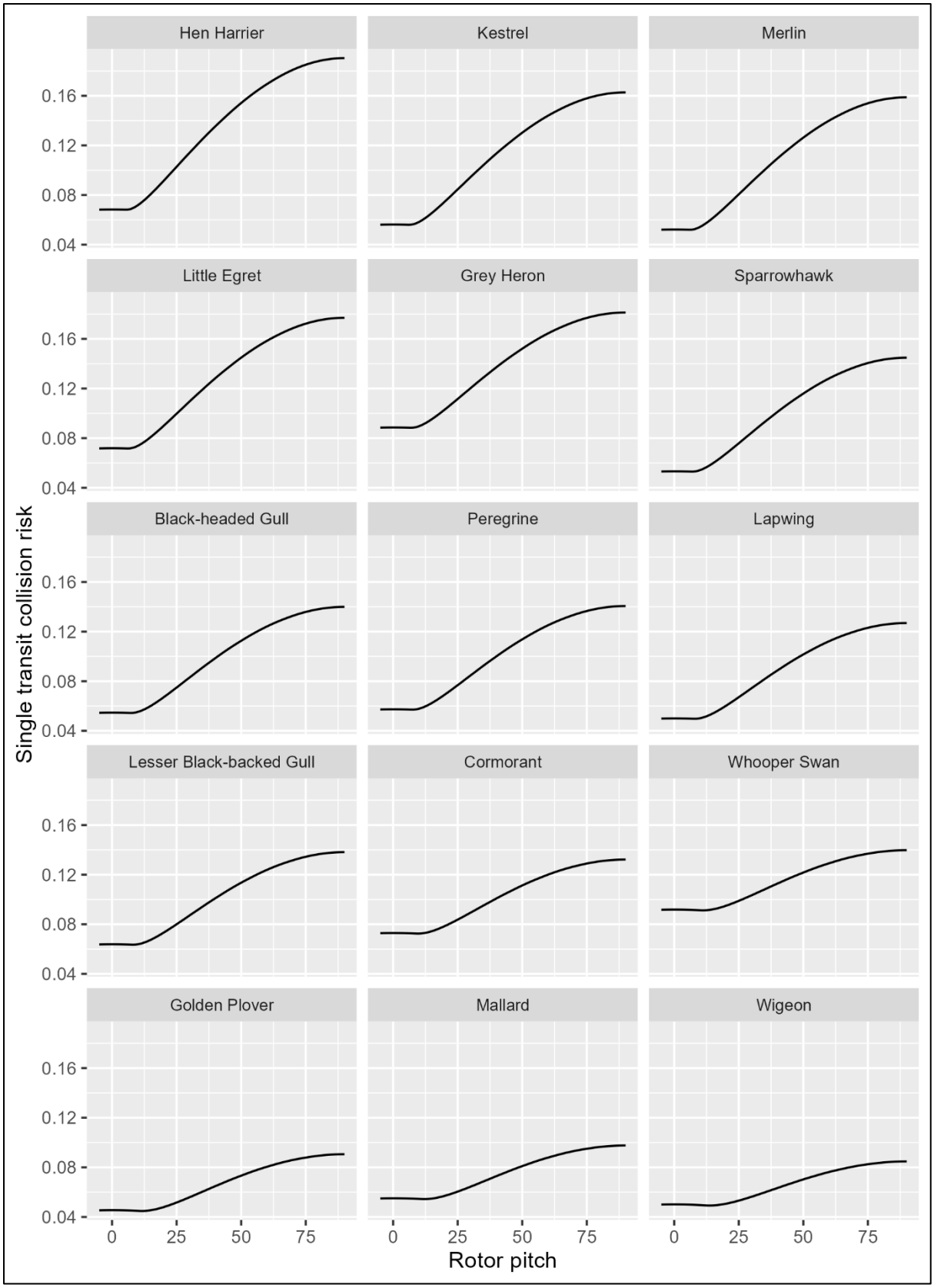


Figure 4.2. Relationship between pitch angle and single transit collision risk for the V150 turbine and pitch angles between -5 and 90°, with species arranged in order of increasing flight speed.

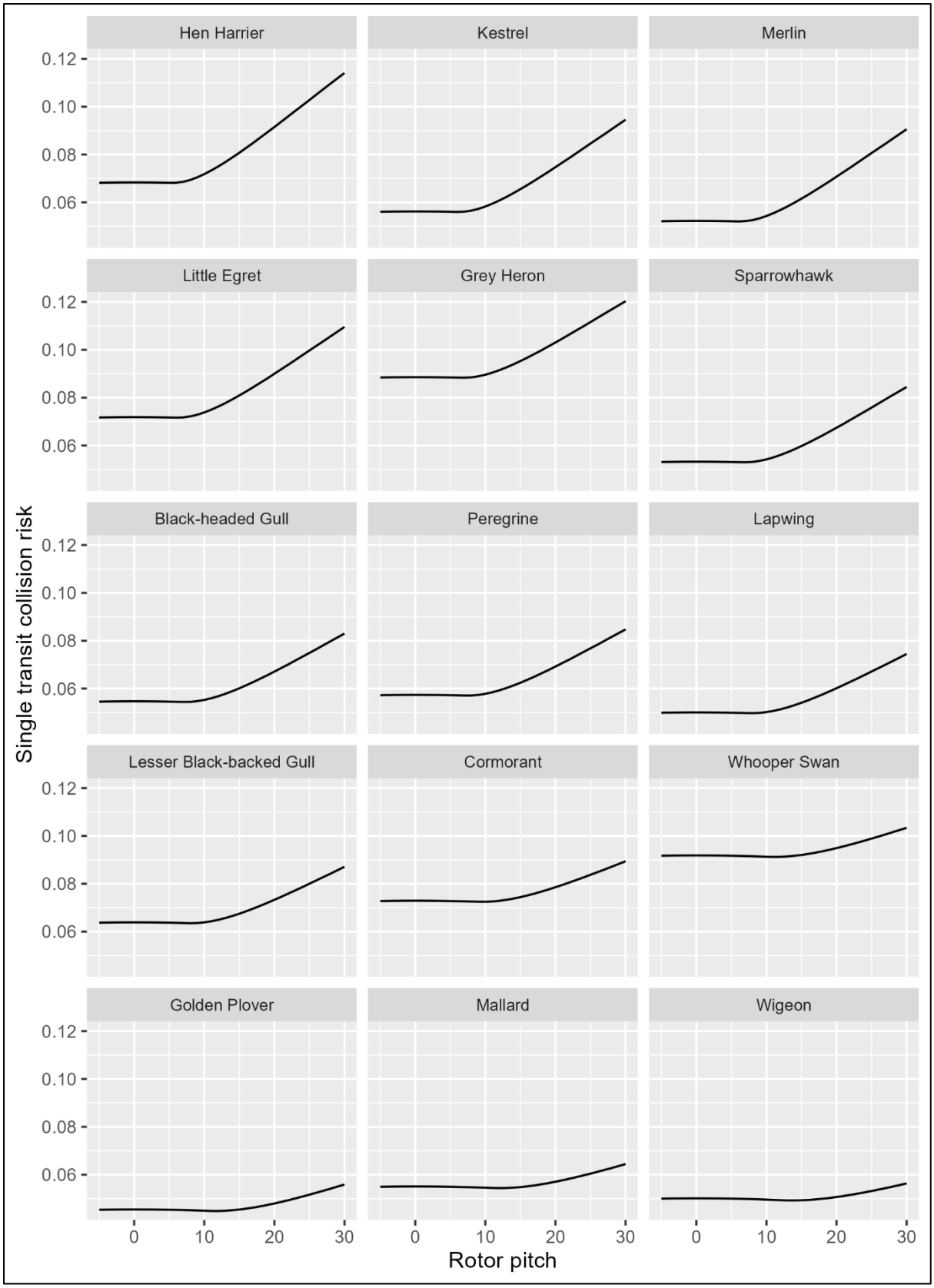


Figure 4.3. Relationship between pitch angle and single transit collision risk for the V150 turbine and pitch angles between -5 and 30°, with species arranged in order of increasing flight speed

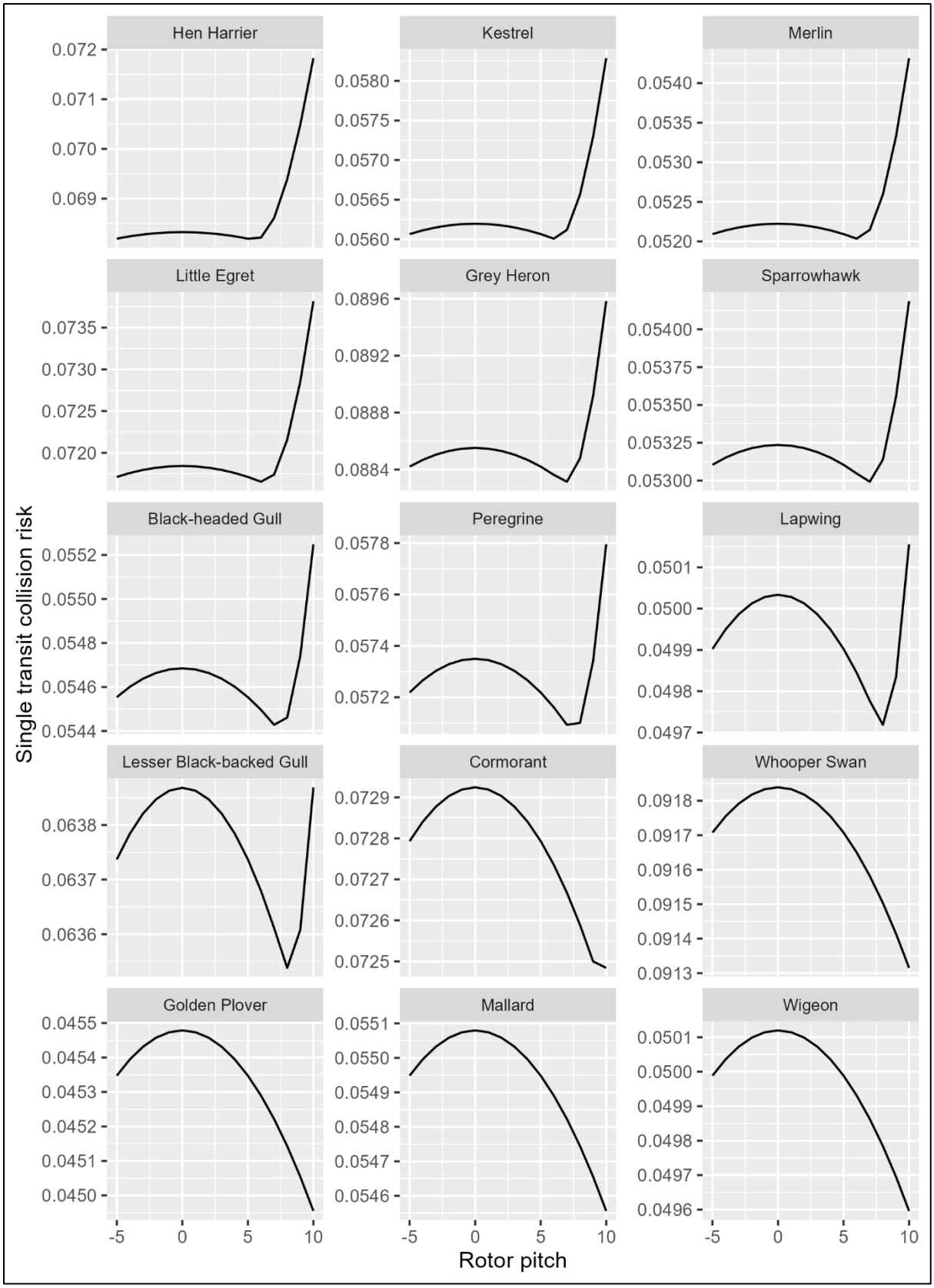


Figure 4.4. Maximum single transit collision risks for the V150 turbine with pitch angle of between -5 and 10°, with species arranged in order of increasing flight speed.

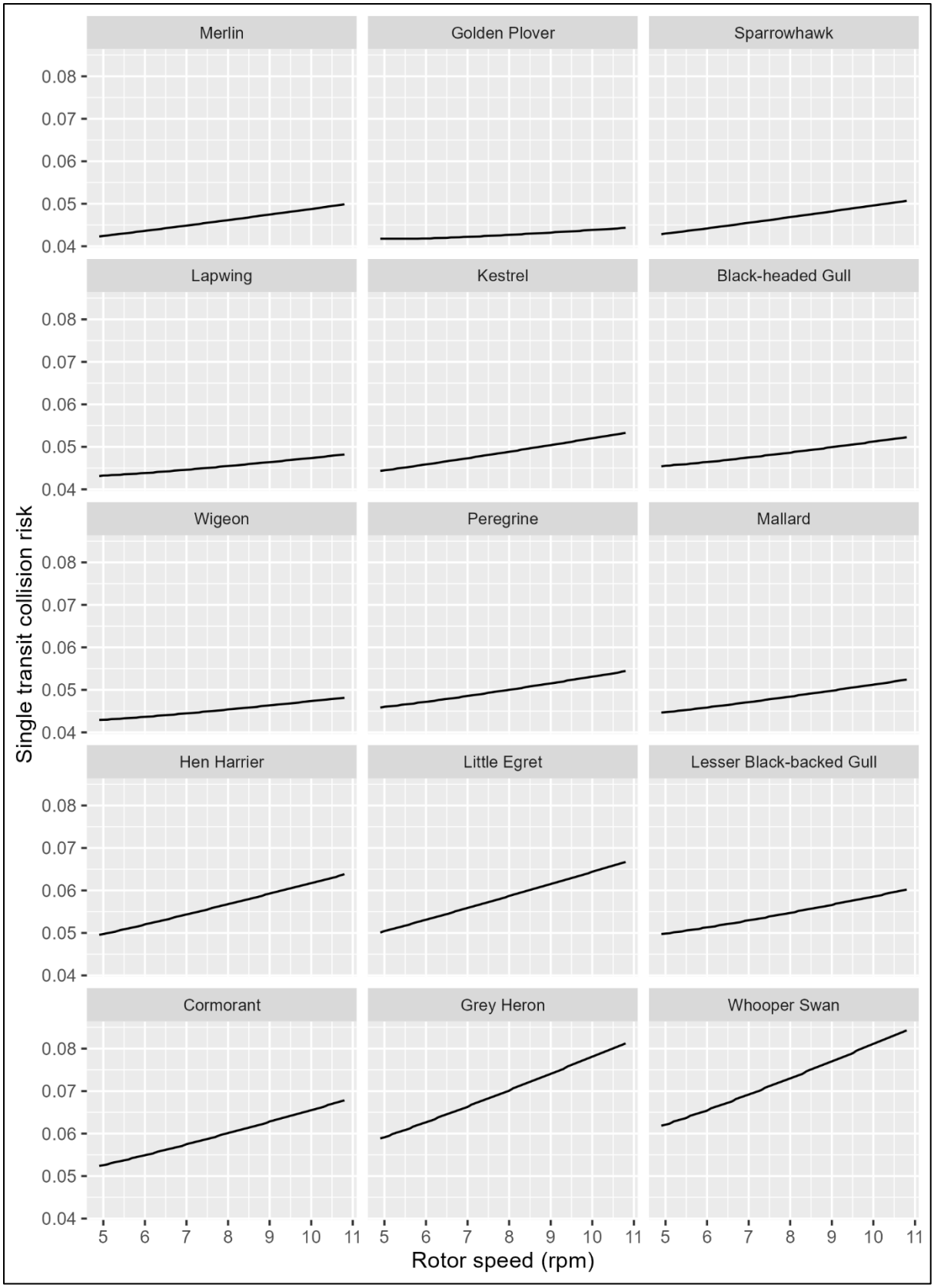


Figure 4.5. Relationship between rotor speed and single transit collision risk for the V150 turbine, with species arranged in order of increasing body size (body length × wingspan).

5. COLLISION RISK ASSESSMENT

5.1. RESULTS

The results of the collision risk assessment are shown in Table 5.1. The range of uncertainty around the mortality increases due to the calculated uncertainty in the predicted collision risk is also shown.

These uncertainty ranges are based on the simulation/multiplicative uncertainty factors. These were used instead of the relative error/RSS factors due to the methodological issues with the latter (see Sections 2.6.7.5 and 4.7.2.1)

Table 5.1. Potential increase in annual mortality rates due to the predicted collision risk from the Ballincor Wind Farm.

Species	Population	Scale	Turbine		
			N149	N163	V150
Whooper Swan	winter	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		county	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		local	0.0% (0.0% - 0.1%)	0.1% (0.0% - 0.2%)	0.0% (0.0% - 0.1%)
Wigeon	winter	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		local	0.0% (0.0% - 0.2%)	0.1% (0.0% - 0.3%)	0.0% (0.0% - 0.2%)
Mallard	winter	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		local	1.6% (0.8% - 5.7%)	1.9% (0.9% - 6.9%)	1.6% (0.8% - 5.8%)
Cormorant	breeding	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		local	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)
	non-breeding	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.1%)	0.0% (0.0% - 0.0%)
Little Egret	non-breeding	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
Grey Heron	breeding	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		county	0.4% (0.2% - 1.1%)	0.6% (0.3% - 1.8%)	0.4% (0.2% - 1.1%)
Sparrowhawk	breeding	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		county	0.1% (0.1% - 0.4%)	0.2% (0.1% - 0.7%)	0.1% (0.1% - 0.5%)
Golden Plover (99.6%)	winter	national	0.0% (0.0% - 0.1%)	0.0% (0.0% - 0.1%)	0.0% (0.0% - 0.1%)
		local	0.3% (0.1% - 1.0%)	0.4% (0.2% - 1.3%)	0.3% (0.1% - 1.1%)
Golden Plover (99.8%)	winter	national	0.0% (0.0% - 0.1%)	0.0% (0.0% - 0.1%)	0.0% (0.0% - 0.1%)
		local	0.2% (0.1% - 0.5%)	0.2% (0.1% - 0.6%)	0.2% (0.1% - 0.5%)
Lapwing	winter	national	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		local	0.1% (0.0% - 0.3%)	0.1% (0.0% - 0.3%)	0.1% (0.0% - 0.3%)
Black-tailed Godwit	non-breeding	national	0.2% (0.1% - 0.9%)	0.3% (0.1% - 1.3%)	0.2% (0.1% - 1.0%)
		local	1.6% (0.7% - 6.5%)	2.2% (0.9% - 9.2%)	1.6% (0.7% - 6.7%)
Kestrel	breeding	national	0.0% (0.0% - 0.1%)	0.1% (0.0% - 0.2%)	0.0% (0.0% - 0.1%)
		county	1.5% (0.9% - 3.3%)	3.0% (1.9% - 6.7%)	1.5% (1.0% - 3.4%)

Separate estimates of mortality increases are included for Golden Plover using avoidance rates of 99.6% and 99.8%. The values in parentheses indicate the range of uncertainty around the mortality increases due to uncertainty in the predicted collision risk.

The central estimates of the potential increase in annual mortality due to the predicted collision risk exceeded the 1% threshold for the local Mallard wintering population, the local Black-tailed Godwit wintering population and the county Kestrel population. The upper limit of the uncertainty range exceeded the thresholds by small amounts for the Grey Heron county population, the national Black-tailed Godwit wintering population (N163 and V150 turbines), and the local Golden Plover wintering population (99.6% avoidance rate).

The potential increase in annual mortality to the local Mallard wintering population may be overestimated. This population was quantified using Irish Wetland Bird Survey count data for the Little Brosna Callows. However, this is likely to be a substantial under-estimate of the local population as wintering Mallards occur widely across the Irish countryside.

The local Golden Plover and Black-tailed Godwit wintering populations are qualifying interests of the Little Brosna Callows SPA.

5.2. BLACK-TAILED GODWIT

The predicted impact on the local Black-tailed Godwit wintering population was driven by a collision risk largely generated by a single record of a flock of 1,750 birds. This record accounted for around 95% of the flight activity included in the collision risk model. The remaining records involved much smaller flock sizes (<100 birds). The collision risk estimate is therefore highly sensitive to a single observation and should be interpreted with caution.

The available data were insufficient to estimate the frequency with which such large flocks occur at the site or to meaningfully characterise sampling uncertainty. This is reinforced by the fact that the record was obtained during an additional replacement watch, illustrating how the result was sensitive to the chance timing of survey effort.

The predicted impact on the local Black-tailed Godwit wintering population was negligible when the record of the large flock was excluded, demonstrating that the collision risk estimate for Black-tailed Godwit is not robust.

If occurrences of large Black-tailed Godwit flocks at the wind farm site are rare, the predicted collision risk is more appropriately interpreted as a plausible worst-case scenario rather than a reliable estimate of average risk. Vantage point surveys typically sample only around 1.5–2% of daylight hours across the season. As a result, if the survey effort, by chance, coincided with one of the relatively few occasions when a large flock occurred, the collision risk could be overestimated by at least an order of magnitude. This highlights the sensitivity of the estimate to the timing of survey effort relative to infrequent, high-magnitude events.

An alternative possibility is that the survey effort may have under-sampled the occurrence of large flocks, and that the recorded event reflects a more regular but infrequently detected pattern of site use. This uncertainty cannot be resolved from the available data and is inherent in datasets where activity is dominated by infrequent, high-magnitude events, and therefore represents an irreducible source of uncertainty in the collision risk estimates.

5.3. CAVEATS

The uncertainty ranges did not take account of potential under-detection of distant flightlines. Inclusion of this factor would raise the mortality increases by factors of around 1.5–3 times. However, for some species, these factors may be over-estimated (see Section 4.7.2).

The uncertainty ranges also did not take account of uncertainty due to limited knowledge of avoidance rates.

As discussed in Section 2.7, the 1% threshold is likely to be very precautionary. The calculations of the increase in annual mortality also made strong precautionary assumptions that all the collision fatalities were adult birds, and that the collision mortality was additive not compensatory. Therefore, substantial increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations.

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Appendix 1 Results tables for intermediate stages of the collision risk model

Table A1.1. Monthly daytime flight activity densities (bird/km^2), all watches.

BTO	Viewshed height	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
BH	17 m	0.2497	0.0031	0.0019	0.0000	0.0002	0.0007	0.0000	0.0007	0.0000	0.0000	0.0439	0.5643
BH	30 m	0.2482	0.0033	0.0000	0.0000	0.0001	0.0003	0.0000	0.0000	0.0000	0.0000	0.0475	0.3288
BW	17 m	0.0000	1.5464	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BW	30 m	0.0000	1.1117	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BZ	17 m	0.0018	0.0036	0.0129	0.0059	0.0039	0.0074	0.0091	0.0048	0.0093	0.0016	0.0015	0.0015
BZ	30 m	0.0008	0.0019	0.0094	0.0040	0.0048	0.0060	0.0089	0.0041	0.0071	0.0010	0.0008	0.0016
CA	17 m	0.0269	0.0118	0.0063	0.0007	0.0087	0.0052	0.0035	0.0053	0.0639	0.0069	0.0212	0.0348
CA	30 m	0.0180	0.0075	0.0041	0.0006	0.0073	0.0025	0.0066	0.0067	0.0623	0.0014	0.0114	0.0271
CM	17 m	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006
CM	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006
CU	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CU	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ET	17 m	0.0022	0.0001	0.0105	0.0000	0.0002	0.0000	0.0000	0.0001	0.0000	0.0006	0.0011	0.0031
ET	30 m	0.0002	0.0000	0.0011	0.0000	0.0001	0.0000	0.0017	0.0001	0.0000	0.0003	0.0008	0.0008
GP	17 m	0.0128	0.0356	0.1259	0.0000	0.0000	0.0000	0.0000	0.0000	0.6920	0.0014	0.0383	0.0056
GP	30 m	0.0132	0.0253	0.6504	0.0000	0.0000	0.0000	0.0000	0.0000	0.5692	0.0014	0.0296	0.0174
H.	17 m	0.0040	0.0019	0.0111	0.0008	0.0050	0.0029	0.0025	0.0053	0.0015	0.0015	0.0003	0.0005
H.	30 m	0.0036	0.0015	0.0048	0.0001	0.0061	0.0024	0.0019	0.0035	0.0013	0.0007	0.0002	0.0003
HG	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HG	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
HH	17 m	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0001	0.0003	0.0002
HH	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0001	0.0002	0.0001
K.	17 m	0.0010	0.0015	0.0032	0.0012	0.0031	0.0034	0.0216	0.0035	0.0057	0.0013	0.0019	0.0048
K.	30 m	0.0005	0.0008	0.0044	0.0004	0.0028	0.0019	0.0062	0.0016	0.0051	0.0007	0.0011	0.0024
L.	17 m	0.0001	0.0458	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1511	0.3958	0.0833
L.	30 m	0.0001	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1252	0.3608	0.0838
LB	17 m	0.0853	0.0063	0.1139	0.0000	0.0004	0.0024	0.0013	0.0138	0.0117	0.0349	0.0713	0.0035
LB	30 m	0.0818	0.0047	0.0110	0.0000	0.0003	0.0021	0.0016	0.0170	0.0079	0.0053	0.0286	0.0033
MA	17 m	0.0000	0.0114	0.0058	0.0046	0.0015	0.0081	0.0501	0.0004	0.0100	0.0012	0.0001	0.0001
MA	30 m	0.0000	0.0021	0.0014	0.0038	0.0010	0.0078	0.0483	0.0000	0.0082	0.0008	0.0000	0.0000
ML	17 m	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002
ML	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
MS	17 m	0.0017	0.0027	0.0003	0.0000	0.0007	0.0003	0.0000	0.0007	0.0033	0.0004	0.0001	0.0024
MS	30 m	0.0017	0.0015	0.0003	0.0000	0.0005	0.0000	0.0000	0.0009	0.0016	0.0000	0.0000	0.0000
PE	17 m	0.0000	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0001	0.0002	0.0002	0.0001
PE	30 m	0.0000	0.0001	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0003	0.0001	0.0002	0.0001
PT	17 m	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT	30 m	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SH	17 m	0.0001	0.0004	0.0014	0.0000	0.0009	0.0002	0.0005	0.0001	0.0028	0.0010	0.0005	0.0006
SH	30 m	0.0001	0.0002	0.0010	0.0000	0.0006	0.0002	0.0001	0.0001	0.0021	0.0007	0.0003	0.0004
SV	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SV	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T.	17 m	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T.	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WE	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000
WE	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
WG	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000
WG	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
WN	17 m	0.0072	0.0315	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2505	0.2112
WN	30 m	0.0000	0.0150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1407	0.1256
WS	17 m	0.0020	0.0003	0.0091	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0046	0.0038
WS	30 m	0.0013	0.0000	0.0035	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0042	0.0010

BH = Black-headed Gull; BW = Black-tailed Godwit; BZ = Buzzard; CA = Cormorant; CM = Common Gull; CU = Curlew; ET = Little Egret; GP = Golden Plover; H. = Grey Heron; HG = Herring Gull; HH = Hen Harrier; K. = Kestrel; L. = Lapwing; LB = Lesser Black-backed Gull; MA = Mallard; ML = Merlin; MS = Mute Swan; PE = Peregrine; PT = Pintail; SH = Sparrowhawk; SV = Shoveler; T. = Teal; WE = White-tailed Eagle; WG = White-fronted Goose; WN = Wigeon; WS = Whooper Swan.

Table A1.2. Monthly daytime flight activity densities (bird/km^2), compliant watches.

BTO	Viewshed height	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
BH	17 m	0.0000	0.0061	0.0027	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0969	0.7651
BH	30 m	0.0000	0.0065	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.1069	0.4450
BW	17 m	0.0000	1.9047	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BW	30 m	0.0000	1.3714	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BZ	17 m	0.0012	0.0035	0.0091	0.0104	0.0034	0.0064	0.0077	0.0019	0.0020	0.0006	0.0017	0.0005
BZ	30 m	0.0006	0.0017	0.0050	0.0077	0.0043	0.0053	0.0097	0.0020	0.0007	0.0006	0.0010	0.0005
CA	17 m	0.0278	0.0128	0.0027	0.0011	0.0095	0.0083	0.0024	0.0065	0.0668	0.0061	0.0184	0.0443
CA	30 m	0.0144	0.0064	0.0032	0.0009	0.0084	0.0040	0.0022	0.0067	0.0600	0.0018	0.0051	0.0376
CM	17 m	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CM	30 m	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CU	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CU	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ET	17 m	0.0008	0.0002	0.0120	0.0000	0.0004	0.0000	0.0000	0.0002	0.0000	0.0009	0.0027	0.0032
ET	30 m	0.0004	0.0000	0.0013	0.0000	0.0002	0.0000	0.0034	0.0002	0.0000	0.0000	0.0013	0.0004
GP	17 m	0.0083	0.0478	0.0901	0.0000	0.0000	0.0000	0.0000	0.0000	1.3840	0.0026	0.0465	0.0012
GP	30 m	0.0086	0.0319	0.1108	0.0000	0.0000	0.0000	0.0000	0.0000	1.1385	0.0027	0.0358	0.0167
H.	17 m	0.0004	0.0024	0.0177	0.0009	0.0042	0.0009	0.0045	0.0096	0.0011	0.0024	0.0000	0.0000
H.	30 m	0.0005	0.0011	0.0096	0.0003	0.0044	0.0000	0.0034	0.0066	0.0009	0.0010	0.0000	0.0000
HG	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
HG	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
HH	17 m	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0009	0.0000
HH	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0006	0.0000
K.	17 m	0.0009	0.0017	0.0037	0.0000	0.0024	0.0049	0.0093	0.0009	0.0044	0.0010	0.0016	0.0049
K.	30 m	0.0007	0.0010	0.0057	0.0000	0.0017	0.0028	0.0064	0.0001	0.0036	0.0005	0.0014	0.0025
L.	17 m	0.0002	0.0133	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1736	0.5089	0.1107
L.	30 m	0.0001	0.0116	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1417	0.4579	0.1102
LB	17 m	0.0000	0.0078	0.2253	0.0000	0.0001	0.0013	0.0011	0.0167	0.0080	0.0553	0.0834	0.0049
LB	30 m	0.0000	0.0061	0.0177	0.0000	0.0002	0.0001	0.0013	0.0107	0.0011	0.0086	0.0229	0.0046
MA	17 m	0.0000	0.0162	0.0112	0.0003	0.0024	0.0162	0.1007	0.0000	0.0000	0.0003	0.0001	0.0001
MA	30 m	0.0000	0.0022	0.0028	0.0008	0.0017	0.0157	0.0970	0.0000	0.0000	0.0002	0.0000	0.0000
ML	17 m	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ML	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MS	17 m	0.0021	0.0021	0.0000	0.0000	0.0000	0.0005	0.0000	0.0003	0.0067	0.0006	0.0000	0.0036
MS	30 m	0.0020	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0032	0.0000	0.0000	0.0000
PE	17 m	0.0000	0.0001	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0002	0.0004	0.0003	0.0002
PE	30 m	0.0000	0.0001	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0002	0.0002	0.0003	0.0001
PT	17 m	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT	30 m	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SH	17 m	0.0000	0.0003	0.0018	0.0000	0.0006	0.0000	0.0000	0.0003	0.0001	0.0016	0.0001	0.0007
SH	30 m	0.0000	0.0001	0.0009	0.0000	0.0004	0.0000	0.0000	0.0002	0.0000	0.0012	0.0001	0.0007
SV	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SV	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T.	17 m	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T.	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
WE	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000
WE	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
WG	17 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0000
WG	30 m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000

BH = Black-headed Gull; BW = Black-tailed Godwit; BZ = Buzzard; CA = Cormorant; CM = Common Gull; CU = Curlew; ET = Little Egret; GP = Golden Plover; H. = Grey Heron; HG = Herring Gull; HH = Hen Harrier; K. = Kestrel; L. = Lapwing; LB = Lesser Black-backed Gull; MA = Mallard; ML = Merlin; MS = Mute Swan; PE = Peregrine; PT = Pintail; SH = Sparrowhawk; SV = Shoveler; T. = Teal; WE = White-tailed Eagle; WG = White-fronted Goose; WN = Wigeon; WS = Whooper Swan.

Table A1.3. Daylight (t_{day}) and nighttime (t_{night}) hours per month.

Month	Non-waterfowl species		Waterfowl species	
	t_{day}	t_{night}	t_{day}	t_{night}
Jan	253.3	490.7	315.3	428.7
Feb	274.5	397.5	330.5	341.5
Mar	366.4	377.6	428.4	315.6
Apr	417.8	302.2	477.8	242.2
May	489.7	254.3	551.7	192.3
Jun	505.1	214.9	565.1	154.9
Jul	508.2	235.8	570.2	173.8
Aug	457.8	286.2	519.8	224.2
Sept	382.3	337.7	442.3	277.7
Oct	330.3	413.7	392.3	351.7
Nov	262.4	457.6	322.4	397.6
Dec	237.7	506.3	299.7	444.3

Table A1.4. Nocturnal correction factors.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mute Swan	1.13	1.11	1.37	1.26	1.34	1.08	1.07	1.18	1.09	1.31	1.22	1.16
Whooper Swan	1.13	1.11	1.37	1.26	1.34	1.08	1.07	1.18	1.09	1.31	1.22	1.16
White-fronted Goose	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22
Wigeon	1.25	1.22	1.74	1.52	1.68	1.15	1.14	1.37	1.17	1.62	1.45	1.31
Teal	1.25	1.22	1.74	1.52	1.68	1.15	1.14	1.37	1.17	1.62	1.45	1.31
Mallard	1.25	1.22	1.74	1.52	1.68	1.15	1.14	1.37	1.17	1.62	1.45	1.31
Pintail	1.25	1.22	1.74	1.52	1.68	1.15	1.14	1.37	1.17	1.62	1.45	1.31
Shoveler	1.25	1.22	1.74	1.52	1.68	1.15	1.14	1.37	1.17	1.62	1.45	1.31
Little Egret	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22
Grey Heron	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22
Golden Plover	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22
Lapwing	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22
Curlew	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22
Black-tailed Godwit	1.18	1.16	1.53	1.36	1.48	1.12	1.11	1.26	1.13	1.44	1.31	1.22

This table only includes species with nocturnal correction factors > 1.

Table A1.5. Projected number of rotor transits.

BTO	Turbine	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
BH	N149	315	5	0	0	0	1	0	0	0	0	63	392
BH	N163	0	9	5	0	0	2	0	0	0	0	139	997
BH	V150	317	5	0	0	0	1	0	0	0	0	63	394
BW	N149	0	3956	0	0	0	0	0	0	0	0	0	0
BW	N163	0	6006	0	0	0	0	0	0	0	0	0	0
BW	V150	0	3980	0	0	0	0	0	0	0	0	0	0
BZ	N149	11	28	185	90	127	162	245	102	147	19	12	20
BZ	N163	26	59	278	144	113	221	272	129	208	31	24	21
BZ	V150	11	28	186	90	128	163	246	103	148	19	12	20
CA	N149	29	13	10	2	23	8	21	20	153	3	19	41
CA	N163	49	25	7	3	33	29	8	21	179	14	34	74
CA	V150	29	13	10	2	23	8	22	20	154	3	19	42
CM	N149	0	0	0	0	0	0	0	0	0	0	0	8
CM	N163	0	4	0	0	0	0	0	0	0	0	0	9
CM	V150	0	0	0	0	0	0	0	0	0	0	0	8
CU	N149	0	0	0	0	0	19	0	0	0	0	0	0
CU	N163	0	0	0	0	0	23	0	0	0	0	0	0
CU	V150	0	0	0	0	0	19	0	0	0	0	0	0
ET	N149	1	0	3	0	1	0	8	0	0	0	2	1
ET	N163	1	0	26	0	1	0	0	0	0	2	5	5
ET	V150	1	0	3	0	1	0	8	0	0	0	2	1
GP	N149	268	991	4238	0	0	0	0	0	44108	97	1118	506
GP	N163	282	1620	3766	0	0	0	0	0	58620	104	1592	39
GP	V150	270	997	4264	0	0	0	0	0	44375	98	1125	509
H.	N149	1	2	21	1	12	0	9	16	2	2	0	0
H.	N163	1	5	42	2	12	3	13	26	3	5	0	0
H.	V150	1	2	21	1	12	0	9	17	2	2	0	0
HG	N149	0	0	0	0	0	0	0	3	0	0	0	0
HG	N163	0	0	0	0	0	0	0	2	0	0	0	0
HG	V150	0	0	0	0	0	0	0	3	0	0	0	0
HH	N149	0	0	0	0	0	0	11	0	0	1	2	1
HH	N163	1	0	0	0	0	0	24	0	0	2	4	2
HH	V150	0	0	0	0	0	0	11	0	0	1	2	1
K.	N149	6	11	75	9	64	45	148	35	91	10	14	27
K.	N163	13	21	61	25	78	89	563	82	112	22	26	58
K.	V150	6	11	76	9	64	45	149	35	92	10	14	27
L.	N149	0	23	0	0	0	0	0	0	0	332	931	217
L.	N163	0	29	0	0	0	0	0	0	0	444	1131	238
L.	V150	0	23	0	0	0	0	0	0	0	334	937	218
LB	N149	114	7	22	0	1	6	5	43	17	10	41	4
LB	N163	0	13	498	0	0	4	3	46	18	110	132	7
LB	V150	115	7	22	0	1	6	5	43	17	10	42	4
MA	N149	0	9	13	4	8	78	497	0	0	1	0	0
MA	N163	0	69	56	2	14	89	564	0	0	2	1	0
MA	V150	0	9	13	4	8	79	500	0	0	1	0	0
ML	N149	0	0	0	0	1	0	0	0	0	1	0	0
ML	N163	2	1	1	0	1	1	0	1	0	2	1	3
ML	V150	0	0	0	0	1	0	0	0	0	1	0	0
MS	N149	5	4	1	0	2	0	0	4	6	0	0	0
MS	N163	7	6	0	0	0	2	0	1	25	2	0	11
MS	V150	5	4	1	0	2	0	0	4	6	0	0	0
PE	N149	0	1	0	0	6	0	1	0	4	3	4	2
PE	N163	0	1	0	0	7	0	1	0	5	8	6	3
PE	V150	0	1	0	0	6	0	1	0	4	3	4	2
PT	N149	8	0	0	0	0	0	0	0	0	0	0	0

BTO	Turbine	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
PT	N163	10	0	0	0	0	0	0	0	0	0	0	0
PT	V150	8	0	0	0	0	0	0	0	0	0	0	0
SH	N149	1	2	19	0	15	5	4	3	42	11	4	5
SH	N163	1	6	30	0	24	6	15	4	61	20	7	8
SH	V150	1	2	19	0	15	5	4	3	42	12	4	5
SV	N149	0	0	0	0	0	0	0	0	0	0	0	1
SV	N163	0	0	0	0	0	0	0	0	0	0	0	2
SV	V150	0	0	0	0	0	0	0	0	0	0	0	1
T.	N149	0	0	0	0	0	0	0	0	0	0	0	0
T.	N163	8	0	0	0	0	0	0	0	0	0	0	0
T.	V150	0	0	0	0	0	0	0	0	0	0	0	0
WE	N149	0	0	0	0	0	0	0	0	0	0	4	0
WE	N163	0	0	0	0	0	0	0	0	0	0	10	0
WE	V150	0	0	0	0	0	0	0	0	0	0	4	0
WG	N149	0	0	0	0	0	0	0	0	0	0	31	0
WG	N163	0	0	0	0	0	0	0	0	0	0	51	0
WG	V150	0	0	0	0	0	0	0	0	0	0	32	0
WN	N149	0	81	0	0	0	0	0	0	0	0	805	739
WN	N163	9	186	0	0	0	0	0	0	0	0	1581	1372
WN	V150	0	81	0	0	0	0	0	0	0	0	810	743
WS	N149	6	0	26	0	0	0	0	0	0	3	18	4
WS	N163	11	1	74	0	0	0	0	0	0	6	20	13
WS	V150	6	0	26	0	0	0	0	0	0	3	18	4

BH = Black-headed Gull; BW = Black-tailed Godwit; BZ = Buzzard; CA = Cormorant; CM = Common Gull; CU = Curlew; ET = Little Egret;; GP = Golden Plover; H. = Grey Heron; HG = Herring Gull; HH = Hen Harrier; K. = Kestrel; L. = Lapwing; LB = Lesser Black-backed Gull; MA = Mallard; ML = Merlin; MS = Mute Swan; PE = Peregrine; PT = Pintail; SH = Sparrowhawk; SV = Shoveler; T. = Teal; WE = White-tailed Eagle; WG = White-fronted Goose; WN = Wigeon; WS = Whooper Swan.

Table A1.6. Single transit collision risks for flapping flight.

Species	Turbine	Pitch	Single transit collision risk		
			upwind	downwind	weighted mean
Mute Swan	N149	0	0.095	0.095	0.095
	N163	0	0.088	0.088	0.088
	V150	0	0.096	0.096	0.096
	N149	15	0.115	0.075	0.095
	N163	15	0.108	0.070	0.089
	V150	15	0.118	0.077	0.097
	N149	30	0.132	0.082	0.107
	N163	30	0.124	0.078	0.101
	V150	30	0.136	0.085	0.110
Whooper Swan	N149	0	0.091	0.091	0.091
	N163	0	0.085	0.085	0.085
	V150	0	0.093	0.093	0.093
	N149	15	0.111	0.072	0.091
	N163	15	0.104	0.067	0.086
	V150	15	0.113	0.073	0.093
	N149	30	0.126	0.077	0.102
	N163	30	0.119	0.073	0.096
	V150	30	0.130	0.080	0.105
White-fronted Goose	N149	0	0.064	0.064	0.064
	N163	0	0.060	0.060	0.060
	V150	0	0.065	0.065	0.065
	N149	15	0.085	0.044	0.065
	N163	15	0.079	0.041	0.060
	V150	15	0.087	0.045	0.066
	N149	30	0.102	0.052	0.077
	N163	30	0.096	0.049	0.073
	V150	30	0.105	0.054	0.079
Wigeon	N149	0	0.050	0.050	0.050
	N163	0	0.046	0.046	0.046
	V150	0	0.051	0.051	0.051
	N149	15	0.066	0.032	0.049
	N163	15	0.061	0.030	0.046
	V150	15	0.067	0.032	0.050
	N149	30	0.079	0.032	0.055
	N163	30	0.074	0.030	0.052
	V150	30	0.081	0.033	0.057
Teal	N149	0	0.047	0.047	0.047
	N163	0	0.043	0.043	0.043
	V150	0	0.047	0.047	0.047
	N149	15	0.063	0.028	0.046
	N163	15	0.059	0.026	0.042
	V150	15	0.065	0.028	0.046
	N149	30	0.077	0.029	0.053
	N163	30	0.072	0.028	0.050
	V150	30	0.079	0.030	0.055

Species	Turbine	Pitch	Single transit collision risk		
			upwind	downwind	weighted mean
Mallard	N149	0	0.055	0.055	0.055
	N163	0	0.051	0.051	0.051
	V150	0	0.055	0.055	0.055
	N149	15	0.073	0.036	0.054
	N163	15	0.068	0.033	0.050
	V150	15	0.074	0.036	0.055
	N149	30	0.087	0.039	0.063
	N163	30	0.081	0.037	0.059
	V150	30	0.089	0.040	0.065
Pintail	N149	0	0.053	0.053	0.053
	N163	0	0.049	0.049	0.049
	V150	0	0.054	0.054	0.054
	N149	15	0.069	0.035	0.052
	N163	15	0.064	0.033	0.048
	V150	15	0.071	0.036	0.053
	N149	30	0.082	0.035	0.058
	N163	30	0.076	0.033	0.055
	V150	30	0.084	0.036	0.060
Shoveler	N149	0	0.050	0.050	0.050
	N163	0	0.046	0.046	0.046
	V150	0	0.051	0.051	0.051
	N149	15	0.066	0.032	0.049
	N163	15	0.061	0.029	0.045
	V150	15	0.067	0.032	0.050
	N149	30	0.078	0.032	0.055
	N163	30	0.073	0.030	0.052
	V150	30	0.081	0.033	0.057
Cormorant	N149	0	0.072	0.072	0.072
	N163	0	0.067	0.067	0.067
	V150	0	0.074	0.074	0.074
	N149	15	0.094	0.052	0.073
	N163	15	0.088	0.049	0.069
	V150	15	0.097	0.054	0.075
	N149	30	0.113	0.062	0.087
	N163	30	0.106	0.059	0.082
	V150	30	0.116	0.064	0.090
Little Egret	N149	0	0.071	0.071	0.071
	N163	0	0.066	0.066	0.066
	V150	0	0.072	0.072	0.072
	N149	15	0.104	0.053	0.079
	N163	15	0.098	0.051	0.074
	V150	15	0.107	0.055	0.081
	N149	30	0.133	0.079	0.106
	N163	30	0.125	0.075	0.100
	V150	30	0.137	0.082	0.110

Species	Turbine	Pitch	Single transit collision risk		
			upwind	downwind	weighted mean
Grey Heron	N149	0	0.088	0.088	0.088
	N163	0	0.082	0.082	0.082
	V150	0	0.089	0.089	0.089
	N149	15	0.118	0.069	0.093
	N163	15	0.111	0.065	0.088
	V150	15	0.121	0.071	0.096
	N149	30	0.144	0.090	0.117
	N163	30	0.136	0.086	0.111
	V150	30	0.148	0.094	0.121
White-tailed Eagle	N149	0	0.081	0.081	0.081
	N163	0	0.076	0.076	0.076
	V150	0	0.083	0.083	0.083
	N149	15	0.111	0.063	0.087
	N163	15	0.104	0.059	0.082
	V150	15	0.114	0.064	0.089
	N149	30	0.137	0.083	0.110
	N163	30	0.129	0.080	0.104
	V150	30	0.141	0.087	0.114
Hen Harrier	N149	0	0.068	0.068	0.068
	N163	0	0.063	0.063	0.063
	V150	0	0.069	0.069	0.069
	N149	15	0.105	0.052	0.079
	N163	15	0.099	0.050	0.074
	V150	15	0.108	0.054	0.081
	N149	30	0.138	0.083	0.110
	N163	30	0.130	0.079	0.105
	V150	30	0.142	0.087	0.115
Sparrowhawk	N149	0	0.053	0.053	0.053
	N163	0	0.049	0.049	0.049
	V150	0	0.054	0.054	0.054
	N149	15	0.083	0.034	0.058
	N163	15	0.078	0.032	0.055
	V150	15	0.085	0.035	0.060
	N149	30	0.108	0.055	0.082
	N163	30	0.102	0.053	0.077
	V150	30	0.112	0.058	0.085
Buzzard	N149	0	0.064	0.064	0.064
	N163	0	0.060	0.060	0.060
	V150	0	0.065	0.065	0.065
	N149	15	0.094	0.045	0.070
	N163	15	0.088	0.043	0.065
	V150	15	0.096	0.047	0.071
	N149	30	0.119	0.065	0.092
	N163	30	0.111	0.062	0.087
	V150	30	0.122	0.068	0.095

Species	Turbine	Pitch	Single transit collision risk		
			upwind	downwind	weighted mean
Golden Plover	N149	0	0.046	0.046	0.046
	N163	0	0.042	0.042	0.042
	V150	0	0.046	0.046	0.046
	N149	15	0.064	0.027	0.045
	N163	15	0.060	0.024	0.042
	V150	15	0.065	0.027	0.046
	N149	30	0.079	0.030	0.055
	N163	30	0.074	0.029	0.052
	V150	30	0.081	0.032	0.056
Lapwing	N149	0	0.050	0.050	0.050
	N163	0	0.046	0.046	0.046
	V150	0	0.051	0.051	0.051
	N149	15	0.077	0.030	0.053
	N163	15	0.071	0.029	0.050
	V150	15	0.078	0.031	0.055
	N149	30	0.099	0.046	0.073
	N163	30	0.093	0.044	0.069
	V150	30	0.102	0.049	0.075
Curlew	N149	0	0.056	0.056	0.056
	N163	0	0.052	0.052	0.052
	V150	0	0.057	0.057	0.057
	N149	15	0.077	0.036	0.057
	N163	15	0.072	0.034	0.053
	V150	15	0.078	0.037	0.058
	N149	30	0.093	0.043	0.068
	N163	30	0.088	0.042	0.065
	V150	30	0.096	0.045	0.071
Black-tailed Godwit	N149	0	0.050	0.050	0.050
	N163	0	0.046	0.046	0.046
	V150	0	0.050	0.050	0.050
	N149	15	0.068	0.031	0.049
	N163	15	0.063	0.028	0.046
	V150	15	0.069	0.031	0.050
	N149	30	0.082	0.034	0.058
	N163	30	0.077	0.032	0.055
	V150	30	0.085	0.035	0.060
Black-headed Gull	N149	0	0.055	0.055	0.055
	N163	0	0.051	0.051	0.051
	V150	0	0.055	0.055	0.055
	N149	15	0.083	0.035	0.059
	N163	15	0.078	0.033	0.055
	V150	15	0.085	0.036	0.061
	N149	30	0.107	0.054	0.081
	N163	30	0.101	0.052	0.076
	V150	30	0.111	0.057	0.084

Species	Turbine	Pitch	Single transit collision risk		
			upwind	downwind	weighted mean
Common Gull	N149	0	0.056	0.056	0.056
	N163	0	0.052	0.052	0.052
	V150	0	0.056	0.056	0.056
	N149	15	0.081	0.036	0.058
	N163	15	0.075	0.033	0.054
	V150	15	0.083	0.037	0.060
	N149	30	0.102	0.050	0.076
	N163	30	0.096	0.048	0.072
	V150	30	0.105	0.052	0.079
Lesser Black-backed Gull	N149	0	0.064	0.064	0.064
	N163	0	0.059	0.059	0.059
	V150	0	0.065	0.065	0.065
	N149	15	0.090	0.044	0.067
	N163	15	0.084	0.041	0.063
	V150	15	0.092	0.045	0.068
	N149	30	0.111	0.059	0.085
	N163	30	0.105	0.056	0.080
	V150	30	0.115	0.062	0.088
Herring Gull	N149	0	0.065	0.065	0.065
	N163	0	0.061	0.061	0.061
	V150	0	0.066	0.066	0.066
	N149	15	0.092	0.045	0.069
	N163	15	0.086	0.043	0.064
	V150	15	0.094	0.047	0.070
	N149	30	0.114	0.061	0.088
	N163	30	0.107	0.059	0.083
	V150	30	0.117	0.064	0.091
Kestrel	N149	0	0.055	0.055	0.055
	N163	0	0.051	0.051	0.051
	V150	0	0.056	0.056	0.056
	N149	15	0.089	0.038	0.064
	N163	15	0.084	0.036	0.060
	V150	15	0.092	0.040	0.066
	N149	30	0.118	0.064	0.091
	N163	30	0.111	0.061	0.086
	V150	30	0.122	0.067	0.095
Merlin	N149	0	0.051	0.051	0.051
	N163	0	0.048	0.048	0.048
	V150	0	0.052	0.052	0.052
	N149	15	0.085	0.034	0.060
	N163	15	0.080	0.033	0.056
	V150	15	0.088	0.036	0.062
	N149	30	0.114	0.060	0.087
	N163	30	0.108	0.058	0.083
	V150	30	0.118	0.063	0.091

Species	Turbine	Pitch	Single transit collision risk		
			upwind	downwind	weighted mean
Peregrine	N149	0	0.057	0.057	0.057
	N163	0	0.053	0.053	0.053
	V150	0	0.058	0.058	0.058
	N149	15	0.085	0.038	0.061
	N163	15	0.080	0.036	0.058
	V150	15	0.087	0.039	0.063
	N149	30	0.109	0.056	0.082
	N163	30	0.102	0.053	0.078
	V150	30	0.112	0.058	0.085

Table A1.7. Collision risk before avoidance.

BTO	Turbine	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
BH	N149	15.89	0.23	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	3.15	19.75
BH	N163	0.00	0.44	0.26	0.00	0.00	0.08	0.00	0.00	0.00	0.00	6.57	47.01
BH	V150	16.38	0.24	0.00	0.00	0.01	0.05	0.00	0.00	0.00	0.00	3.25	20.35
BW	N149	0.00	165.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N163	0.00	233.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	V150	0.00	169.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BZ	N149	0.64	1.67	10.93	5.29	7.51	9.56	14.45	6.03	8.69	1.09	0.69	1.17
BZ	N163	1.45	3.25	15.45	8.00	6.26	12.28	15.11	7.16	11.55	1.70	1.31	1.16
BZ	V150	0.66	1.73	11.30	5.46	7.76	9.88	14.93	6.23	8.98	1.13	0.72	1.21
CA	N149	1.82	0.82	0.59	0.10	1.43	0.50	1.33	1.22	9.53	0.19	1.20	2.57
CA	N163	2.88	1.44	0.41	0.19	1.91	1.72	0.49	1.21	10.45	0.82	1.98	4.31
CA	V150	1.87	0.84	0.61	0.10	1.47	0.51	1.37	1.25	9.81	0.19	1.23	2.65
CM	N149	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
CM	N163	0.00	0.21	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
CM	V150	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
CU	N149	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00
CU	N163	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00
CU	V150	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.00
ET	N149	0.04	0.00	0.17	0.00	0.04	0.00	0.56	0.03	0.00	0.00	0.14	0.04
ET	N163	0.09	0.02	1.64	0.00	0.06	0.00	0.00	0.03	0.00	0.12	0.30	0.35
ET	V150	0.05	0.00	0.17	0.00	0.04	0.00	0.58	0.03	0.00	0.00	0.14	0.05
GP	N149	10.34	38.20	163.36	0.00	0.00	0.00	0.00	0.00	1700.15	3.76	43.10	19.50
GP	N163	10.08	57.83	134.39	0.00	0.00	0.00	0.00	0.00	2091.99	3.70	56.80	1.41
GP	V150	10.56	39.01	166.82	0.00	0.00	0.00	0.00	0.00	1736.08	3.84	44.01	19.92
H.	N149	0.07	0.15	1.65	0.05	0.92	0.01	0.73	1.30	0.16	0.16	0.00	0.00
H.	N163	0.06	0.35	3.16	0.18	0.91	0.19	0.99	1.96	0.20	0.39	0.01	0.00
H.	V150	0.07	0.16	1.71	0.06	0.95	0.01	0.75	1.35	0.17	0.16	0.00	0.00
HG	N149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00
HG	N163	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
HG	V150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00
HH	N149	0.01	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.09	0.16	0.07
HH	N163	0.04	0.00	0.00	0.00	0.00	0.00	1.49	0.00	0.00	0.13	0.25	0.13
HH	V150	0.01	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.09	0.16	0.07
K.	N149	0.33	0.59	4.07	0.47	3.46	2.43	8.04	1.90	4.94	0.56	0.75	1.46
K.	N163	0.66	1.05	3.09	1.27	3.95	4.53	28.67	4.18	5.70	1.10	1.33	2.97
K.	V150	0.34	0.61	4.21	0.49	3.58	2.52	8.33	1.96	5.12	0.58	0.77	1.51
L.	N149	0.01	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.07	42.33	9.84
L.	N163	0.02	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.87	48.05	10.11
L.	V150	0.01	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.52	43.60	10.14
LB	N149	6.51	0.40	1.27	0.00	0.05	0.33	0.26	2.44	0.94	0.54	2.36	0.25
LB	N163	0.00	0.69	26.53	0.00	0.02	0.20	0.18	2.46	0.98	5.87	7.04	0.37
LB	V150	6.71	0.41	1.31	0.00	0.05	0.34	0.26	2.52	0.97	0.56	2.43	0.26
MA	N149	0.00	0.39	0.59	0.16	0.39	3.61	22.90	0.00	0.00	0.03	0.00	0.00
MA	N163	0.00	2.97	2.40	0.07	0.58	3.81	24.16	0.00	0.00	0.07	0.02	0.02
MA	V150	0.00	0.40	0.60	0.17	0.40	3.70	23.45	0.00	0.00	0.03	0.00	0.00
ML	N149	0.02	0.02	0.01	0.00	0.03	0.02	0.00	0.00	0.00	0.07	0.00	0.00
ML	N163	0.09	0.04	0.04	0.00	0.05	0.03	0.00	0.03	0.00	0.09	0.05	0.13
ML	V150	0.02	0.02	0.01	0.00	0.03	0.02	0.00	0.00	0.00	0.07	0.00	0.00
MS	N149	0.40	0.33	0.08	0.00	0.18	0.00	0.00	0.29	0.45	0.00	0.00	0.01
MS	N163	0.50	0.49	0.00	0.00	0.00	0.17	0.00	0.10	1.93	0.15	0.00	0.84
MS	V150	0.41	0.34	0.08	0.00	0.18	0.00	0.00	0.30	0.46	0.00	0.00	0.01
PE	N149	0.02	0.06	0.00	0.00	0.32	0.00	0.06	0.00	0.23	0.15	0.22	0.10
PE	N163	0.01	0.07	0.00	0.00	0.34	0.00	0.06	0.00	0.25	0.37	0.27	0.13
PE	V150	0.02	0.06	0.00	0.00	0.33	0.00	0.06	0.00	0.23	0.16	0.22	0.10
PT	N149	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BTO	Turbine	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
PT	N163	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	V150	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SH	N149	0.04	0.11	0.93	0.00	0.75	0.23	0.20	0.14	2.09	0.57	0.22	0.23
SH	N163	0.06	0.26	1.39	0.00	1.14	0.28	0.69	0.18	2.86	0.91	0.33	0.37
SH	V150	0.04	0.12	0.96	0.00	0.78	0.24	0.20	0.15	2.16	0.59	0.23	0.24
SV	N149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SV	N163	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
SV	V150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
T.	N149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T.	N163	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T.	V150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WE	N149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00
WE	N163	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
WE	V150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00
WG	N149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72	0.00
WG	N163	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.60	0.00
WG	V150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.77	0.00
WN	N149	0.00	3.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.64	30.89
WN	N163	0.34	7.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.22	53.10
WN	V150	0.00	3.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.33	31.52
WS	N149	0.50	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.24	1.36	0.29
WS	N163	0.77	0.09	5.37	0.00	0.00	0.00	0.00	0.00	0.00	0.41	1.47	0.96
WS	V150	0.51	0.00	2.09	0.00	0.00	0.00	0.00	0.00	0.00	0.25	1.40	0.30

BH = Black-headed Gull; BW = Black-tailed Godwit; BZ = Buzzard; CA = Cormorant; CM = Common Gull; CU = Curlew; ET = Little Egret; GP = Golden Plover; H. = Grey Heron; HG = Herring Gull; HH = Hen Harrier; K. = Kestrel; L. = Lapwing; LB = Lesser Black-backed Gull; MA = Mallard; ML = Merlin; MS = Mute Swan; PE = Peregrine; PT = Pintail; SH = Sparrowhawk; SV = Shoveler; T. = Teal; WE = White-tailed Eagle; WG = White-fronted Goose; WN = Wigeon; WS = Whooper Swan.

Table A1.8. Collision risk after avoidance.

BTO	Turbine	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
BH	N149	0.95	0.79	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.99
BH	N163	0.95	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	2.35
BH	V150	0.95	0.82	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	1.02
BH	N149	0.98	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.39
BH	N163	0.98	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.94
BH	V150	0.98	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.41
BH	N149	0.99	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.20
BH	N163	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.47
BH	V150	0.99	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.20
BH	N149	0.995	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.10
BH	N163	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.24
BH	V150	0.995	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.10
BW	N149	0.95	0.00	8.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N163	0.95	0.00	11.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	V150	0.95	0.00	8.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N149	0.98	0.00	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N163	0.98	0.00	4.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	V150	0.98	0.00	3.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N149	0.99	0.00	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N163	0.99	0.00	2.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	V150	0.99	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N149	0.995	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	N163	0.995	0.00	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BW	V150	0.995	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BZ	N149	0.95	0.03	0.08	0.55	0.26	0.38	0.48	0.72	0.30	0.43	0.05	0.03	0.06
BZ	N163	0.95	0.07	0.16	0.77	0.40	0.31	0.61	0.76	0.36	0.58	0.09	0.07	0.06
BZ	V150	0.95	0.03	0.09	0.56	0.27	0.39	0.49	0.75	0.31	0.45	0.06	0.04	0.06
BZ	N149	0.98	0.01	0.03	0.22	0.11	0.15	0.19	0.29	0.12	0.17	0.02	0.01	0.02
BZ	N163	0.98	0.03	0.07	0.31	0.16	0.13	0.25	0.30	0.14	0.23	0.03	0.03	0.02
BZ	V150	0.98	0.01	0.03	0.23	0.11	0.16	0.20	0.30	0.12	0.18	0.02	0.01	0.02
BZ	N149	0.99	0.01	0.02	0.11	0.05	0.08	0.10	0.14	0.06	0.09	0.01	0.01	0.01
BZ	N163	0.99	0.01	0.03	0.15	0.08	0.06	0.12	0.15	0.07	0.12	0.02	0.01	0.01
BZ	V150	0.99	0.01	0.02	0.11	0.05	0.08	0.10	0.15	0.06	0.09	0.01	0.01	0.01
BZ	N149	0.995	0.00	0.01	0.05	0.03	0.04	0.05	0.07	0.03	0.04	0.01	0.00	0.01
BZ	N163	0.995	0.01	0.02	0.08	0.04	0.03	0.06	0.08	0.04	0.06	0.01	0.01	0.01
BZ	V150	0.995	0.00	0.01	0.06	0.03	0.04	0.05	0.07	0.03	0.04	0.01	0.00	0.01
CA	N149	0.95	0.09	0.04	0.03	0.00	0.07	0.02	0.07	0.06	0.48	0.01	0.06	0.13
CA	N163	0.95	0.14	0.07	0.02	0.01	0.10	0.09	0.02	0.06	0.52	0.04	0.10	0.22
CA	V150	0.95	0.09	0.04	0.03	0.00	0.07	0.03	0.07	0.06	0.49	0.01	0.06	0.13
CA	N149	0.98	0.04	0.02	0.01	0.00	0.03	0.01	0.03	0.02	0.19	0.00	0.02	0.05
CA	N163	0.98	0.06	0.03	0.01	0.00	0.04	0.03	0.01	0.02	0.21	0.02	0.04	0.09
CA	V150	0.98	0.04	0.02	0.01	0.00	0.03	0.01	0.03	0.03	0.20	0.00	0.02	0.05
CA	N149	0.99	0.02	0.01	0.01	0.00	0.01	0.00	0.01	0.01	0.10	0.00	0.01	0.03
CA	N163	0.99	0.03	0.01	0.00	0.00	0.02	0.02	0.00	0.01	0.10	0.01	0.02	0.04
CA	V150	0.99	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.10	0.00	0.01	0.03
CA	N149	0.995	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.05	0.00	0.01	0.01
CA	N163	0.995	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.01	0.05	0.00	0.01	0.02
CA	V150	0.995	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.05	0.00	0.01	0.01
CM	N149	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
CM	N163	0.95	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
CM	V150	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
CM	N149	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
CM	N163	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
CM	V150	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

BTO	Turbine	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
CU	N149	0.95	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
CU	N163	0.95	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
CU	V150	0.95	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
CU	N149	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
CU	N163	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
CU	V150	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
CU	N149	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
CU	N163	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
CU	V150	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
CU	N163	0.995	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
ET	N149	0.95	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.01	0.00
ET	N163	0.95	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
ET	V150	0.95	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.01	0.00
ET	N149	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
ET	N163	0.98	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
ET	V150	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
ET	N149	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
ET	N163	0.99	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ET	V150	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
ET	N163	0.995	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GP	N149	0.95	0.52	1.91	8.17	0.00	0.00	0.00	0.00	0.00	85.01	0.19	2.16	0.98
GP	N163	0.95	0.50	2.89	6.72	0.00	0.00	0.00	0.00	0.00	104.60	0.19	2.84	0.07
GP	V150	0.95	0.53	1.95	8.34	0.00	0.00	0.00	0.00	0.00	86.80	0.19	2.20	1.00
GP	N149	0.98	0.21	0.76	3.27	0.00	0.00	0.00	0.00	0.00	34.00	0.08	0.86	0.39
GP	N163	0.98	0.20	1.16	2.69	0.00	0.00	0.00	0.00	0.00	41.84	0.07	1.14	0.03
GP	V150	0.98	0.21	0.78	3.34	0.00	0.00	0.00	0.00	0.00	34.72	0.08	0.88	0.40
GP	N149	0.99	0.10	0.38	1.63	0.00	0.00	0.00	0.00	0.00	17.00	0.04	0.43	0.20
GP	N163	0.99	0.10	0.58	1.34	0.00	0.00	0.00	0.00	0.00	20.92	0.04	0.57	0.01
GP	V150	0.99	0.11	0.39	1.67	0.00	0.00	0.00	0.00	0.00	17.36	0.04	0.44	0.20
GP	N149	0.995	0.05	0.19	0.82	0.00	0.00	0.00	0.00	0.00	8.50	0.02	0.22	0.10
GP	N163	0.995	0.05	0.29	0.67	0.00	0.00	0.00	0.00	0.00	10.46	0.02	0.28	0.01
GP	V150	0.995	0.05	0.20	0.83	0.00	0.00	0.00	0.00	0.00	8.68	0.02	0.22	0.10
H.	N149	0.95	0.00	0.01	0.08	0.00	0.05	0.00	0.04	0.07	0.01	0.01	0.00	0.00
H.	N163	0.95	0.00	0.02	0.16	0.01	0.05	0.01	0.05	0.10	0.01	0.02	0.00	0.00
H.	V150	0.95	0.00	0.01	0.09	0.00	0.05	0.00	0.04	0.07	0.01	0.01	0.00	0.00
H.	N149	0.98	0.00	0.00	0.03	0.00	0.02	0.00	0.01	0.03	0.00	0.00	0.00	0.00
H.	N163	0.98	0.00	0.01	0.06	0.00	0.02	0.00	0.02	0.04	0.00	0.01	0.00	0.00
H.	V150	0.98	0.00	0.00	0.03	0.00	0.02	0.00	0.02	0.03	0.00	0.00	0.00	0.00
H.	N149	0.99	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
H.	N163	0.99	0.00	0.00	0.03	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00
H.	V150	0.99	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
H.	N149	0.995	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
H.	N163	0.995	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
H.	V150	0.995	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
HG	N149	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
HG	V150	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
HH	N149	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.00
HH	N163	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.01	0.01	0.01
HH	V150	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.00
HH	N149	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
HH	N163	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
HH	V150	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
HH	N149	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
HH	N163	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
HH	V150	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
HH	N163	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00

BTO	Turbine	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
K.	N149	0.95	0.02	0.03	0.20	0.02	0.17	0.12	0.40	0.09	0.25	0.03	0.04	0.07
K.	N163	0.95	0.03	0.05	0.15	0.06	0.20	0.23	1.43	0.21	0.29	0.05	0.07	0.15
K.	V150	0.95	0.02	0.03	0.21	0.02	0.18	0.13	0.42	0.10	0.26	0.03	0.04	0.08
K.	N149	0.98	0.01	0.01	0.08	0.01	0.07	0.05	0.16	0.04	0.10	0.01	0.01	0.03
K.	N163	0.98	0.01	0.02	0.06	0.03	0.08	0.09	0.57	0.08	0.11	0.02	0.03	0.06
K.	V150	0.98	0.01	0.01	0.08	0.01	0.07	0.05	0.17	0.04	0.10	0.01	0.02	0.03
K.	N149	0.99	0.00	0.01	0.04	0.00	0.03	0.02	0.08	0.02	0.05	0.01	0.01	0.01
K.	N163	0.99	0.01	0.01	0.03	0.01	0.04	0.05	0.29	0.04	0.06	0.01	0.01	0.03
K.	V150	0.99	0.00	0.01	0.04	0.00	0.04	0.03	0.08	0.02	0.05	0.01	0.01	0.02
K.	N149	0.995	0.00	0.00	0.02	0.00	0.02	0.01	0.04	0.01	0.02	0.00	0.00	0.01
K.	N163	0.995	0.00	0.01	0.02	0.01	0.02	0.02	0.14	0.02	0.03	0.01	0.01	0.01
K.	V150	0.995	0.00	0.00	0.02	0.00	0.02	0.01	0.04	0.01	0.03	0.00	0.00	0.01
L.	N149	0.95	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	2.12	0.49
L.	N163	0.95	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	2.40	0.51
L.	V150	0.95	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	2.18	0.51
L.	N149	0.98	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.85	0.20
L.	N163	0.98	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.96	0.20
L.	V150	0.98	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.87	0.20
L.	N149	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.42	0.10
L.	N163	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.48	0.10
L.	V150	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.44	0.10
L.	N149	0.995	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.21	0.05
L.	N163	0.995	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.24	0.05
L.	V150	0.995	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.22	0.05
LB	N149	0.95	0.33	0.02	0.06	0.00	0.00	0.02	0.01	0.12	0.05	0.03	0.12	0.01
LB	N163	0.95	0.00	0.03	1.33	0.00	0.00	0.01	0.01	0.12	0.05	0.29	0.35	0.02
LB	V150	0.95	0.34	0.02	0.07	0.00	0.00	0.02	0.01	0.13	0.05	0.03	0.12	0.01
LB	N149	0.98	0.13	0.01	0.03	0.00	0.00	0.01	0.01	0.05	0.02	0.01	0.05	0.00
LB	N163	0.98	0.00	0.01	0.53	0.00	0.00	0.00	0.00	0.05	0.02	0.12	0.14	0.01
LB	V150	0.98	0.13	0.01	0.03	0.00	0.00	0.01	0.01	0.05	0.02	0.01	0.05	0.01
LB	N149	0.99	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.02	0.00
LB	N163	0.99	0.00	0.01	0.27	0.00	0.00	0.00	0.00	0.02	0.01	0.06	0.07	0.00
LB	V150	0.99	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.02	0.00
LB	N149	0.995	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
LB	N163	0.995	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.04	0.00
LB	V150	0.995	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
MA	N149	0.95	0.00	0.02	0.03	0.01	0.02	0.18	1.14	0.00	0.00	0.00	0.00	0.00
MA	N163	0.95	0.00	0.15	0.12	0.00	0.03	0.19	1.21	0.00	0.00	0.00	0.00	0.00
MA	V150	0.95	0.00	0.02	0.03	0.01	0.02	0.19	1.17	0.00	0.00	0.00	0.00	0.00
MA	N149	0.98	0.00	0.01	0.01	0.00	0.01	0.07	0.46	0.00	0.00	0.00	0.00	0.00
MA	N163	0.98	0.00	0.06	0.05	0.00	0.01	0.08	0.48	0.00	0.00	0.00	0.00	0.00
MA	V150	0.98	0.00	0.01	0.01	0.00	0.01	0.07	0.47	0.00	0.00	0.00	0.00	0.00
MA	N149	0.99	0.00	0.00	0.01	0.00	0.00	0.04	0.23	0.00	0.00	0.00	0.00	0.00
MA	N163	0.99	0.00	0.03	0.02	0.00	0.01	0.04	0.24	0.00	0.00	0.00	0.00	0.00
MA	V150	0.99	0.00	0.00	0.01	0.00	0.00	0.04	0.23	0.00	0.00	0.00	0.00	0.00
MA	N149	0.995	0.00	0.00	0.00	0.00	0.00	0.02	0.11	0.00	0.00	0.00	0.00	0.00
MA	N163	0.995	0.00	0.01	0.01	0.00	0.00	0.02	0.12	0.00	0.00	0.00	0.00	0.00
MA	V150	0.995	0.00	0.00	0.00	0.00	0.00	0.02	0.12	0.00	0.00	0.00	0.00	0.00
ML	N163	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MS	N149	0.95	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.00
MS	N163	0.95	0.02	0.02	0.00	0.00	0.00	0.01	0.00	0.01	0.10	0.01	0.00	0.04
MS	V150	0.95	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.00
MS	N149	0.98	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
MS	N163	0.98	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02
MS	V150	0.98	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
MS	N163	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01

BTO	Turbine	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
MS	N163	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
PE	N149	0.95	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.01
PE	N163	0.95	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.02	0.01	0.01
PE	V150	0.95	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.01
PE	N149	0.98	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PE	N163	0.98	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00
PE	V150	0.98	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	N149	0.95	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	N163	0.95	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	V150	0.95	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	N149	0.98	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	N163	0.98	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PT	V150	0.98	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SH	N149	0.95	0.00	0.01	0.05	0.00	0.04	0.01	0.01	0.01	0.10	0.03	0.01	0.01
SH	N163	0.95	0.00	0.01	0.07	0.00	0.06	0.01	0.03	0.01	0.14	0.05	0.02	0.02
SH	V150	0.95	0.00	0.01	0.05	0.00	0.04	0.01	0.01	0.01	0.11	0.03	0.01	0.01
SH	N149	0.98	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.04	0.01	0.00	0.00
SH	N163	0.98	0.00	0.01	0.03	0.00	0.02	0.01	0.01	0.00	0.06	0.02	0.01	0.01
SH	V150	0.98	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.04	0.01	0.00	0.00
SH	N149	0.99	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00
SH	N163	0.99	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.03	0.01	0.00	0.00
SH	V150	0.99	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00
SH	N149	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
SH	N163	0.995	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
SH	V150	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
T.	N163	0.95	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T.	N163	0.98	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WE	N149	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
WE	N163	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
WE	V150	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
WE	N149	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WE	N163	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WE	V150	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WE	N163	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WG	N149	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
WG	N163	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
WG	V150	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
WG	N149	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
WG	N163	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
WG	V150	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
WG	N149	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
WG	N163	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
WG	V150	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
WG	N149	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WG	N163	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WG	V150	0.995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WN	N149	0.95	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.68	1.54
WN	N163	0.95	0.02	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.06	2.65
WN	V150	0.95	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72	1.58
WN	N149	0.98	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.62
WN	N163	0.98	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	1.06
WN	V150	0.98	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.63
WN	N149	0.99	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.31
WN	N163	0.99	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.53
WN	V150	0.99	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.32
WN	N149	0.995	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.15

BTO	Turbine	Avoidance rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WN	N163	0.995	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.27
WN	V150	0.995	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.16
WS	N149	0.95	0.02	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.01
WS	N163	0.95	0.04	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.05
WS	V150	0.95	0.03	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.01
WS	N149	0.98	0.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01
WS	N163	0.98	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.02
WS	V150	0.98	0.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.01
WS	N149	0.99	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WS	N163	0.99	0.01	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
WS	V150	0.99	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WS	N149	0.995	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WS	N163	0.995	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
WS	V150	0.995	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00

Species/turbine combinations with collision risks < 0.005 in all months are not included in this table. BH = Black-headed Gull; BW = Black-tailed Godwit; BZ = Buzzard; CA = Cormorant; CM = Common Gull; CU = Curlew; ET = Little Egret; GP = Golden Plover; H. = Grey Heron; HG = Herring Gull; HH = Hen Harrier; K. = Kestrel; L. = Lapwing; LB = Lesser Black-backed Gull; MA = Mallard; ML = Merlin; MS = Mute Swan; PE = Peregrine; PT = Pintail; SH = Sparrowhawk; SN = Snipe; SV = Shoveler; T. = Teal; WE = White-tailed Eagle; WG = White-fronted Goose; WN = Wigeon; WS = Whooper Swan.

Appendix C SURFACE WATER MANAGEMENT PLAN

TOBIN

Ballincor Wind Farm
RWE Renewables,
Co. Offaly

Volume 3
Appendix 9-4
Surface Water Management Plan

RWE

BUILT ON KNOWLEDGE

Document Control Sheet	
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1. SURFACE WATER MANAGEMENT PLAN

1.1 INTRODUCTION

The objective of this Surface Water Management Plan (SWMP) is to manage the movement of surface water during the construction, operation and decommissioning of the proposed Ballincor Wind Farm (proposed project). The specific objective of this SWMP is to provide methods for surface water management during the pre-construction, construction, operation and decommissioning phases of the proposed project.

The SWMP has been prepared taking into consideration the findings and conclusions within the Ballincor Wind Farm EIAR and Flood Risk Assessment (FRA). The SWMP and associated drainage strategy is a Planning Stage document and will be subject to further revision following Planning Permission and the Detailed Design Stage.

Several guidelines were also considered in the development of this management plan[1] , as listed:

- COFORD (2004) Forest Road Manual, Guidelines for the design, construction and management of forest roads
- CIRIA Document C811 'Environmental Good Practice on Site'
- CIRIA Document C532 – 'Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors'
- CIRIA Document C648 and C649 – 'Control of Water Pollution from Linear Construction Projects'
- The Irish Wind Energy Association (2012) Best Practice Guidelines
- 2006 Wind Energy Planning Guidelines, Department of Environment, Heritage and Local Government;
- Inland Fisheries Ireland, (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters;
- Scottish Natural Heritage (2010) A Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with particular reference to Wind Farm Developments in Scotland;

[1] Accessed February 2026

2. PROJECT INFORMATION

2.1 SITE DESCRIPTION

The proposed wind farm is located approximately 5 km south of Birr and 4 km north of Shinrone in County Offaly, on the border between County Offaly and County Tipperary.

The site comprises cutover bog, grassland, mixed woodland and scrub. There is a low density of one-off residential developments in the area surrounding the site. The water courses of particular interest to the proposed wind farm site are the Little Brosna River and its tributaries. The Little Brosna River flows along the eastern boundary of the proposed wind farm in a north easterly direction towards Birr town and enters the River Shannon c.15 km northwest of the proposed wind farm site.

Three minor tributaries of the Little Brosna River transverse the northern section of the proposed wind farm site namely the North Cloonaheen and the Rath Beg, which join the Holy Well Clohaskin stream. The Holy Well Clohaskin stream merges with the Little Brosna River at the northeast corner of the proposed wind farm site. It is proposed to supply the power from the proposed project to the Irish electricity network via a 110 kV underground cables (approximately 12.23 km total cable length of which approximately 10 km is on the public road corridor) to the existing Dallow 110 kV substation in the townland of Clondallow. A summary of the GCR crossings is included in Table 2-1.

The proposed Grid Connection Route (GCR) crosses the Little Brosna River (EPA Code:25L02) at Croghan Bridge where it. The proposed GCR also crosses two small streams:

- The Ross 25 stream (EPA Code: 25R43), a tributary of the Little Brosna River, where it flows under the R439, west of Woodville Wood; and

The Woodfield_25 stream (EPA Code: 25W29), a tributary of the Little Brosna River, where it flows under the L-70152 local road, on the access road to Dallow 110 kV substation.

Table 2-1 Summary of GCR stream crossings

TLI Reference Number [2]	EPA Name	Description	Proposed crossing method
W1	Not applicable	Box culvert over drainage channel – L1071	HDD in road
W2	Not applicable	Culvert in road	Overcrossing of culvert in road
W3	Little Brosna River	Croghan bridge, Birr	HDD to the north of Croghan Bridge
W6	Not applicable	Culvert in road	Overcrossing of culvert in road

[2] TLI (2025) TLI Construction Methodology, Note W4- W6 are storm drains

TLI Reference Number [2]	EPA Name	Description	Proposed crossing method
W7	Not applicable	Culvert in road	Overcrossing of culvert in road
W8	Ross 25 stream	Culvert in road	Overcrossing of culvert in road
W9	Woodfield 25 stream	Drainage channel- no space in local road	Proposed Dam and Flume of first order stream – catchment area <0.4 km^2

Limited excavations are required for the proposed TDR. Works comprise primarily of overrun areas near roundabouts and road marking works, with off-road excavations near Sharavogue crossroads. No new watercourse crossings or modification of existing culverts are required for the works along the proposed TDR.

2.2 Drainage Design Overview

The drainage measures described will be implemented for the construction phase of the proposed project and the majority of the measures will remain in place for the operational phase. The measures described within Section 3 apply to the proposed wind farm site.

The surface water drainage system takes into account the recommendations of sustainable urban drainage systems (SuDS) and uses SuDS measures. The principal behind SuDS is to reduce the quantity of discharge from developments to predevelopment flows and to also improve the quality of run-off from proposed projects. SUDS drainage system to be constructed during the early stages of the construction, prior to, or at the same time as the access tracks.

A drainage evaluation has been carried out for the proposed project using the HR Wallingford Website (http://geoservergisweb2.hrwallingford.co.uk/uksd/index.htm) to identify appropriate SuDS measures for use on the proposed wind farm site. Appropriate measures identified include the use of swales.

For the proposed wind farm site the drainage design will decrease the quantity of run-off by using permeable road construction for the access roads and on the hardstanding areas and by providing surface water sedimentation/storage ponds. The following SuDS features are included in the drainage design for the proposed wind farm site:

- **Swales/Check Dams:** Sloped channels with check dams will slow down water flow, improving water quality, infiltration and reducing erosion:
- **Filter strips:** a gently sloped, vegetated area designed to treat stormwater runoff by filtering pollutants and allowing water to infiltrate into the soil. Filter strips are utilised at the Substation/ BESS location:
- **Settlement Ponds:** Vegetated ponds designed to temporarily store surface water runoff, aiding in flood control; and
- **Hydrocarbon Interceptor:** a device designed to remove hydrocarbons, silt and other pollutants from surface water runoff before it enters the drainage system. The

hydrocarbon interceptor will be located at the substation and temporary construction compounds.

The layout of the proposed wind farm site has been designed to collect surface water runoff from hardstanding areas and discharge to settlement/storage ponds within the proposed wind farm site boundary. From here the water will discharge to the ground by means of finger drains in a fan arrangement at the appropriate greenfield run off rates. A drawing of the proposed settlement ponds is shown in Drawing 11333-2034, in Appendix A.

Check dams will be provided in drainage channels to reduce the velocity of surface water run-off and are depicted in Figure 2-1. Swales will be constructed adjacent to the access road (See Appendix A) to provide drainage as depicted in Figure 2-2.

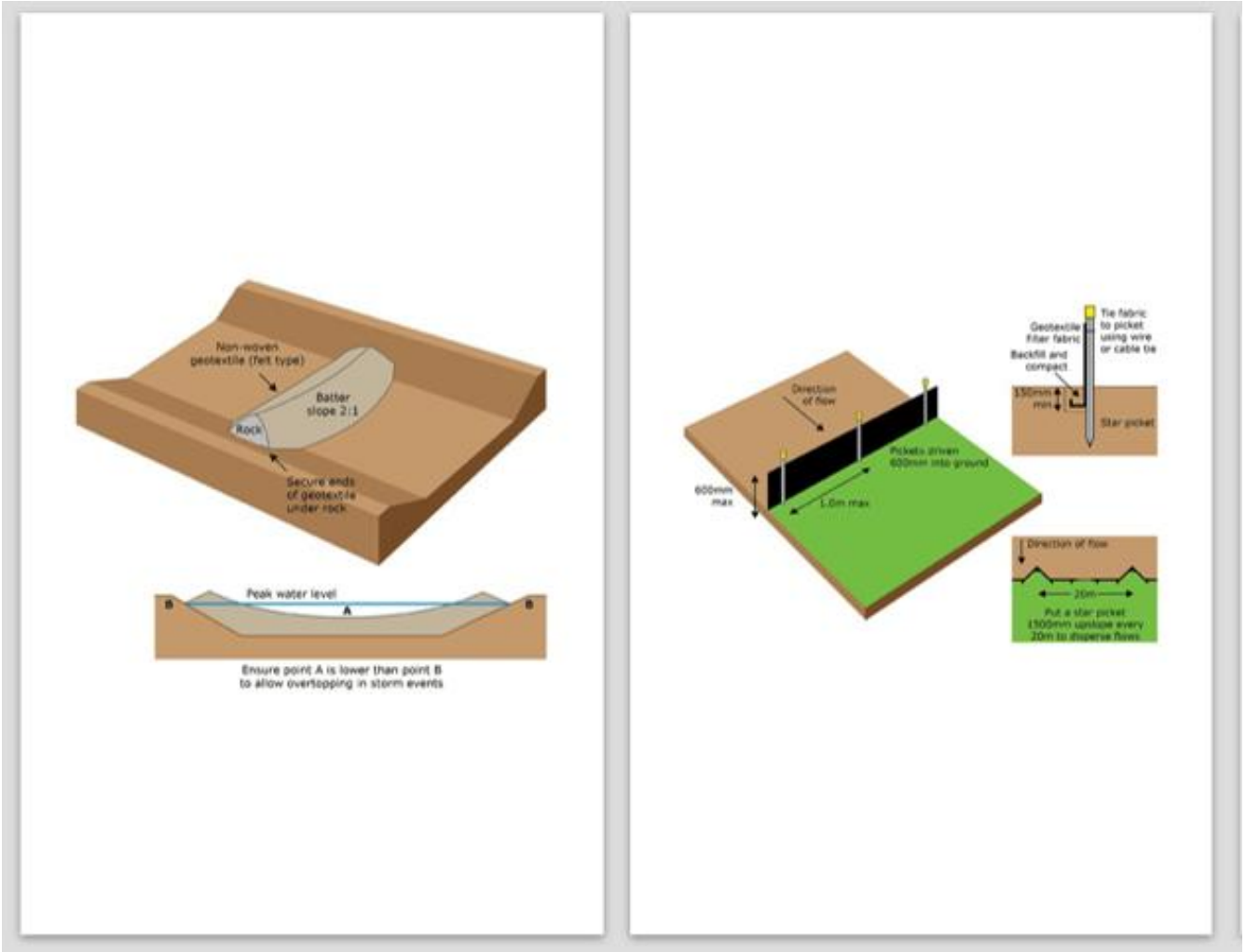

Figure 2-1 Check dam and silt fence examples (Source: Guidelines for Environmental Management, EPA Australia, 2004)

Figure 2-2 Vegetated swale

2.3 FORESTRY DRAINAGE

Forest felling will be undertaken during the initial phase of the construction works. The Felling and Reforestation Standards describe the universal standards that apply to all felling (thinning, clear felling) and reforestation projects on all proposed wind farm sites, will be implemented under a felling licence issued by the Department of Agriculture, Food & the Marine.

All associated tree felling will be undertaken using good working practices as outlined in the Forestry Report and Construction Environmental Management Plan (CEMP) (Appendices 2-8 and 2-3 of this EIAR), the Forest Service 'Forestry Harvesting and Environment Guidelines' (2000a), 'Forestry and Water Quality Guidelines '(2000b) and Standards for felling and reforestation (2019). The 2000b guidelines deal with sensitive areas, erosion, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel and machine oils. Brash mats will also be used to support harvesting and forwarding machinery. The brash mats reduce erosion of the surface and will be renewed as they become used and worn over time.

Trees will be manually felled inside the 10m stream buffer. During the near stream construction work, silt traps and a double row silt fences will be placed immediately down-gradient of the construction area for the duration of the construction phase.

2.4 FLOOD RISK ATTENUATION

The creation of infrastructure such as roads, has the potential to increase rates of runoff and this may increase flood risk and flood severity downstream. The site is relatively flat with low permeability and will have limited potential to increase flows. Roadside drainage will have a capacity to manage and contain surface water runoff. Some areas of the flood plain in the vicinity of the subject site are removed due to the construction of the turbine hardstanding areas and roads, to compensate for the removed flood plain compensatory storage is proposed. The compensation storage has an area of approximately 14,000m^2. A project specific Flood Risk Assessment carried out for the proposed wind farm site (See Appendix 9-4 of the EIAR).

Residual risks at the proposed wind farm site and to the proposed wind farm site during an extreme flood event can be managed to an acceptable level, through a dedicated stormwater drainage system and effective landscaping and topography. The layout of the development will minimise the flood risk to people, property, the economy, and the environment. Flood compensation is provided to the south of the BESS and T2 access track.

It is proposed to provide temporary water storage within the drainage channels, by creating check dams at regular intervals. The spacing of the dams is every 50 metres on average but depends on the channel slope, with steeper channels requiring shorter intervals (30m). Runoff from the impermeable and gravel areas will be directed to swales and settlement ponds. The outflow from the settlement ponds will be released in a controlled and diffuse manner onto the vegetation and existing drains.

2.5 Turbine Delivery Route and Grid Connection Route

There will be limited construction activities required for the Grid Connection Route (GCR) and works areas of the proposed Turbine Delivery Route (TDR). Further details in relation to the grid connection cable route and road/junction accommodation works on the TDR are outlined in the CEMP in Appendix 2-3 of the EIAR.

No refuelling of machinery will take place within 50m of a watercourse on the wind farm site. No refuelling of machinery will take place within 10m of a watercourse on the GCR. Appropriate steps will be taken to prevent soil/dirt generated during the temporary upgrade works to the TDR from being transported on the public road. Road sweeping vehicles will be used as required, to ensure that the public road network remains free of soil/dirt from the location of the TDR works when required. This will reduce the potential for sedimentation of surface watercourses locally.

Silt fencing will be erected at the location of all stream crossings along the GCR. Where existing drainage ditches need to be realigned (e.g., around substation), new ditches will match profile of existing ditch in relation to width, existing side slope profile (or lower) and material at base of channel will be reused. The sizing of any new culverts will be designed to maintain existing flow characteristics and depth of flow. Within the proposed wind farm site, culverts will be assessed to ensure no barriers to fish migration occur. Where barriers occur, such culverts will be improved to increase fisheries potential. HDD will be utilised for the Little Brosna River crossing. Further details are included in Appendix 2-5 TLI Cable Methodology. Silt fencing will be installed at the launch and reception pits for the HDD crossing.

In-stream works is required for one small stream (Woodfield_25 stream) located near the Dallow 110 kV substation as there is insufficient cover/space in the existing local road – see photo 1. The stream is ephemeral(dry during the summer) due to the limited catchment area. As the stream is mapped on the EPA stream database, the proposed crossing is considered in-stream works. The flume is used to divert the stream temporarily (<1 week). A dam of sandbags and suitable clay material is constructed across the existing stream/riverbed to ensure all flow is diverted through the pipework. The water (if present) will be collected at the existing road culvert and diverted downgradient. Stream bed material will be reinstated post construction.

Photo 1 – Drainage pipes under local road near proposed GCR crossing location (March 2025)

3. WATER QUALITY MEASURES

The drainage design measures outlined in Section 2 will manage flow and quality within the proposed wind farm site and near the works areas of the proposed TDR and GCR. Specific water quality measures in relation to sediment, concrete and fuel management are detailed below.

3.1 CONCRETE

Concrete is required for the construction of the proposed turbine bases and foundations. After concrete is poured, the chutes of ready mixed concrete trucks must be washed out to remove the remaining concrete before it hardens. Wash out of the main concrete bottle will not be permitted within the proposed wind farm site and wash out is restricted only to chute wash out. Small quantities of concrete is required for the GCR. No concrete is required for the TDR works. Wash down and wash out of the concrete transporting vehicles will take place at an appropriate facility away from the proposed wind farm site i.e., at the premises of the concrete supplier. The collected concrete washout water and solids will be emptied on a regular basis.

3.2 FUELS, OILS AND CHEMICALS – SPILL CONTROL

The following will be employed on the proposed wind farm site:

- Fuels and chemicals will be stored within bunded areas as appropriate to guard against potential accidental spills or leakages. The bund area will have a volume of at least 110% of the volume of such materials stored;
- Store all containers of oil and fuel in a secure, bunded area.
- Regularly check tanks, containers and bunds for damage and leaks.
- Supervise all fuel and oil deliveries.

- Lock containers and tanks when not in use.
- Seek advice from a line manager before disposing of waste fuel or oil, or contaminated spill granules or absorbent mats – all contaminated materials to be disposed of in the appropriate manner.
- Liaise with a line manager to organise removal of contaminated water from bunds and trays by an appropriate contractor.
- Do not store fuel and oil, or carry out refuelling, within 50 m of a watercourse or drain.
- All on-site refuelling will be carried out by a trained competent operative. Use a funnel when refuelling small plant. Use an automatic shut off or pistol grip delivery system when refuelling plant.
- Clear up and report all spillages immediately.
- Place a drip tray or absorbent mat under all static plant and mobile plant during fuelling.
- Mobile measures such as drip trays and fuel absorbent mats kept with all plant and bowsers and will be used as required during all refuelling operations;
- A spill kit will be stored with the bowser and the person operating the bowser will be trained in their use;
- All equipment and machinery will have regular checking for leakages and quality of performance and will carry spill kits;
- Any servicing of vehicles will be confined to designated and suitably protected areas such as construction compounds; and
- Additional drip trays and spill kits will be kept available on the proposed wind farm site, to ensure that any spills from vehicles are contained and removed off-site.

3.2.1 Oil Interceptor

Surface runoff from the substation has the potential to have hydrocarbons due to vehicular activities. Therefore, an oil interceptor is proposed to prevent contamination.

A class I Bypass Separator, typically a NSBP003 (capacity for 1670m^2 drainage area – hardstand area within substation), is recommended due to the minimal risk of contamination expected at the site. The oil separator should comply with the requirements of EN-858-1 and 858-2 guidelines for oil separators.

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m²)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

Figure 3.1: Typical Sizes for Bypass Oil Interceptor

The oil interceptors are to be fitted with an oil level alarm system in accordance with BS EN 858-1. It will be installed and calibrated by a suitably qualified technician so that it will respond to an alarm condition when the separator requires emptying.

3.3 Erosion and Sediment Control Measures

It is proposed, that during the ground clearance of the proposed project, the contractor will implement water control measures to limit the impact on water quality using standards measures. Suspended solid (silt) removal features will be implemented in accordance with the Construction Industry Research and Information Association (CIRIA) C697 SuDS Manual, and CIRIA C648 Control of water pollution from linear construction projects.

Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. These flows will discharge diffusely overland, within the buffer zone before entering any watercourse. Regular cross flow and energy dissipation devices will be installed to divert overland flows and prevent these flows from entering the borrow pits

All drainage from the proposed wind farm site shall be designed to have as a minimum three stages of treatment, as defined in the SuDS Manual. Management of runoff will include the following:

- Filtration of water through filter media (sand/stone check dam, silt fence);
- Detention/settlement in settlement ponds or behind check dam in swales; and
- Conveyance of shallow depths of water in vegetated swale.

All surface water run-off from the proposed wind farm site will pass through settlement ponds. It is proposed to locate settlement ponds downstream of borrow pits and associated stockpile areas, each hardstand and along all the proposed wind farm site access tracks. Drainage drawings are presented in Drawing 11333-2061 to 11333-2065 in Appendix A. Interceptor cut-off drains around the borrow pits will be provided to divert overland flows and prevent these flows from entering the borrow pits. These flows will discharge diffusely overland,creating a buffer before entering the surface water management infrastructure.

Water that accumulates in the borrow pits will be directed to a sump. Water from the sump will be pass through a silt bag prior to a settlement pond or a mobile Siltbuster system.

Where works are to be carried out such as the crossing of drainage ditches, the works area shall be isolated from surface water using a sufficiently large flume or other suitable containment methods. Water within the contained area contaminated with suspended solids or other potential pollutants shall not be released directly to the drainage ditch. It shall be pumped to a suitable sediment control structure (e.g. sediment control pond) to allow sediment removal before it re-enters the drainage ditch.

3.3.1 Forestry measures

Forest felling will be undertaken during the initial phase of the construction works. The Felling and Reforestation Standards describe the universal standards that apply to all felling (thinning, clear felling) and reforestation projects on all proposed wind farm sites, will be implemented under a felling licence issued by the Department of Agriculture, Food & the Marine.

All associated tree felling will be undertaken using good working practices as outlined in the Forestry Report and Construction Environmental Management Plan (CEMP) (Appendices 2-8 and 2-3 of this EIAR), the Forest Service 'Forestry Harvesting and Environment Guidelines' (2000a), 'Forestry and Water Quality Guidelines '(2000b) and Standards for felling and reforestation (2019). The 2000b guidelines deal with sensitive areas, erosion, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel and machine oils. Brash mats will also be used to support harvesting and forwarding machinery. The brash mats reduce erosion of the surface and will be renewed as they become used and worn over time.

Trees will be manually felled inside the 10m stream buffer. During the near stream construction work, silt traps and a double row silt fences will be placed immediately down-gradient of the construction area for the duration of the construction phase.

All timber harvesting exclusion zones (DAFM, 2019) to be clearly marked on site maps and on the Proposed wind farm site before any works commence:

- 10 m-wide exclusion zone to be established from the edges of any aquatic zones or water hotspots.
- 5 m-wide exclusion zone to be established from the edges of any relevant watercourses.
- Appropriate exclusion zone (following consultation with the Ecological Clerk of Works (ECoW) or the Environmental Manager) to be established for any wildlife habitat present within the harvesting area, and the location of this exclusion zone to be well known by all harvesting operators on the site.

- Prior to harvesting works, silt traps to be installed within existing forest drains that connect with aquatic zones, either directly or indirectly through other relevant watercourses. Silt traps to be constructed along the length of drains and to be monitored and maintained throughout works.
- Temporary bridging points to be used where machinery routes must cross existing water features - direct crossing over a stream bed is not permitted. Water features to be crossed at a right angle to the flow of water and any crossing to be via an appropriate structure – see *Standards for Felling & Reforestation* (DAFM, 2019).

- Any drains crossed during the timber extraction phase to be kept clear of residues and debris to ensure no drainage issues arise for the remaining trees: this can be a major attributor to windblow.
- Maintenance, refuelling and storage areas to be sited in dry and sheltered locations, at least 50 m from aquatic zones and 20 m from relevant watercourses.
- No rinsing of fuel, chemical or oil containers to occur on the site.
- Harvesting machinery to be fitted with spill kits to mitigate against an accidental spillage.
- Dense mats of brash and branch wood to be laid along all machinery routes. Additional brash to be deployed on any sections of soft ground that are subject to high levels of machinery passage. Brash mats to be replaced as soon as they exhibit signs of wear.
- Stacking areas to be located at least 50 m from aquatic zones.
- On-site supervision to be present to ensure operations are carried out according to standards, and to confirm mitigation measures are effective. Regular visual monitoring of aquatic zones and relevant watercourses to occur to check for any silt/sediment discharge from harvesting works.
- Felling and extraction to cease during and after periods of rainfall that could result in the surface mobilisation of silt - until conditions improve.
- Harvesting works and haulage to adhere to the designated working hours as specified in Appendix 2-3 Construction Environmental Management Plan (CEMP).
- Harvesting machinery must not enter any exclusion zones: trees standing within an exclusion zone outside the reach of the harvester arm to be manually felled by an experienced chainsaw operator and removed by an extended harvester arm for processing and stacking outside of the exclusion zone.
- Trees to be directionally felled away from sensitive features. Hand felling within 10m of an EPA stream.
- Contractors to monitor machinery routes and to use extra brash (where available) to pre-empt the risk of soil damage. Where ground conditions begin to visibly deteriorate, a new track to be promptly established containing a new brash mat layer.
- Any waste or hazardous materials that accumulate throughout operations to be removed from the Proposed Development site once harvesting is complete.
- Temporary drain bridging points to be removed as no longer required and relevant areas restored to their original condition, with due care afforded to avoid the release of any sediment or harvesting residues.
- Any harvesting debris evident within drains or silt traps to be removed.

3.3.2 Check Dams/Silt Fences

Track edge drainage/swales are required to control run-off from the running surface to lower water levels in the subgrade, to control surface water and to carry this flow to outlet points.

Swales will be re-vegetated by hydro-seeding with indigenous seed mix as soon as is practicable following excavation. This will reduce the flow velocity, treat potential pollutants, increase filtration and silt retention.

Swales will be installed in advance of the main construction phase. Check dam/Silt fence are presented in Drawing 11333-2036 – Appendix A. On sections of track where there is <5% longitudinal gradient, regular surface water interception channels will be employed – these will typically be at 20m intervals to collect any surface water that is discharging as sheet flow along the track and discharge the flow into the trackside swale.

Check dams will have a minimum 0.2m freeboard (from top of check dam) to top of swale level, to prevent overtopping of flows onto the access track. All check dams, etc to be checked at least once weekly via a walkover survey during the period of construction. All excess silts will be removed. Where check dams have become fully blocked with silt, they will be replaced. The following measures will be implemented:

All stockpiled material will be battered back (Slope of 1:2 or less) to reduce the rainfall erosion potential. Silt fencing will be utilised as the base of stockpiles.

Silt fencing is to be installed in the path of sheet flow runoff to filter our heavy sediments. Silt fences are to be located at the toe of stockpiled areas to reduce sediment transport. Additional silt fencing and emergency spill kits will be kept on the proposed wind farm site for use in emergencies. All silt fencing on the proposed wind farm site will also require regular cleaning and maintenance in accordance with manufactures guidelines. The fence should be taut, with no sagging. No gaps should exist between the fence and the ground.

Silt build ups, within settlement ponds, check dams, silt fences are to be removed as required to ensure no carryover/breakthrough of suspended matter downstream in the drainage system. Any sediment removed will be disposed of so as to prevent any reintroduction into the drainage system.

3.3.3 Settlement ponds

Settlement ponds will be located downstream of road swale sections and at turbine/hardstand locations, to manage/buffer volumes of runoff discharging from the drainage system during periods of high rainfall, thereby reducing the hydraulic loading to watercourses. Settlement ponds are designed in consideration of the greenfield runoff rates. A longitudinal cross-section and plan of a settlement pond is presented in Drawing 11333-2034, in Appendix A. A total of 19 settlement ponds will be put in place across the Site (refer to Appendix A)

The proposed settlement pond design consists of a sediment forebay, which removes the majority of suspended solids from the inflow water. Inflow water enters the sediment forebay via an energy break, which removes energy from the incoming water resulting in a decrease in the incoming waters capacity to transport suspended solids and the deposition of material in the sediment forebay. The water then flows over a section of elevated channel bed into the flow control bay. Here the flow is controlled by a weir constructed of silt fencing or equivalent. Once the water has been filtered by the flow control device it then outfalls to an area of intact vegetation, which acts as a secondary filter. The outflow control from the settlement device is designed such that in an extreme event the device can overflow into adjacent vegetated areas.

Settlement ponds will be installed concurrently with the formation of the road. Additional settlement ponds will be constructed as required on the proposed wind farm site. Settlement

ponds are to be located as close to the source of sediment as possible with a buffer zone between the settlement pond outfall and any existing watercourse.

The settlement pond design (Drawing 11333-2036, Appendix A) is based on primary settling out of suspended solids from aqueous suspension. The theory behind the design of the settlement ponds is the application of Stoke's Law. The settlement ponds will be designed to provide sufficient retention time and a low velocity environment to allow suspended solids of small particle size to fall out of suspension prior to allowing the water to outfall to the receiving environment.

Runoff will be maintained at Greenfield (pre-development) runoff rates. The layout of the development has been designed to collect surface water runoff from hardstanding areas within the development and discharge to associated surface water attenuation lagoons adjacent to the proposed infrastructure. It will then be managed by gravity flow at Greenfield runoff rates.

3.3.4 Works near Watercourses

As mentioned above, where main drain crossings and stream crossings occur (i.e., access tracks), it is proposed to use a clear-span design bridge or bottomless culverts. Installation of such features will take place during dry periods to reduce the risk of sediment entering the watercourse. Smaller drains with be crossed using normal culverts.

One new clear span bridge is required to cross the Holy Well Clohaskin stream for access to T2 to T3, and a design has been developed in consultation with the Office of Public Works (OPW) and Inland Fisheries Ireland (IFI). A Section 50 Consent application will be prepared and submitted to the OPW prior to construction. No instream works are proposed.

As a further precaution, near-stream construction work will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works guidance document *"Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites"*.

Culverts will be designed to be of a size adequate to carry expected peak flows in accordance with CIRIA Culvert design and operation guide (C689). Culverts will be installed to conform, wherever possible, to the natural slope and alignment of the drainage line. Where required, culverts will be buried at an appropriate depth below the channel bed and the original bed material placed at the bottom of the culvert. The sizing of any new internal drainage crossings will maintain existing depth of flow and channel characteristics.

Culverts will be required at drain crossings along the access roads and to allow for cross drainage on the proposed windfarm. Precast concrete culverts or uPVC drainage pipes shall be provided for drain culverts, detail of which is shown in Drawing 11333-2035, in Appendix A. Earth embankments constructed for bridge approaches will be protected against erosion e.g., by re-vegetation or rock surfacing etc.

3.3.5 HDD crossings

As mentioned above, HDD crossings occur for the former railway cattle underpass and crossing of the Little Brosna River. Installation of such features will take place during dry periods to reduce the risk of sediment potential. The following procedure will be implemented:

- The Contractor will prepare a directional drilling Method Statement which will outline the standard approach for the construction. The Method Statement will include a contingency plan for frac-out and for excessive ground settlement;
- The Contractor will undertake the directional drilling in accordance with industry standards including British Standard EN 16191:2014 Tunnelling machinery, safety requirements and CIRIA C648 '*Control of water pollution from linear construction projects Technical Guidance*';
- The contractor will ensure that all personnel working on site are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, with the Contractor required to prepare a contingency plan for before and after such events;
- Weather conditions will be considered when planning construction activities to minimise the risk of runoff from site;
- There will be no storage of fuels within 10 m of the watercourse; Provision of exclusion zones and barriers (silt fences) between any excavated material and any surface water features will be installed to prevent sediment washing into the receiving water environment. Silt fences will be installed and the contractor will ensure that silt fences are regularly inspected and maintained during the construction phase;
- If dewatering is required as part of the works (e.g., in trenches for underground cabling or in wet areas), water must be treated to remove sediment prior to discharge;
- To prevent loss of drilling fluid[3] or 'frac-out' from occurring, a series of actions will be implemented; the drill fluids operator will monitor drill fluid density, viscosity and solids content on an ongoing basis, to ensure that the fluid does not increase in viscosity, requiring additional pressure to maintain mobility;
- Viscometers will be used to measure drill fluid gel strength and shear strength. Filtrate can also be measured to calculate the amount of filter cake building up on the internal wall of the bore. Any increases in pump pressure experienced by the drill operator will be investigated immediately to prevent the risk of pressure build up within the annulus. In some circumstances, dependant on the drilling equipment used, the pilot drill borehole assembly will be fitted with a down hole pressure monitor to measure pressure in the annulus between the drill and the bore wall. This will give an early indication of pressure build up in the hole and allow the drill operator to prevent a 'frac-out'. If there is a risk of a 'frac-out' a number of measures will be implemented including:
    - pumping a pill of drilling fluid with a higher density to the higher risk zone; and
    - circulate and pump loss circulation material (typically cork or manufactured inert polymers) to the risk zone to seal the risk zone, grouting of the risk zone, and, or launch a packer before the risk zone.
- The Contractor will implement procedures to maximise the recirculation or reuse of drilling fluid to minimise waste disposal;

[3] Use of inert, biodegradable food grade polymers

- Disposal of drilling fluids will be the responsibility of the Contractor to an approved and licenced waste facility;
- Monitoring of the drilling operations will be undertaken at all times by the Contractor. The monitoring will include visual inspection of the pits and monitoring of the volume of returns flowing back to the entry pit. The monitoring personnel will be in constant communication with the drilling rig operator and thus will be able to immediately cease drilling if necessary;
- Buffer strips of natural uncleared vegetation shall be preserved between construction activity. Reception pits will be situated (<20 m) from streams.

3.3.6 Dam/Flume Works

The following sequence of works will be completed at the W9 location:

- No in-stream structures, strictly no temporary stream crossings or temporary culverting shall take place without the prior agreement of IFI;
- The flume pipe(s) will be set out on the bed of the existing stream;
- A dam will be constructed using sandbags and suitable clay material around the flume pipe(s) and across the stream so that all the flows are diverted through the pipe(s);
- Silt traps, such as geotextile membrane, straw bales etc. will be placed downstream of the in-stream trenching location prior to construction, to minimise silt loss;
- The ducting installation works will be carried out in the dry stream bed and under/around the flume pipe(s);
- If required, a temporary sump will be established and used to collect any additional water. This water will be removed by pumping to a percolation area if the soil is not saturated, otherwise a settlement tank will be used to remove any solids from the de-watering.
- Following the completion of works, the stream bed will be reinstated with original or similar material and the spawning gravels replaced under the supervision of an aquatic ecologist.
- Once the stream bed is appropriately re-instated the dam and the flume pipe(s) will be removed thus restoring the stream to its original condition.

3.4 Invasive Species

There may be a risk associated with the spread of, or introduction of invasive species via soil or other materials which will be imported to the site during construction work, or via machinery or equipment, the following mitigation shall be adhered to:

- Staff involved in the works shall be informed as to the presence of invasive species in the area. All staff working on the project shall be familiar with the sections within the

document ‘Guidelines on the Management of Noxious Weeds and Non-Native Plant Species on National Roads’ (NRA, 2008) which detail the treatment necessary for each of the aforementioned species, together with the required reporting procedure if encountered;

- All plant and equipment employed on the proposed construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned using a power washer unit prior to arrival on-site, and prior to leaving site, to prevent the spread of invasive aquatic / riparian species in accordance with the Office of Public Works (OPW) Environmental Standard Operating Procedures (2011) and IFI Biosecurity Protocols (IFI, 2010). A sign off sheet must be maintained to confirm cleaning; and
- If invasive species are found within the works area during the course of construction works, a buffer zone will be marked around the invasive species, and plant and equipment that could transport the species within the site will be excluded. This will be reported to the ECoW, who will develop a plan of action in association with the appointed contractor(s). The significance of the buffer will be explained to machinery operators.

4. Surface Water Monitoring

Details of the proposed surface water monitoring and maintenance activities are given in this section of the SWMP. No operational phase monitoring is required due to the low risk of contamination.

Records of all monitoring and maintenance activities will be retained by the Contractor for the construction phase.

4.1 Recording And Reporting

Inspections will be recorded for the proposed project. In the event that pollution indicators are observed, works will cease, and sampling will immediately be undertaken as described for the weekly monitoring, and an investigation of the potential cause will be undertaken by the appointed Contractor.

Where the construction works are identified as the source causing the exceedance, the following details will be recorded:

- Nature of the impacts and mechanism of pollution;
- Details of the activity identified as causing the incident or, in the event no clear pathway still exists, activities capable of causing the incident and an assessment undertaken as to the most likely source; and
- Details of measures proposed and implemented to ensure that such an incident does not re-occur.

This information will be shared with the Employer and the regulators. Through monitoring and this open and transparent reporting, there is a much reduced likelihood of a small incident becoming a serious one that may require regulator action; proactively providing this information gives the regulator and the Client comfort that these issues are taken seriously on the proposed wind farm site and addressed in a professional manner.

4.2 Details of Monitoring Locations On Site

There are 5 no. surface water monitoring locations (see Figure 4-1) to monitor surface water quality. These points are focussed on areas where turbines are located close to streams/rivers. The proposed monitoring schedule is robust and sufficient for the scale of the proposed wind farm site and in line with the relevant guidance. It is discussed below in detail.

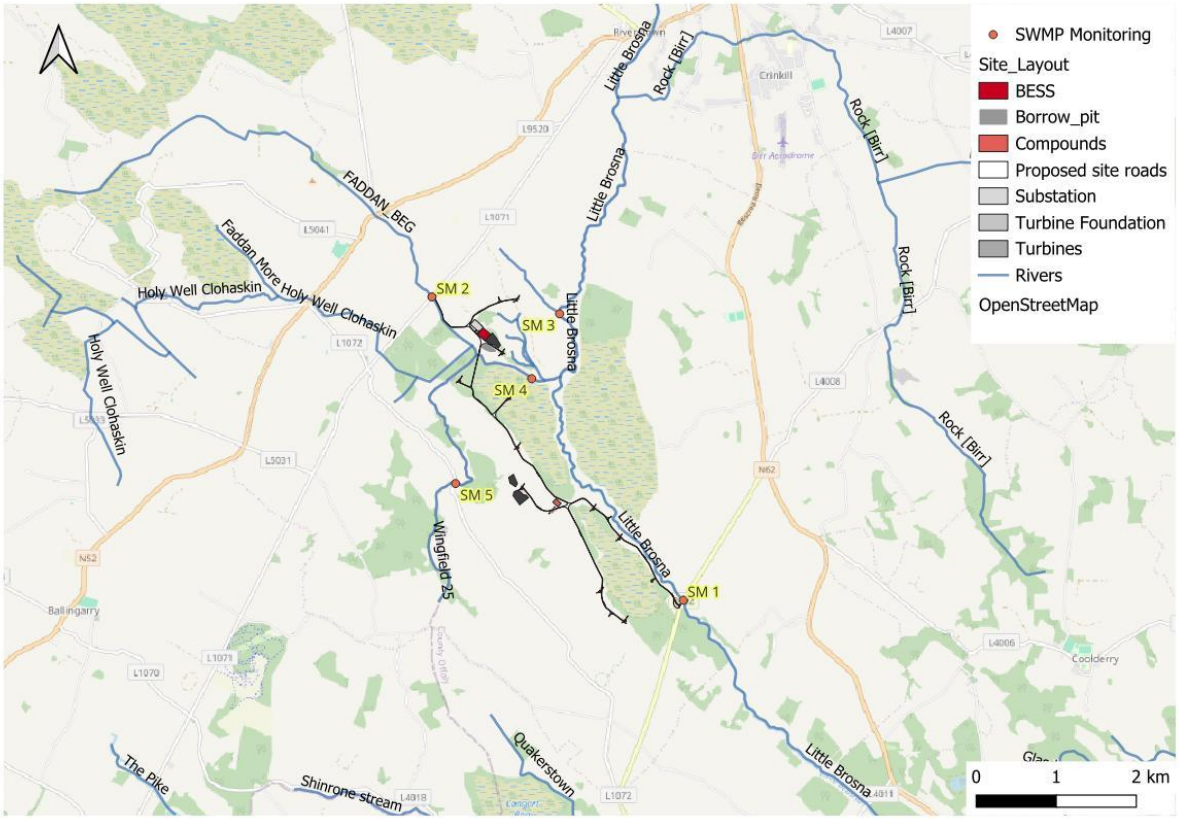

Figure 4-1 Surface Water Monitoring Locations for the SWMP

4.2.1 Surface Water Monitoring Schedule

All surface water control measures for the proposed project will be adhered to in accordance with the CEMP (Appendix 2-3 of the EIAR). A surface water monitoring schedule for the construction stage of the proposed wind farm site has been developed (See Table 4-1 below) and outlines the selected parameters with their associated trigger limits (See Table 4-2 below), as well as the frequency of monitoring to be completed prior to, during, and at the post construction phase of the project.

4.2.2 Schedule of Monitoring

The critical water parameters in terms of their potential to cause damage to aquatic life, ecosystems, human health and water quality in the receiving waters are outlined in the surface water monitoring schedule (see Table 4-1 below).

Table 4-1 Surface Water Monitoring Schedule for Ballincor Wind Farm

Phase	Preconstruction	Construction	Post construction
Monitoring Period	3 Months	24 Months	3 Months
Frequency	Continuous		
Parameters	Turbidity	Turbidity	Turbidity
Surface Water Parameters	Turbidity monitoring	Turbidity and visual checks (examination of surface	Turbidity and visual checks (examination of surface

Phase	Preconstruction	Construction	Post construction
		drainage/sediment control measures/watercourses)	drainage/sediment control measures/watercourses)
Frequency	Weekly		
Surface Water Parameters	pH, Electrical Conductivity, Temperature (Handheld Meter)	pH, Electrical Conductivity, Temperature (Handheld Meter) Monitoring during clearance phase and construction works at Turbines	N/A
Frequency	Monthly		
Surface Water Parameters	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Total Ammonia, Total Phosphorus, Total Suspended Solids (Grab Samples)	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Total Ammonia, Total Phosphorus, Total Suspended Solids (Grab Samples)	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Total Ammonia, Total Phosphorus, Total Suspended Solids (Grab Samples)
Frequency	Quarterly		
Frequency	Pre-Construction Report	Monthly and Quarterly Monitoring Report	Final Monitoring Report
Surface Water Parameters	Upgrade limits/trigger values for construction phase water monitoring	Results screened against construction phase surface water monitoring trigger levels	Results screened against construction phase surface water monitoring trigger levels

4.2.3 Surface water Monitoring Trigger Values

Surface Water Quality Monitoring (SWQM) will be conducted by the appointed Contractor in accordance with the monitoring schedule proposed in Table 4-1 above. Prior to the commencement of construction, baseline preconstruction monitoring will be carried out. The results of this monitoring suite will determine the baseline and trigger values for the construction monitoring phase of the development. This will be completed in order to establish if local trigger values are required due to existing water quality exceedances. A pre-construction monitoring report will be issued, establishing the baseline trigger values for these parameters, which will then be appended to this SWMP.

The final details of the monitoring schedule will be agreed with the relevant authorities, prior to the commencement of construction. Construction and post construction sampling results will be screened against the agreed trigger values as proposed in Table 4-2, except where local triggers are required.

Table 4-2 Analysis and Proposed Trigger Values (Pre-Construction)

Parameter	Proposed Limits	Units
Conductivity	1,000 µS/cm or within preconstruction values	µS/cm
Chloride	200 mg/l or lower. I.e. within trigger values established by preconstruction monitoring	mg/l
Molybdate Reactive Phosphorus	0.035 mg/l annual average or within preconstruction values	mg/l
Mineral Oil	10 µg/l or within preconstruction values	µg/l
pH	6-9	pH units
Turbidity	50 NTU or within preconstruction values	Nephelometric Turbidity Unit (NTU)
Total Ammonia	0.14 mg/l (95%ile) or within preconstruction values	mg/l
Total Suspended Solids	<25 mg/l or within preconstruction values	mg/l

Field measurements will be taken by the contractor on a weekly basis during the main earthworks stage of the construction period. In addition, daily visual inspections of the surface drainage and sediment control measurements and the watercourses will be completed. Daily turbidity monitoring will also be undertaken on the proposed wind farm site. Indicators that show evidence of water quality issues include the following and will be noted.

- Changes in water quality; and
- Changes in water transparency.

In-situ field monitoring will also be conducted during major rainfall events i.e., 15 mm in a 6-hour period. The clerk of works will undertake monitoring during the rainfall events.

Laboratory samples will be taken on a monthly basis during construction as shown in Table 4-1.

4.2.4 Surface Water Quality Monitoring Locations

Monitoring will be undertaken at 5 no. locations around the proposed wind farm site (see Figure 4-1). The proposed monitoring for the construction phase will be completed at the following locations along the following streams.

- SM1 – Little Brosna River
- SM2 – Faddan Beg – upgradient (UG)
- SM3 – Little Brosna River
- SM4 – Holy Well Clohaskin stream
- SM5 – Windfield_25

Monitoring records should include the date and time of the monitoring period and relate to the relevant consent conditions, where applicable. A written log of the environmental performance of the works will be maintained. A monthly monitoring report on the findings of the monitoring

exercises will be prepared within two weeks of receipt of analytical results. The monthly monitoring reports will cover the construction and post construction works.

4.2.5 Proposed Monitoring Frequency and Parameters

4.2.5.1 Pre-Construction Monitoring

It is proposed that the surface water monitoring will be scheduled in conjunction with the pre-construction stage. Continuous turbidity monitoring will be undertaken downgradient on the Little Brosna River preconstruction and during construction.

4.2.5.2 Construction Stage Monitoring

Surface water monitoring will be undertaken by the Ecological Clerk of Works (ECoW) daily during the construction stage of the proposed project. The daily monitoring will include for a walk around the proposed wind farm site, visual inspection of the watercourses and field measurements for turbidity to be undertaken as required and, as a minimum, on a weekly basis. Weekly surface water monitoring will take place as per the daily surface water inspection and will include for a routine weekly measurement of turbidity at the surface water locations.

Monthly surface water samples will be collected during the construction stage of the proposed project and laboratory analysis will be undertaken for those monitoring parameters included in Table 4-2 of this SWMP.

4.2.5.3 Post-Construction

Immediately post-construction for three months, surface water samples will be collected, and laboratory analysis will be undertaken for those monitoring parameters included in Table 4-1 of this SWMP.

4.2.6 Trigger Values

The trigger values for the surface water monitoring programme are those listed in Table 4-3 of this SWMP and where relevant Surface Water Quality standards given in the Surface Water (Environmental Objectives) Regulations S.I. 272 of 2009 as amended, or as otherwise agreed with the Planning Authority in consultation with Inland Fisheries Ireland where required.

An Environmental Manager will be engaged for construction stage monitoring. Should the trigger values not be met, the Environmental Manager will have 'Stop Works Authority' to direct the contractor's construction manager to cease all works and activities on the proposed wind farm site pending further instruction.

Table 4-3 Proposed Surface Water Parameters and Trigger Values

		Proposed Trigger Values	SI No. 272 of 2009 EU Surface Water Environmental Objective Regulations (as amended)	SI No. 293 of 1988 EC Regulations (Quality of Salmonid Waters)
Parameter	Units			
Electrical Conductivity (EC)	µS/cm	1,000		
pH	pH units	>4.5 and <9	Soft Water 4.5< pH < 9.0	>6 and <9
MRP	mg/l	0.025 (mean – high status) 0.035 (mean- good status)	0.025 (mean – high status) 0.035 (mean- good status)	
Dissolved Inorganic Nitrogen as N	mg/l	2.6	2.6	
Total Suspended Solids	mg/l	25		25
BOD	mg/l	<5	<2.6 (95%ile) good status <2.2 (95%ile) high status	<5
COD	mg/l	40		
Total Alkalinity as $CaCO_3$	mg/l	No abnormal change		No abnormal change
Hydroxide Alkalinity as $CaCO_3$	mg/l	No abnormal change		No abnormal change

4.3 MAINTENANCE ACTIVITIES

4.3.1 Construction Phase

Settlement ponds will be regularly cleaned/maintained to provide effective and successful operation throughout the works. Outfalls and ditches should be cleaned, when required, starting up stream with the outfalls blocked temporarily prior to cleaning. Settlement pond management will also include the following:

Sediment/silt removed via the contractor from ponds is to be disposed of at suitable locations on the proposed wind farm site, away from watercourses. Machine access is required to enable the accumulated sediment to be excavated. Settlement pond maintenance and/or cleaning will not take place during periods of extended heavy rain. Settlement ponds will be clearly marked for safety. Settlement ponds will be constructed on even ground and not on sloping ground and where possible will discharge into vegetation areas to aid dispersion. The settlement ponds will be monitored closely over the construction timeframe to ensure that they are operating effectively.

4.3.2 Operational Phase

During the operational phase impediments to flows can generally occur as a result from blockages to watercourse crossings, ditches and watercourses themselves, resulting from vegetation and erosion debris. The surface water infrastructure will be maintained by the operator through the lifetime of the planning permission.

4.3.3 Decommissioning Phase

A review of the relevant guidelines will be undertaken prior to the decommissioning phase. The operational phase surface water management infrastructure will be utilised for the decommissioning phase. The operational road layout will remain in place and therefore limit the potential for siltation during the decommissioning phase. Water quality measures as outlined in Section 3 will be implemented.

5. CONCLUSION

This Surface Water Management Plan as designed will ensure that all water within the construction works will be collected and treated before being released to the downstream watercourses. The attenuation system will ensure that water is treated and there will be no increase in flow rates downstream and consequently there will be no increase in flood risk downstream of the site as a result of the development.

6. REFERENCES

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APPENDIX A

DRAWINGS

11333-2034

11333-2035

11333-2036

11333-2060

11333-2061

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11333-2063

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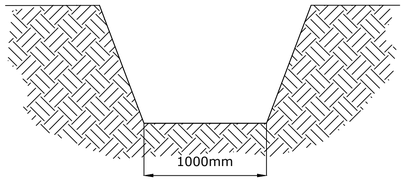
11333-2065



SECTION C-C
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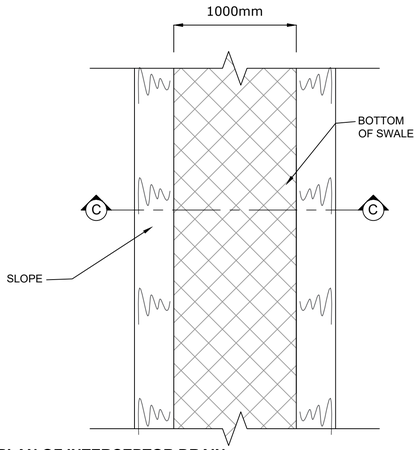

PLAN OF INTERCEPTOR DRAIN
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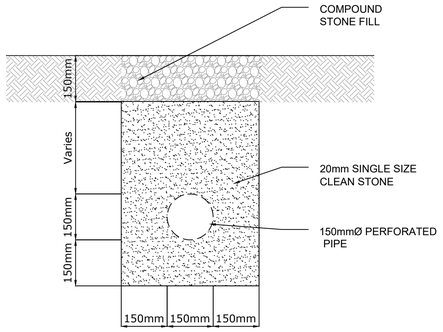

FILTER DRAIN DETAIL
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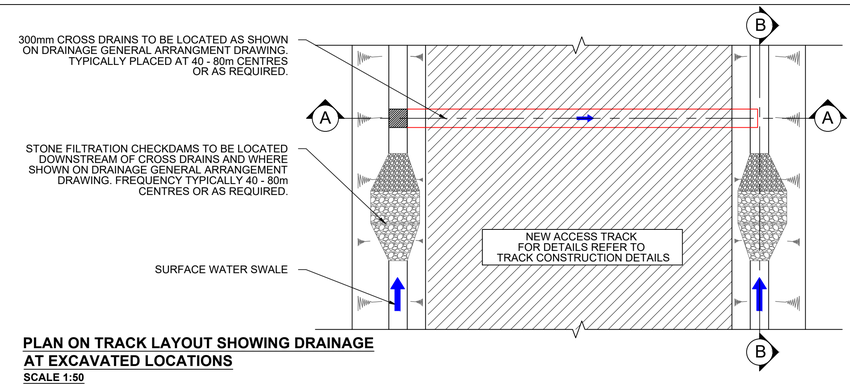

PLAN ON TRACK LAYOUT SHOWING DRAINAGE AT EXCAVATED LOCATIONS
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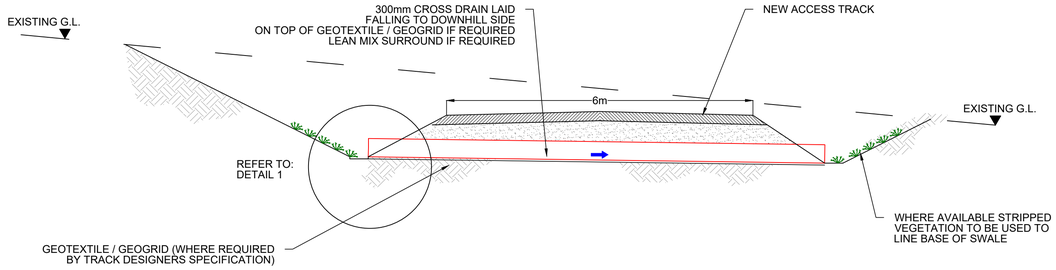

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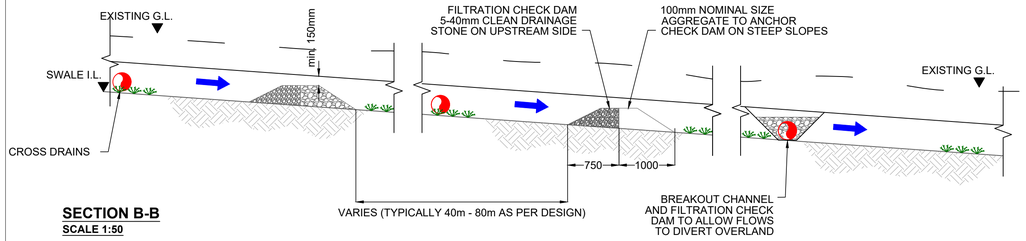

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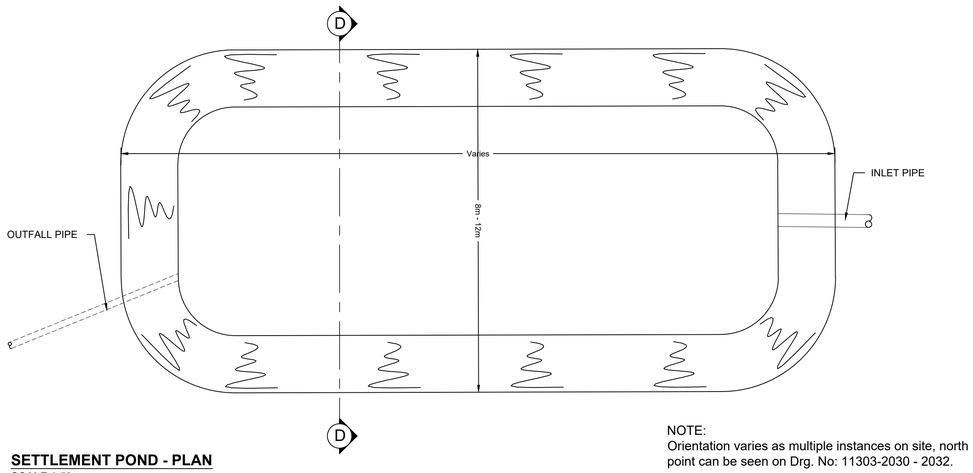
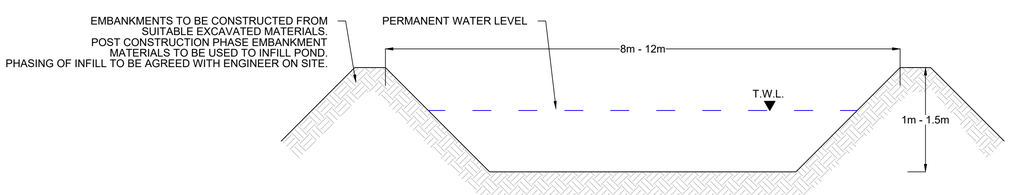


SETTLEMENT POND - PLAN
SCALE 1:50

NOTE:
Orientation varies as multiple instances on site, north point can be seen on Drg. No: 11303-2030 - 2032.



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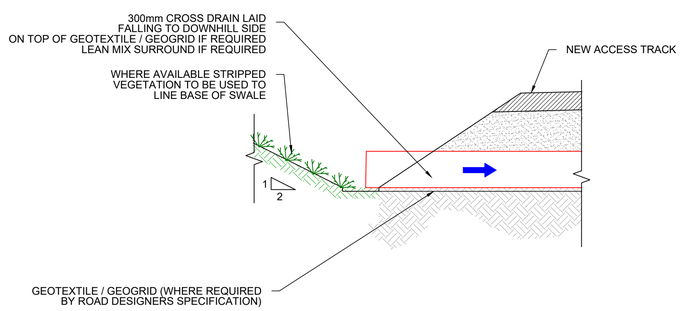

DETAIL 1
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Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	MN	JD

Client: RWE

Project:
BALLINCOR WIND FARM
PLANNING APPLICATION

Title:
TRACK SWALES, DRAINS & SETTLEMENT POND DETAILS

Scale @ A1: As Shown

Prepared by:	Checked by:	Date:
M. Nolan	J. Dillon	March 2026

Drawing Status: Planning

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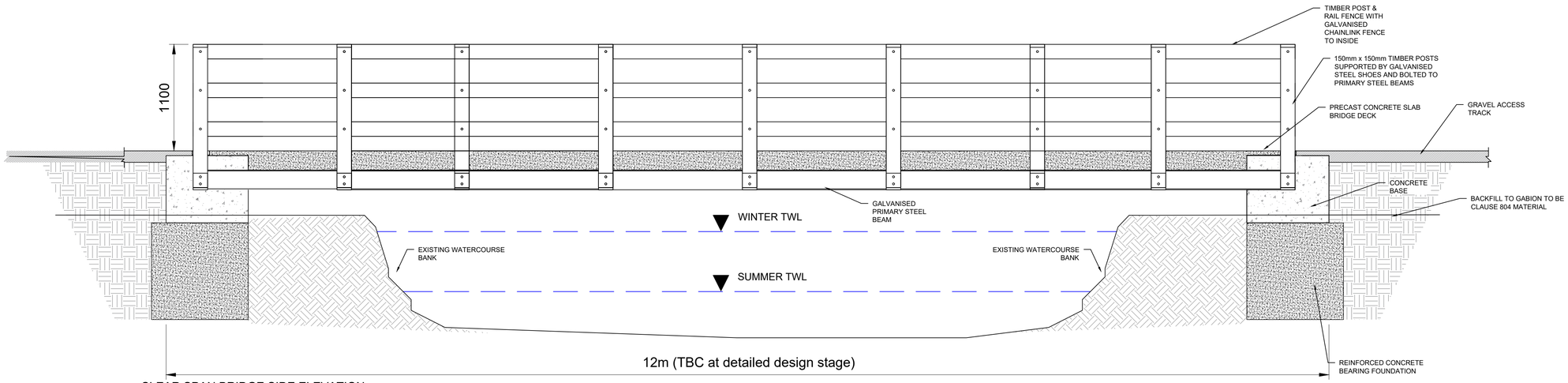
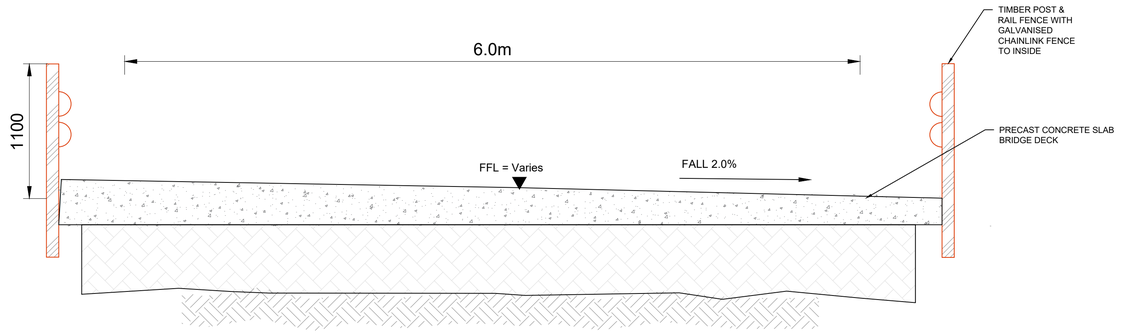
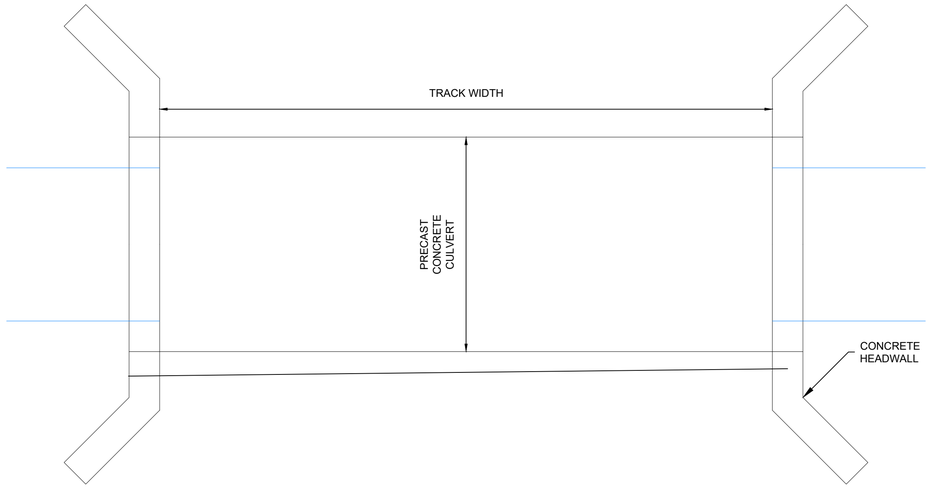
Drawing No.:	Revision:
11333-2034	A



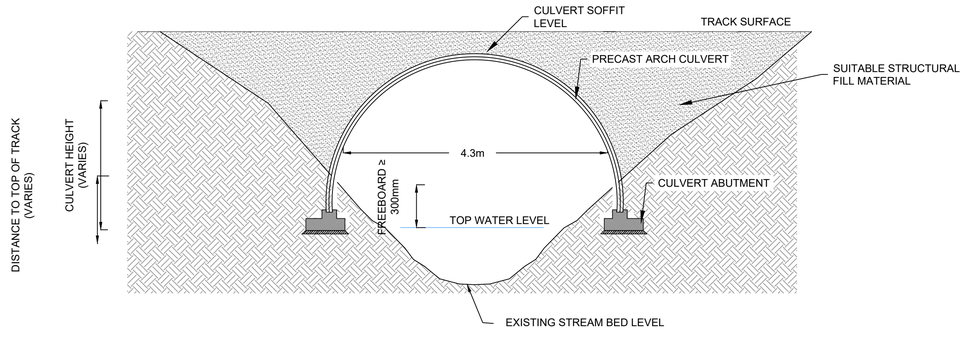
CLEAR SPAN BRIDGE SIDE ELEVATION
1:25



CLEAR SPAN BRIDGE FRONT ELEVATION
1:25



BOTTOMLESS CULVERT
PLAN 1:50



BOTTOMLESS CULVERT
ELEVATION 1:50

NOTE:
Orientation varies as multiple instances on site, north point can be seen on Drg. No: 11333-2003.

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	MN	JD

Client:

RWE

Project:

BALLINCOR WIND FARM
PLANNING APPLICATION

Title:

PROPOSED CLEAR SPAN BRIDGE & CULVERT DETAILS

Scale @ A1: As Shown

Prepared by:	Checked by:	Date:
M. Nolan	J. Dillon	March 2026

Drawing Status: Planning

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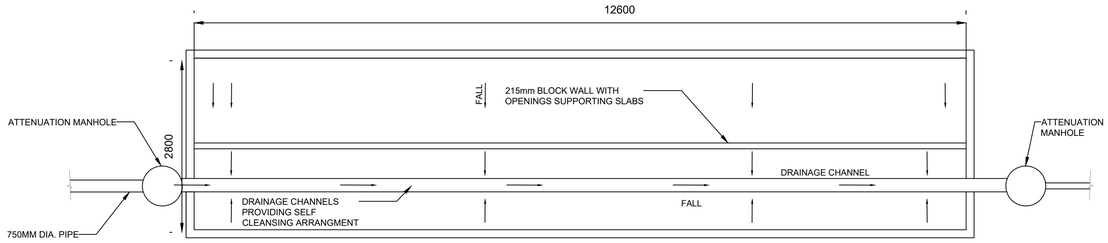
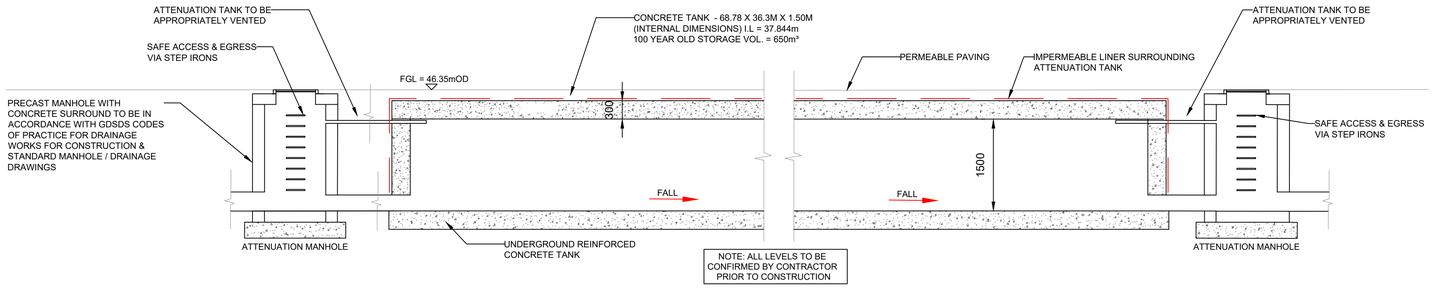
Drawing No.: 11333-2035

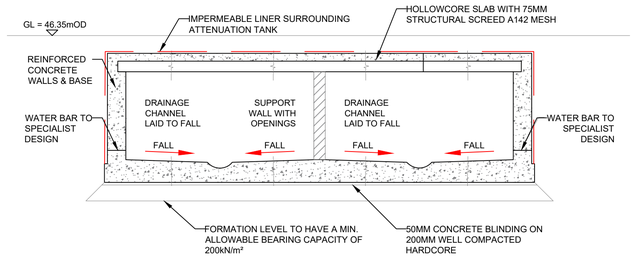
Revision: A



ATTENUATION TANK - FLOOR PLAN
1:50



GENERAL SCHEMATIC OF CONCRETE TANK
1:50



SECTION THROUGH ATTENUATION TANK
1:50

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	JR	MN

Client: RWE

Project:
BALLINCOR
WINDFARM

Title:
UNDERGROUND PRECAST
CONCRETE ATTENUATION
TANK DETAILS

Scale @ A1: As Shown

Prepared by: J.Ryan
Checked by: M. Nolan
Date: March 2026

Drawing Status: Planning

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Drawing No.: 11333-2036
Revision: A

Notes:

1. Intercept drainage and SuDS measures to be constructed prior to access tracks.
2. Access tracks design and construction to Engineer's Specification.
3. Check dams will be installed within drainage ditches located within the proposed development site boundary. Check dams will be keyed 200mm into the drain. Well graded stone will be used to complete the check dam to a height of 500 to 750 mm above the invert of the swale/drain. Aggregate size for stone check dams will be between 10-40mm clean stone.
4. Frequency of check dams to increase where slope is >2%. An area of 1.2m downstream will be protected to dissipate energy from the dam using geotextile and 100mm stone.
5. Regular cross drains / discharge to field ditches will be required to transfer / discharge surface water in interceptor drains to suitable field drain outfall points. Locations of cross drains to be agreed with the Engineer on site. Surface water will not be allowed to discharge directly into existing watercourses.
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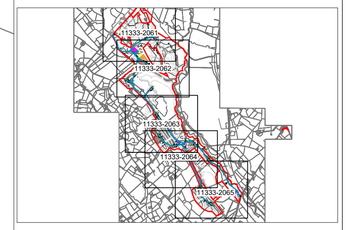
9. Interim measures such as the placement of straw bales/silt fencing/or similar approved method or additional check dams and silt fences.
10. Siltbuster to be available on-site for use as required at borrow pit, substation or turbine bases.
11. Silt fences to be used also around spoil to mitigate silt runoff. silt fences may be removed when suitable vegetation cover is established

GENERAL LEGEND

- APPLICATION BOUNDARY
- PROPOSED ACCESS TRACK
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED VEHICLE TURNING HEAD
- PROPOSED MET MAST
- PROPOSED BORROW PIT
- CONTRACTOR'S COMPOUND
- PROPOSED SUBSTATION
- PROPOSED BESS
- PROPOSED STORAGE AREA
- PROPOSED DRAINAGE POND
- PROPOSED SURFACE WATER DRAINAGE
- DRAINAGE CHANNELS
- INTERCEPTOR DITCH
- PROPOSED CULVERT



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3. GRID REFERENCES TO IRISH NATIONAL GRID.
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

50m 0 50m 100m 150m

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	JK	JD

Client: RWE

Project: BALLINCOR WIND FARM PLANNING APPLICATION

Title: DRAINAGE LAYOUT SHEET 1 OF 5

Scale @ A1: 1:2500

Prepared by:	Checked by:	Date:
J. Kruk	J. Dillon	March 2026

Drawing Status: Planning

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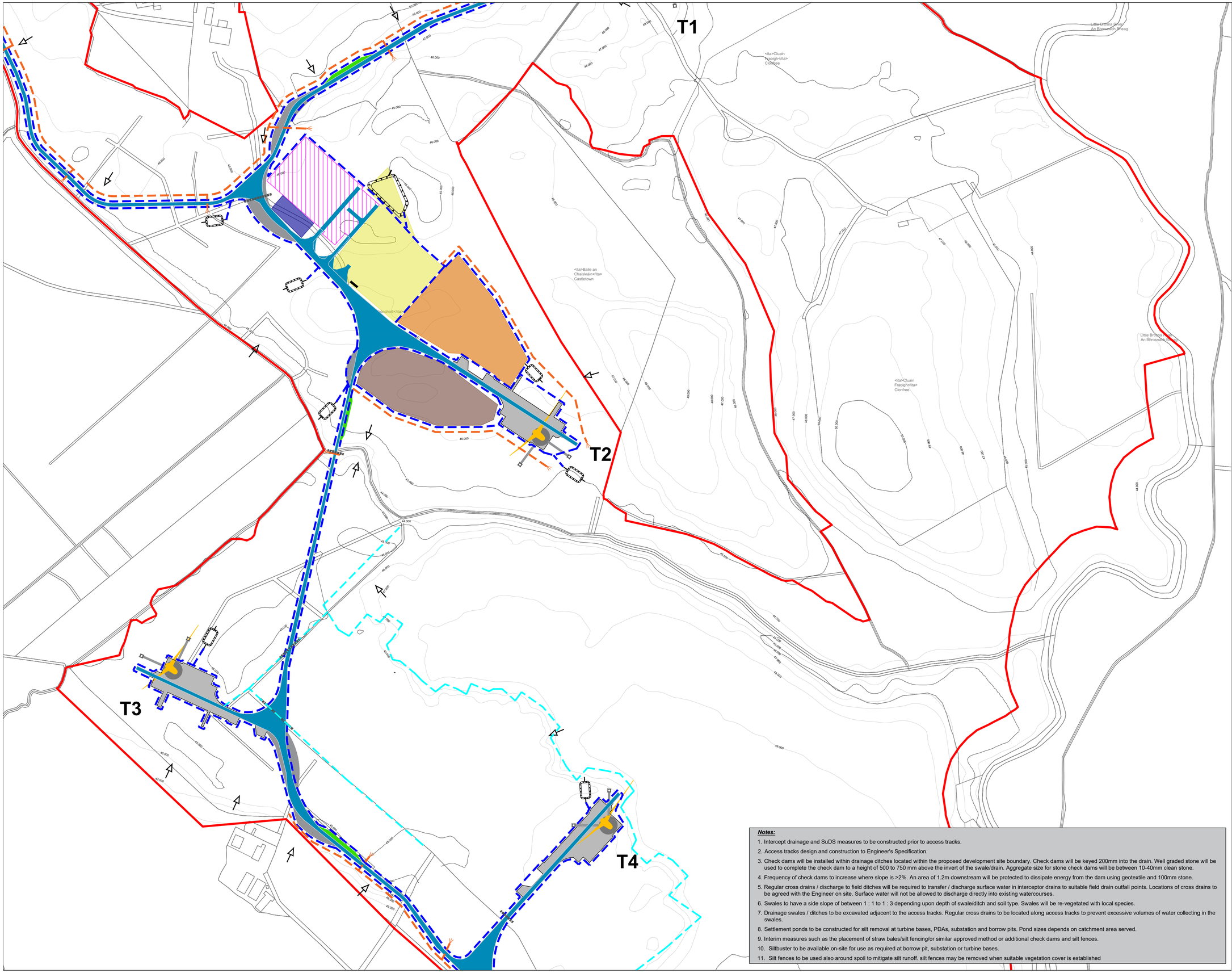
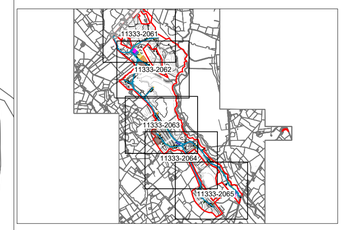
Drawing No.:	Revision:
11333-2061	A



GENERAL LEGEND

- APPLICATION BOUNDARY
- PROPOSED ACCESS TRACK
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED VEHICLE TURNING HEAD
- PROPOSED MET MAST
- PROPOSED BORROW PIT
- CONTRACTOR'S COMPOUND
- PROPOSED SUBSTATION
- PROPOSED BESS
- PROPOSED STORAGE AREA
- PROPOSED DRAINAGE POND
- PROPOSED SURFACE WATER DRAINAGE
- DRAINAGE CHANNELS
- INTERCEPTOR DITCH
- PROPOSED CULVERT



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50m 0 50m 100m 150m

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	JK	JD

Client: RWE

Project:
BALLINCOR WIND FARM
PLANNING APPLICATION

Title:
DRAINAGE LAYOUT
SHEET 2 OF 5

Scale @ A1: 1:2500

Prepared by:	Checked by:	Date:
J. Kruk	J. Dillon	March 2026

Drawing Status: Planning

Notes:

1. Intercept drainage and SuDS measures to be constructed prior to access tracks.
2. Access tracks design and construction to Engineer's Specification.
3. Check dams will be installed within drainage ditches located within the proposed development site boundary. Check dams will be keyed 200mm into the drain. Well graded stone will be used to complete the check dam to a height of 500 to 750 mm above the invert of the swale/drain. Aggregate size for stone check dams will be between 10-40mm clean stone.
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10. Siltbuster to be available on-site for use as required at borrow pit, substation or turbine bases.
11. Silt fences to be used also around spoil to mitigate silt runoff. silt fences may be removed when suitable vegetation cover is established

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Drawing No.: 11333-2062

Revision: A

Notes:

1. Intercept drainage and SuDS measures to be constructed prior to access tracks.
2. Access tracks design and construction to Engineer's Specification.
3. Check dams will be installed within drainage ditches located within the proposed development site boundary. Check dams will be keyed 200mm into the drain. Well graded stone will be used to complete the check dam to a height of 500 to 750 mm above the invert of the swale/drain. Aggregate size for stone check dams will be between 10-40mm clean stone.
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T5

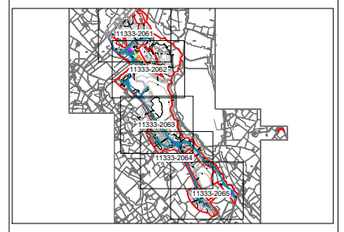
T6

T7

T8

GENERAL LEGEND

- APPLICATION BOUNDARY
- PROPOSED ACCESS TRACK
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED VEHICLE TURNING HEAD
- PROPOSED MET MAST
- PROPOSED BORROW PIT
- CONTRACTOR'S COMPOUND
- PROPOSED SUBSTATION
- PROPOSED BESS
- PROPOSED STORAGE AREA
- PROPOSED DRAINAGE POND
- PROPOSED SURFACE WATER DRAINAGE
- DRAINAGE CHANNELS
- INTERCEPTOR DITCH
- PROPOSED CULVERT



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3. GRID REFERENCES TO IRISH NATIONAL GRID.
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

50m 0 50m 100m 150m

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	JK	JD

Client: RWE

Project: BALLINCOR WIND FARM PLANNING APPLICATION

Title: DRAINAGE LAYOUT SHEET 3 OF 5

Scale @ A1: 1:2500

Prepared by:	Checked by:	Date:
J. Kruk	J. Dillon	March 2026

Drawing Status: Planning

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Drawing No.: 11333-2063

Revision: A

T6

T7

T8

T9

T10

<ita>Baile an Churraigh<ita>
Ballincor Demesne

GENERAL LEGEND

- APPLICATION BOUNDARY
- PROPOSED ACCESS TRACK
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED VEHICLE TURNING HEAD
- PROPOSED MET MAST
- PROPOSED BORROW PIT
- CONTRACTOR'S COMPOUND
- PROPOSED SUBSTATION
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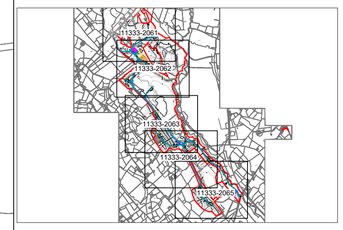
- PROPOSED DRAINAGE POND
- PROPOSED SURFACE WATER DRAINAGE
- EXISTING DRAINAGE CHANNELS
- INTERCEPTOR DITCH
- PROPOSED CULVERT



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50m 0 50m 100m 150m

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	JK	JD

Client: RWE

Project:

BALLINCOR WIND FARM
PLANNING APPLICATION

Title:

DRAINAGE LAYOUT
SHEET 4 OF 5

Scale @ A1: 1:2500

Prepared by:	Checked by:	Date:
J. Kruk	J. Dillon	March 2026

Drawing Status: Planning

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Drawing No.: 11333-2064

Revision: A

T9

T10

T11

<ita>Baile an Churraigh</ita>
Ballincor Demesne

Notes:

1. Intercept drainage and SuDS measures to be constructed prior to access tracks.
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GENERAL LEGEND

- APPLICATION BOUNDARY
- PROPOSED ACCESS TRACK
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED VEHICLE TURNING HEAD
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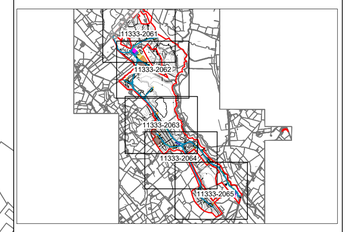

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4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

50m 0 50m 100m 150m

Rev	Date	Description	By	Chkd.
A	31.03.26	PLANNING ISSUE	JK	JD

Client: RWE

Project: BALLINCOR WIND FARM PLANNING APPLICATION

Title: DRAINAGE LAYOUT SHEET 5 OF 5

Scale @ A1: 1:2500

Prepared by:	Checked by:	Date:
J. Kruk	J. Dillon	March 2026

Drawing Status: Planning

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Drawing No.: 11333-2065

Revision: A

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