

7. ORNITHOLOGY

7.1 Introduction

This chapter assesses the likely significant effects that the Ballivor Wind Farm development (the ‘Application Site’) may have on avian receptors. Particular attention has been paid to species of ornithological importance. These include species with national and international protection under the Wildlife Acts 1979-2012 as amended and the EU Birds Directive 2009/147/EC among other relevant legislation. Where potential effects are identified, mitigation is described and residual impacts on avian receptors are assessed.

This chapter is supported by Technical Appendices 7-1 to 7-4, which contain data from the surveys undertaken including full details of the survey times, weather conditions, and other relevant information together with the bird records themselves. Confidential Appendix 7-5 contains sensitive records of protected species breeding sites. Appendix 7-6 contains the Collision Risk Assessment (CRA) document which illustrates how the Collision Risk Modelling was undertaken for the Application Site. Appendix 7-7 contains the bird monitoring programme. The Wind Farm Site and survey radii are provided in Figures 7.1-7.11.

The chapter is structured as follows:

- The Introduction provides a description of the Application Site and the relevant legislation, guidance and policy context regarding ornithology.
- This is followed by a comprehensive description of the ornithological surveys and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on avian receptors.
- A description of the Baseline Ornithological Conditions and Receptor Evaluation is then provided. This is followed by an Assessment of Effects, which as per NatureScot, formerly Scottish Natural Heritage (SNH), Guidance (2017), includes direct habitat loss, displacement and death from a collision. Effects are described with regard to each phase of the Application Site: construction, operational and decommissioning. Potential cumulative effects in combination with other projects are fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on ornithology.

The following list defines the meaning of the technical terms used in this chapter:

- “Key Ornithological Receptor” (KOR) is defined as a species occurring within the zone of influence of the development upon which likely significant effects are anticipated and assessed.
- “Zones of Influence” (ZOI) for individual ornithological receptors refers to the zone within which potential effects are anticipated. ZOIs were assigned following best available guidance (SNH 2016 and McGuinness et.al 2015).
- “Wind Farm Site” refers to all infrastructure located within the EIAR redline with the exception of the turbine delivery route.
- “Turbine delivery route” refers to works relating to upgrading of the road network along the turbine delivery route to facilitate the transportation of the turbines. See Section 4.3.15 of Chapter 4 of this EIAR for further details.
- “Application Site” is defined as all elements of the development within the EIAR redline boundary, including the turbine delivery route and all other associated infrastructure.

7.1.1 Description of the Application Site

The full development description is provided in Chapter 4 of the EIAR. The Application Site comprises 26 no. turbines with a blade tip height 200m, a substation, 2 no. borrow pits and all ancillary infrastructure.

The Application Site will have an operational life of 30 years from the date of commissioning of the wind farm.

7.1.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of the EU EIA Directive (2014/52/EU). The following key legislative provisions apply to habitats and fauna in Ireland:

- Irish Wildlife Acts 1976 to 2012 as amended.
- The European Communities (Birds and Natural Habitats) Regulations 2011, as amended (S.I. no. 477 of 2011). These regulations transpose the EU Birds Directive into Irish law.
- The International Convention on Wetlands of International Importance (the Ramsar Convention), 1971. This convention protects 45 wetland sites of significant value for nature in Ireland.

In the absence of specific national ornithological survey guidance for Ireland, the following guidance documents published by NatureScot (formerly Scottish Natural Heritage [SNH]) have been followed to inform this assessment:

- SNH (2000). Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf>
- SNH (2009). Monitoring the impact of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Monitoring%20the%20impact%20of%20onshore%20windfarms%20on%20birds.pdf>
- SNH (2016). Assessing connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf>
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf>
- SNH (2018a) Avoidance rates for the onshore SNH wind farm collision risk model. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-09/Wind%20farm%20impacts%20on%20birds%20-%20Use%20of%20Avoidance%20Rates%20in%20the%20SNH%20Wind%20Farm%20Collision%20Risk%20Model.pdf>
- SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Assessing%20the%20cumulative%20impacts%20of%20onshore%20wind%20farms%20on%20birds.pdf>

- SNH (2018c). Assessing significance of impacts from onshore wind farms outwith designated areas. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected>
- Goodship, N.M. and Furness, R.W. (2022). NatureScot Research report 1283 – Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. Available at: <https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance>

The following Irish guidance documents were also consulted:

- Percival, S.M. (2003). Birds and wind farms in Ireland: A review of potential issues and impact assessment. Ecology Consulting, Durham, UK. Available at: https://tethys.pnnl.gov/sites/default/files/publications/Percival_2003.pdf
- McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. and Crowe, O. (2015). Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland. Birdwatch Ireland, Wicklow, Ireland. Available at: https://birdwatchireland.ie/app/uploads/2019/09/BWI-Bird-Wind-Energy-devt-Sensitivity-Mapping-Guidance_document.pdf
- Gilbert, G., Stanbury, A. and Lewis, A. (2021). Birds of Conservation Concern in Ireland 4: 2020-2026. Irish Birds, 43:1-22. Available at: <https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland/>

Furthermore, this assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- European Commission (2002). Assessment of plans and projects significantly affecting Natura 2000 sites. Publications Office of the European Union, Luxembourg.
- European Commission (2020). Guidance document on wind energy developments and EU nature legislation. Publications Office of the European Union, Luxembourg.
- Planning and Development Acts 2000 – 2021 (as amended).
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Ireland.
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Statement reports. Environmental Protection Agency, Johnstown Castle Estate, Wexford.
- DoHPLG (2018). Guidelines for planning authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government, Government of Ireland, Dublin.
- CIEEM (2017) Guideline for Ecological Report Writing.
- Meath County Council (2021). Meath County Development Plan 2021-2027.
- Westmeath County Council (2021). Westmeath County Development Plan 2021-2027.

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Patrick Manley (B.Sc.), Project Ornithologist of MKO and reviewed by Senior Ornithologist, Pdraig Cregg (BSc., MSc.), who has over 9 years' experience in surveying and ecological assessment. Both of whom are suitably qualified, competent, professional ecologists with extensive experience of completing avifaunal assessments for wind farm developments and are competent experts for the purposes of the preparation of this EIAR.

Field surveys were undertaken from April 2020 to September 2022 were devised by Senior Ornithologist Pdraig Cregg and were undertaken by Andre Robinson, Conor Rowlands, Declan Manley, Donnacha Woods, Eric Dempsey, Eilis Hogan, Enda Flynn, Eric Dempsey, Ian Hynes, Jack Kennedy, John Curtin,



John McMahon, Kate Bismilla, Kathryn Sheridan, Niall McHugh, Pdraig Webb, Patrick Manley, Paul Troake, Peter Capsey, Sarah Jorgensen (née Ingham), Tom Rae and Tom Siekaniec of MKO.

All of the above surveyors are competent experts in the field of ornithological surveying.

7.2 Assessment Approach and Methodology

7.2.1 Desk Study

A comprehensive desk study was undertaken to search for any relevant information on species of conservation concern that may potentially make use of the Wind Farm Site and its wider surroundings. The assessment included a thorough review of the available ornithological data including:

- Review of online web-mappers¹: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey I-WeBS.
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013).
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2020 – 2026 (Gilbert et al., 2021).
- Review of specially requested records from the NPWS Rare and Protected Species Database.
- Review of supplementary survey data collected at the Wind Farm Site.
- Review of impact assessments associated with nearby developments including wind farms.

7.2.2 Consultation

7.2.2.1 Scoping and Consultation

The consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Section 2.4 of Chapter 2.

Table 7-1 provides a list of the organisations consulted with regard to Ornithology during the scoping process and notes where scoping responses were received. Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-4 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 7-1 Consultation Responses

	Consultee	Response
01	An Taisce	No response to date
02	BirdWatch Ireland	No response to date
04	Department of Agriculture, Food and the Marine	Response received 28/05/2020, with no comments in relation to birds
05	Development Applications Unit (NPWS/NMS)	Response received 26/06/2020. In relation to birds, they stated that the EIAR should adequately address the impact on birds (see Chapter 2, Table 2-4 for further details). The impact assessment is provided in Section 7.6 below.
07	Irish Peatland Conservation Council	No response to date
08	Irish Red Grouse Association	No response to date
09	Irish Raptor Study Group	No response to date
10	Irish Wildlife Trust	Response received 12/05/2020 stating they have no capacity to respond

¹ Accessed on 2nd February 2023

7.2.3 Identification of Target Species and Key Ornithological Receptors

This section of the report describes the criteria used for the selection of target species. The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ornithological Receptors. Following a comprehensive desk study, initial site visits and consultation, a list of “target species” likely to occur in the zone of influence of the Application Site was derived. The observation/survey work carried out on the site was specifically designed to survey for these identified target species in accordance with SNH guidance (2017). The target species list (see Appendix 7-1) was drawn from:

- Species listed in Annex I of the EU Birds Directive.
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects.
- Red listed birds of Conservation Concern.
- Species sensitive to wind farm developments (i.e. raptors).

Following analysis of the collated bird survey data, it was possible to refine the list of target species to identify “Key Ornithological Receptors” and exclude species that were not recorded during the extensive surveys and those for which pathways for a significant effect could not be identified.

7.2.4 Field Surveys

The survey work undertaken between April 2020 and September 2022 forms the core dataset for the assessment of effects on ornithology. These field surveys were undertaken in compliance with SNH guidance (SNH, 2017). The data provided in this report is robust and allows clear, precise and definitive conclusions to be made in relation to the avian receptors identified within the Wind Farm Site and its surroundings. Supplementary survey work was undertaken between October 2019 and March 2020 (see Section 7.3.6 for further details).

Field survey methodologies were devised to survey for the bird species composition and assemblages that occur within the Wind Farm Site and its surroundings. The area surveyed for each type of survey is discussed in the methodology section below. The survey radii mentioned below are discussed in relation to the Wind Farm Site.

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visits, the likely importance of the Wind Farm Site for bird species was ascertained. Based on the collated information available from the above preliminary assessment and adopting a precautionary approach, a site-specific survey scope for the ornithological survey was developed.

7.2.4.2 Survey Methodologies

As previously outlined, the survey work undertaken between April 2020 and September 2022 forms the core dataset for the assessment of effects on ornithology.

In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with ‘*Recommended bird survey methods to inform impact assessment of onshore wind farms*’ (SNH, 2017). The various survey types undertaken are described below.

7.2.4.2.1 Vantage Point Surveys

Vantage point (VP) surveys were undertaken in accordance with SNH guidance (SNH, 2017) from April 2020 to September 2022. Surveys were conducted monthly throughout this survey period from sixteen fixed point vantage points to allow as comprehensive as possible coverage of the 500m survey radius surrounding the proposed turbines. The vantage point locations were selected by undertaking a viewshed analysis, as described below, and confirmed by a recce visit in March 2020. Figure 7.1 shows the vantage point locations used between April 2020 and September 2022.

Viewshed Analysis

Viewshed analysis was carried out to inform coverage of the Wind Farm Site from fixed vantage point locations. Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with QGIS (Version 3.22) using a notional layer suspended at 30m, which is representative of the minimum height considered for the Potential Collision Risk Area based on the selected turbine model. While the relevance of being able to view as much of the site to ground level is acknowledged, the SNH guidance (2017) emphasizes the importance of visibility of the ‘collision risk volume’ when the data is to be used to estimate the risk of collision with turbines by birds.

The viewshed analysis involved testing each VP location for its visibility coverage by creating a viewshed point 1.75m in height (to represent the height of the observer) on a map using 10m contours terrain data. The relative height of forestry and its effects on visibility is also accounted for in the analysis. Using the ZTV software, a viewshed of 360 degrees was produced calculating an area 30m from ground level up, to a 2km radius. The resulting viewshed image was then cropped to 180 degrees to give the viewshed from each VP location in line with SNH (2017). A 500m buffer was applied to the outer most turbines of the proposed wind farm development in line with SNH (2017). The viewshed analysis aims to establish whether the selected vantage points offer adequate coverage of the turbine layout proposed at that time of surveying. Figure 7.2 for surveys undertaken between April 2020 and September 2022.

Data Recording and Digitisation

Data on bird observations and flight activity was collected from a scanning arc of 180° and a 2km radius by an observer at each fixed location for six hours per month. Surveys were scheduled to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Target species were as per listed in Table 1 of Appendix 7-1.

Survey effort for vantage point watches is presented in Appendix 7-2, Table 1. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Table 7-2, below, shows a summary of the VP survey work undertaken.

Table 7-2 Vantage Point Survey Effort

Survey Season	Months	Minimum Effort per VP
2020 Breeding Season (16 VPs)	Apr - Sep	36 hours/VP
2020/21 Non-Breeding Season (16 VPs)	Oct - Mar	36 hours/VP
2021 Breeding Season (16 VPs)	Apr - Sep	36 hours/VP
2021/22 Non-Breeding Season (16 VPs)	Oct - Mar	36 hours/VP
2022 Breeding Season (16 VPs)	Apr - Sep	30 hours/VP

Observed flight activity was recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the Site. Flight bands were split into 0-15m, 15m-25m, 25m-200m and >200m. All flight activity within the height band 25-200m is considered to be within the potential collision height (PCH). Therefore, as the swept path (30-200m) of the turbine falls entirely within the 25-200m height band, the dimensions of the turbine have been assessed in the collision risk calculations.

Each flight observation was assigned a unique identifier when mapped in the field and subsequently digitised using GIS software.

7.2.4.2.2 Breeding Walkover Surveys (Adapted Brown and Shepard Survey)

Breeding walkover surveys were undertaken to determine the presence of bird species of high conservation concern and identify areas of possible, probable, or confirmed breeding for bird species observed within the Wind Farm Site. The survey methodology followed the Brown and Shepherd (1993) and Calladine *et al.* (2009). The survey area for these surveys was the Wind Farm Site and a 500m survey radius of the Wind Farm Site.

Transect routes were devised to ensure the required coverage of different habitat was achieved within the survey area. Transects were selected to ensure all areas of suitable breeding/ foraging habitat were approached to within 100m. Target species included waders, raptors, waterbirds, gulls and other birds of conservation concern. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

Walkover surveys were carried out during daylight hours during the core breeding season months of April, May, June and July (2020, 2021 and 2022), with the Wind Farm Site being visited four to six days per month on each occasion. The timing of visits followed the recommendations of Calladine *et al.* (2009). Following all survey visits, the field maps were analysed to determine the number and location of breeding territories. All non-breeding individuals and species encountered were also recorded.

The survey effort is presented in Appendix 7-2, Table 2. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.3 shows the areas surveyed.

7.2.4.2.3 Breeding Raptor Surveys

Breeding raptor surveys (i.e. birds of prey and owls) were undertaken within the Wind Farm Site and its immediate surroundings. Survey methodology was as outlined in Hardey *et al.* (2013). These surveys aimed to identify occupied territories and monitor their breeding success within the survey area. Raptor surveys were undertaken to a 2km radius from the Wind Farm Site, in the form of short vantage point watches and walked transects. These surveys were undertaken monthly during the core breeding season period (April to July, in 2020, 2021 and 2022). Each round of surveys was undertaken over four days to survey the entirety of the survey area.

Survey effort details are provided in Appendix 7-2, Table 3. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.4 shows the areas surveyed.

7.2.4.2.4 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken in accordance with Gilbert *et al.* (1998). In 2020, 2021 and 2022, surveys were undertaken at the Wind Farm Site in May and June. The survey area extended 500m beyond the Wind Farm Site boundary and was focused in areas of suitable habitat. Surveys commenced one hour before sunset and continued for one hour after sunset or until it was too dark to see, as per Gilbert *et al.* (1998). Transects were slowly walked through areas of suitable woodland habitat onsite and to a 500m radius of the Wind Farm Site. All observations of woodcock (as well as the areas covered) were mapped. The aim of the survey was to record the presence of roding (displaying) male woodcock and thereby establish the distribution and abundance of the species in the surveyed area. This survey method also allowed the observer to survey for owls, i.e. barn owls and long-eared owls.

Survey effort is presented in Appendix 7.2, Table 4. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.5 shows the transect routes surveyed.

7.2.4.2.5 Barn Owl Surveys

Breeding barn owl surveys were undertaken within the Wind Farm Site at two known nest locations. The aim of the survey was to identify if historic breeding barn owl territories were occupied near or within the Wind Farm Site. Survey methodology followed TII (2021). The surveyor conducted a watch at potential nest sites from 30 mins before sunset until 1 hour after sunset, searching for barn owls provisioning young and listening for the sound of chicks. All such observations were recorded and mapped, and a breeding status was assigned following TII (2021). Each potential nest site was surveyed once per month during the core breeding season April to July (2021 and 2022). Additionally, one nest site was also surveyed monthly between December 2020 and March 2021. Survey effort is presented in Appendix 7-2, Table 5, including full details of dates, times and weather conditions. Confidential Appendix 7-5, Figure 7-6 shows the areas surveyed.

7.2.4.2.6 Winter Walkover Surveys

Winter walkover surveys were undertaken during the 2020/21 and 2021/22 winter seasons to record the presence of bird species of high conservation concern within areas of potentially suitable habitat for these species. The survey area extended 500m outside the Wind Farm Site.

Transect routes were devised to ensure coverage of different habitat complexes between vantage point locations within the study area, during the winter months. The methodology was broadly based on methods described in Bibby *et al.* (2000) and adapted Brown and Shepherd surveys' (SNH, 2017). Target species were raptors, waterbirds, gulls and ground birds of conservation interest. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

Survey effort, including details of survey duration and weather condition, is presented in Appendix 7-2, Table 6. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.7 shows the surveyed area.

7.2.4.2.7 Waterbird Distribution and Abundance Surveys

Significant wetland sites within 5km of the Wind Farm Site were surveyed bimonthly for waterbird populations during the 2020/21 and 2021/22 winter seasons. The survey area extended approximately 5km from the Wind Farm Site which exceeds the recommended 500m radius distance for foraging waterbird and 1km radius recommendation for roosting waterbird surveys stipulated by SNH (2017). These surveys aimed to provide contextual information on the distribution and abundance of waterbird species within the wider surroundings of the Wind Farm Site. The methodology was in line with survey methodology guidelines issued by SNH (2017) and BirdWatch Ireland (2015). Counts were undertaken during daylight hours (between dawn and dusk) from suitable vantage points at the wetland sites.

Survey effort for all waterbird distribution and abundance surveys is presented in Appendix 7-2, Table 7. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.8 shows the surveyed area.

7.2.4.2.8 Connectivity Vantage Point Surveys

These surveys aimed to investigate whether there were any regular flight paths between the Lough Ennell SPA, Lough Owel SPA and Lough Derravarragh SPA and the Wind Farm Site. Connectivity vantage points were surveyed between November 2020 and May 2021, and between October 2021 and April 2022.

Data on bird observations and flight activity was collected from a scanning arc of 180° and a two-kilometre radius by an observer from a fixed location for three hours, twice per month, from each of the five vantage point locations.

Survey effort, including details of survey duration and weather condition, is presented in Appendix 7-2, Table 8. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.9 shows the surveyed area.

7.2.4.2.9 Hen Harrier Roost Surveys

Suitable habitat for roosting hen harrier at Lislogher Bog within the Wind Farm Site were surveyed for the presence of hen harrier. Survey work was undertaken in accordance with the methodology devised by Gilbert *et al.* (1998) and the ‘Hen Harrier Roost Types and Guidelines to Roost Watching’ (unpublished guidance document by the Irish Hen Harrier Winter Survey, 2019). Surveys were carried out between October 2021 and March 2022. Full details of the survey effort are provided in Appendix 7-2 Table 9. Figure 7.10 shows the locations of hen harrier roost survey vantage point locations.

7.2.4.2.10 Wintering Golden Plover Surveys

Wintering golden plover surveys were conducted to provide information on golden plover abundance and distribution in relation to the wind farm. Surveys followed Gillings and Fuller (1999) guidance along with Gilbert *et al.* (1998) and Irish Wetland Bird Survey (BirdWatch Ireland, 2021) detection and count methods. Potential golden plover habitats such as lakes, rivers, bogs and large agricultural fields within 12km of the Wind Farm Site were visited by the surveyor during daylight hours. Any golden plover observed at or between these sites were recorded and mapped. Surveys were conducted during the 2021/22 winter seasons (November to April inclusive). Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2, Table 10. Figure 7.11 shows the surveyed area.

7.2.4.2.11 Turbine delivery route

Multidisciplinary walkover surveys of the land take areas along the proposed turbine delivery route were undertaken on the 8th July 2021 and 16th February 2023. The surveys were undertaken in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (NRA, 2009).

During the walkover surveys all habitats within the land take areas were recorded and identified according to the Heritage Council’s ‘*Guide to Habitats in Ireland*’ (Fossitt, 2000). The walkover surveys were designed to detect any protected habitats or species, including any suitable habitat for protected species, that may occur in the vicinity of the Application Site. Incidental sighting/ observations of birds and additional fauna were noted during the site visit.

7.2.4.3 Supplementary Field Surveys

Field surveys were undertaken by Biosphere Environmental between October 2019 and March 2020.

Vantage Point Surveys

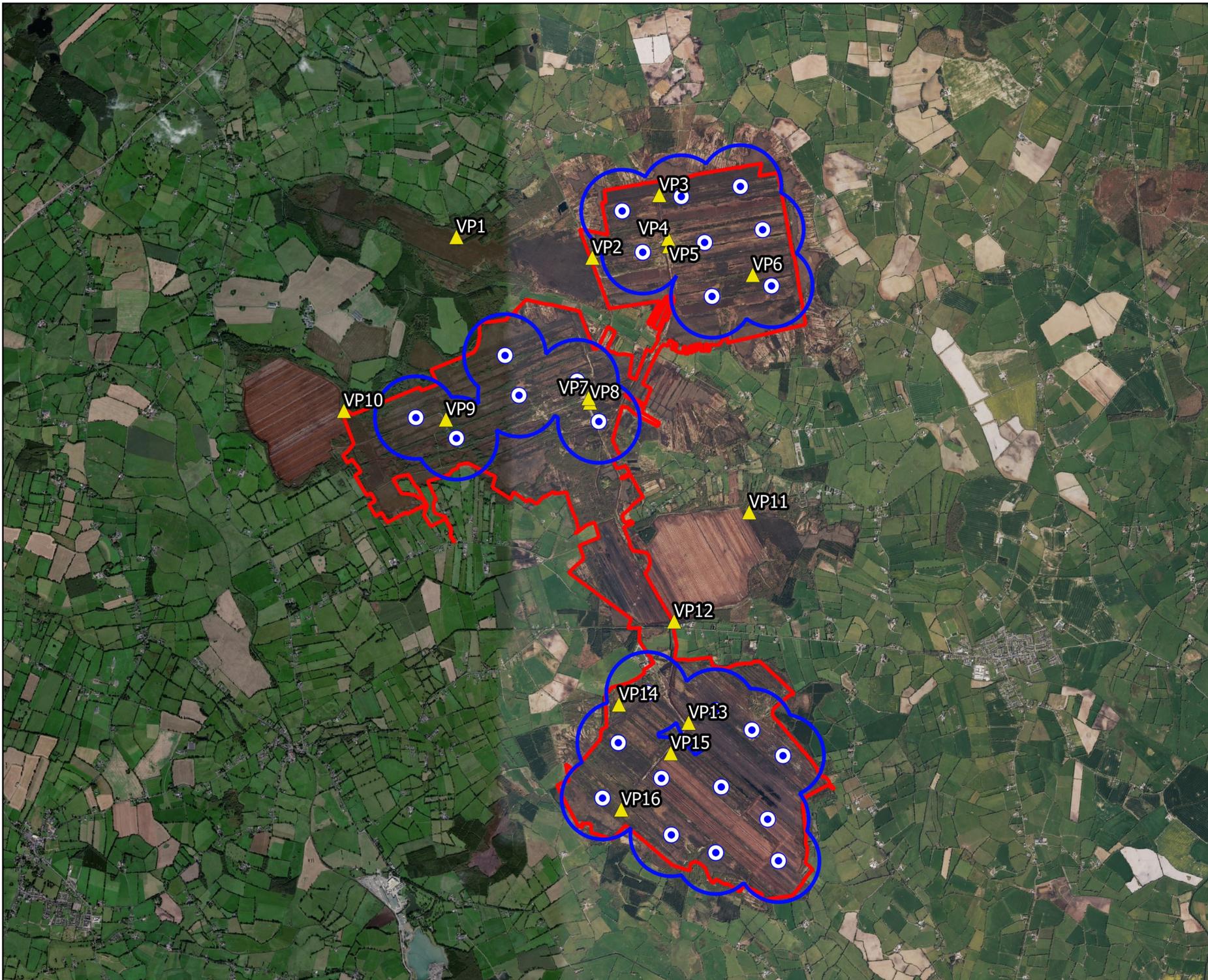
Vantage point (VP) surveys were undertaken in accordance with SNH guidance (SNH, 2017) from October 2019 to March 2020. Surveys were conducted monthly throughout this survey period from sixteen fixed point vantage points to allow as comprehensive as possible coverage of the 500m survey radius surrounding the proposed turbines. Figure 7.1a shows the vantage point locations used between October 2019 and March 2019.

Winter Walkover Surveys

Winter transect surveys were undertaken between October 2019 and March 2020 to record the presence of bird species of high conservation concern within areas of potentially suitable habitat for these species. The survey area extended 500m outside the Wind Farm Site. The methodology was broadly based on methods described in Bibby *et al.* (2000) and adapted Brown and Shepherd surveys’ (SNH, 2017). Target species were raptors, waterbirds, gulls and ground birds of conservation interest.

Whooper Swan Surveys

During the 2019/20 winter season, focused surveys for whooper swan were undertaken by Biosphere Environmental Services. These surveys were conducted at known feeding/roosting sites within areas surrounding the Wind Farm Site. Figure 7.8a shows the feeding sites surveyed during the 2019/20 winter season.



Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- 500m Turbine Buffer
- ▲ Vantage Point Locations



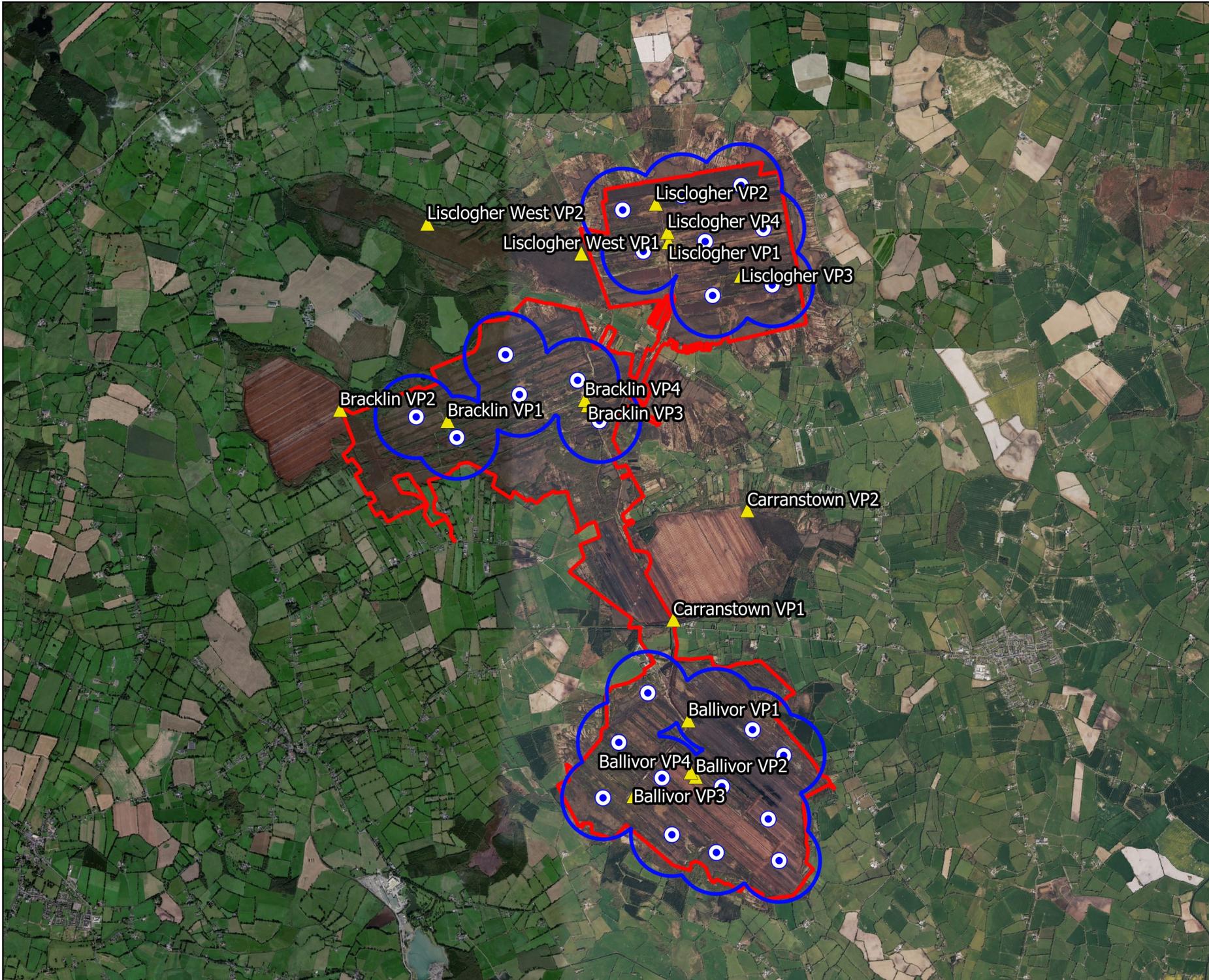
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Vantage Point Survey Locations

Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
Project No. 191137	Drawing No. Fig. 7.1
Scale 1:60000	Date 14.02.23

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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- 500m Turbine Buffer
- ▲ Vantage Point Locations

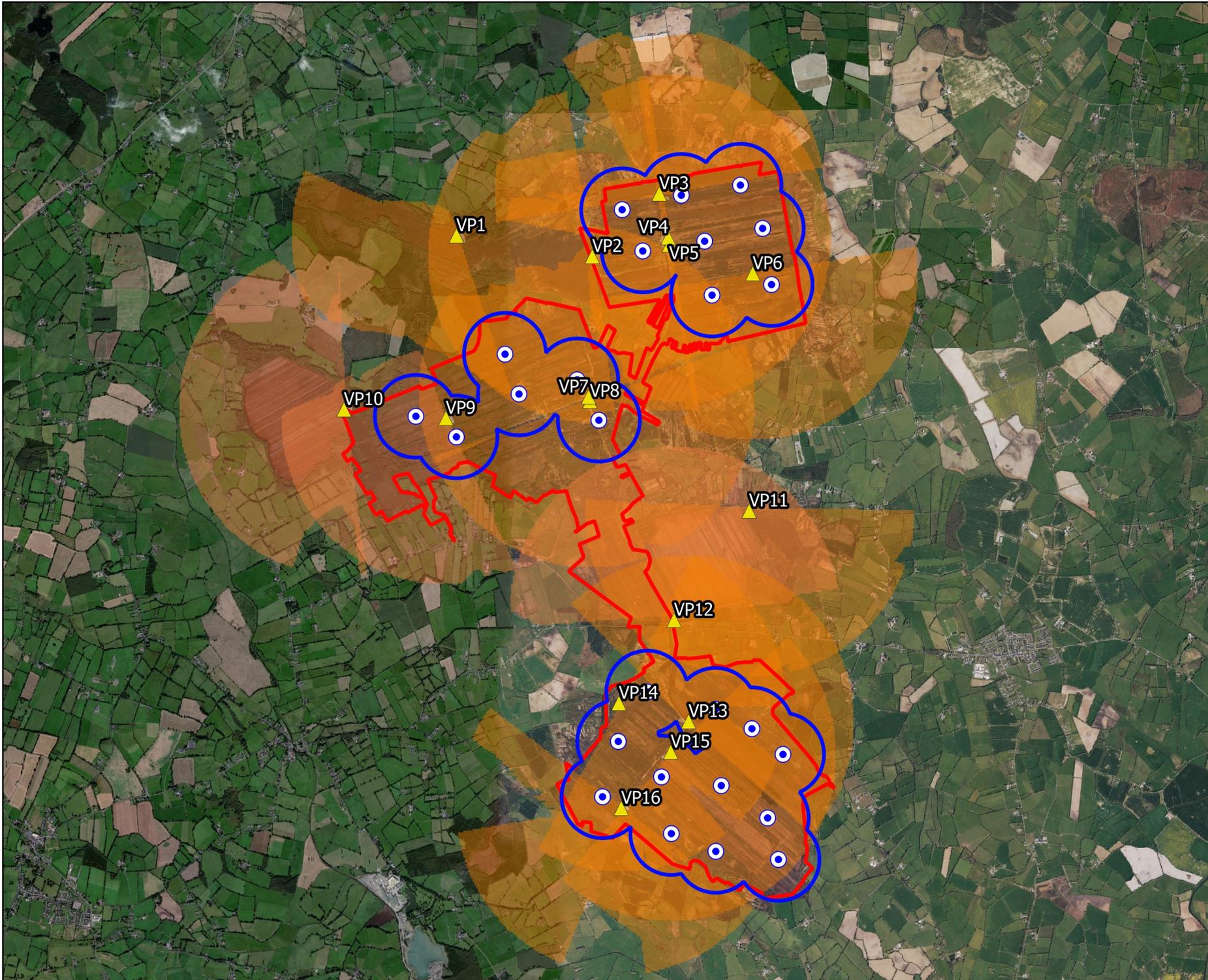


Drawing Title
**Vantage Point Survey Locations
 Biosphere Environmental**

Project Title
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Drawn By P. Manley	Checked By P. Cregg
Project No. 191137	Drawing No. Fig. 7.1a
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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- 500m Turbine Buffer
- ▲ Vantage Point Locations



Drawing Title

Viewshed Analysis
Vantage Point Surveys

Project Title

Ballivor Wind Farm

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Project No.

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Drawing No.

Fig. 7.2

Scale

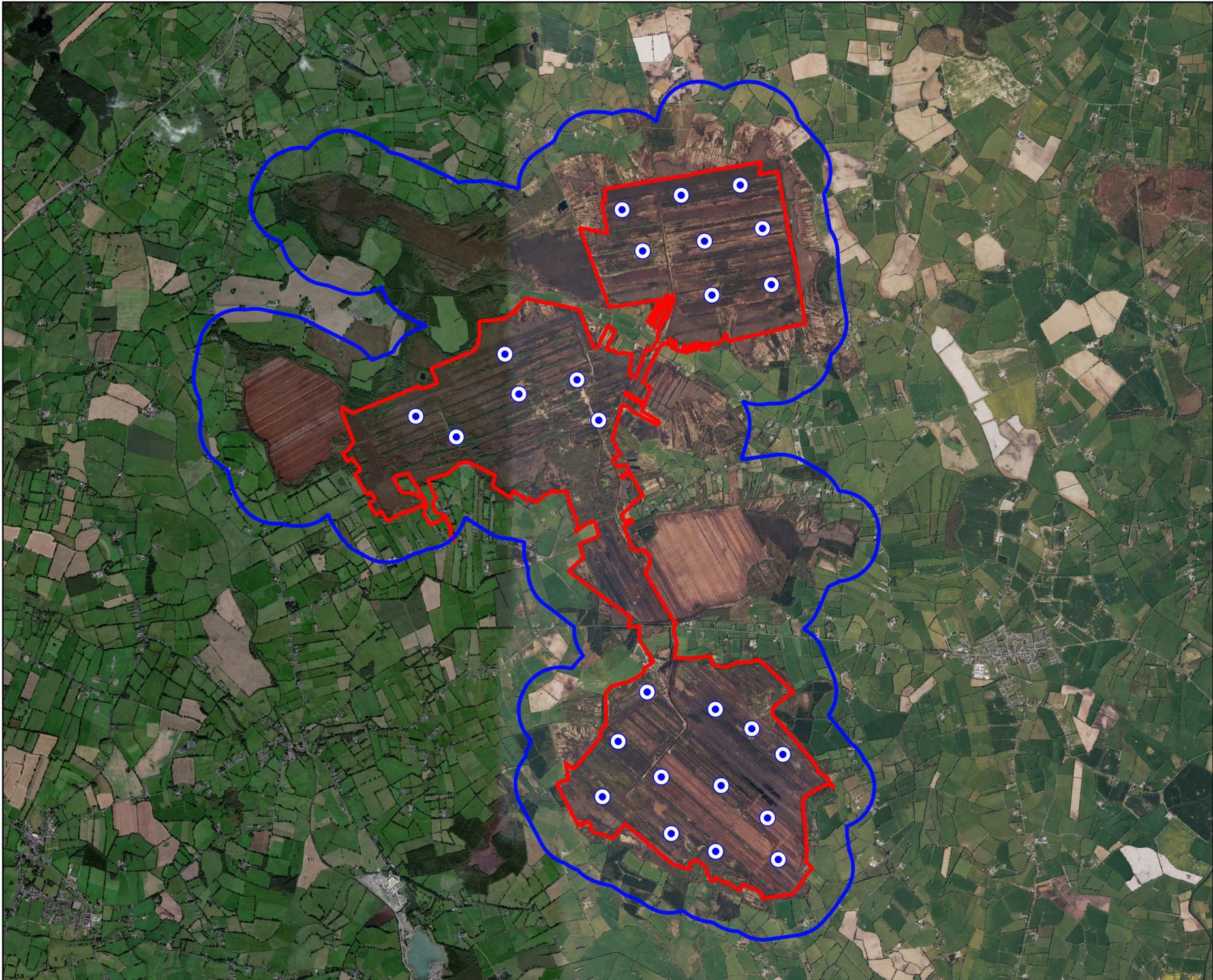
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Date

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Map Legend

-  Wind Farm Site
-  Proposed Turbine Layout
-  Survey Area

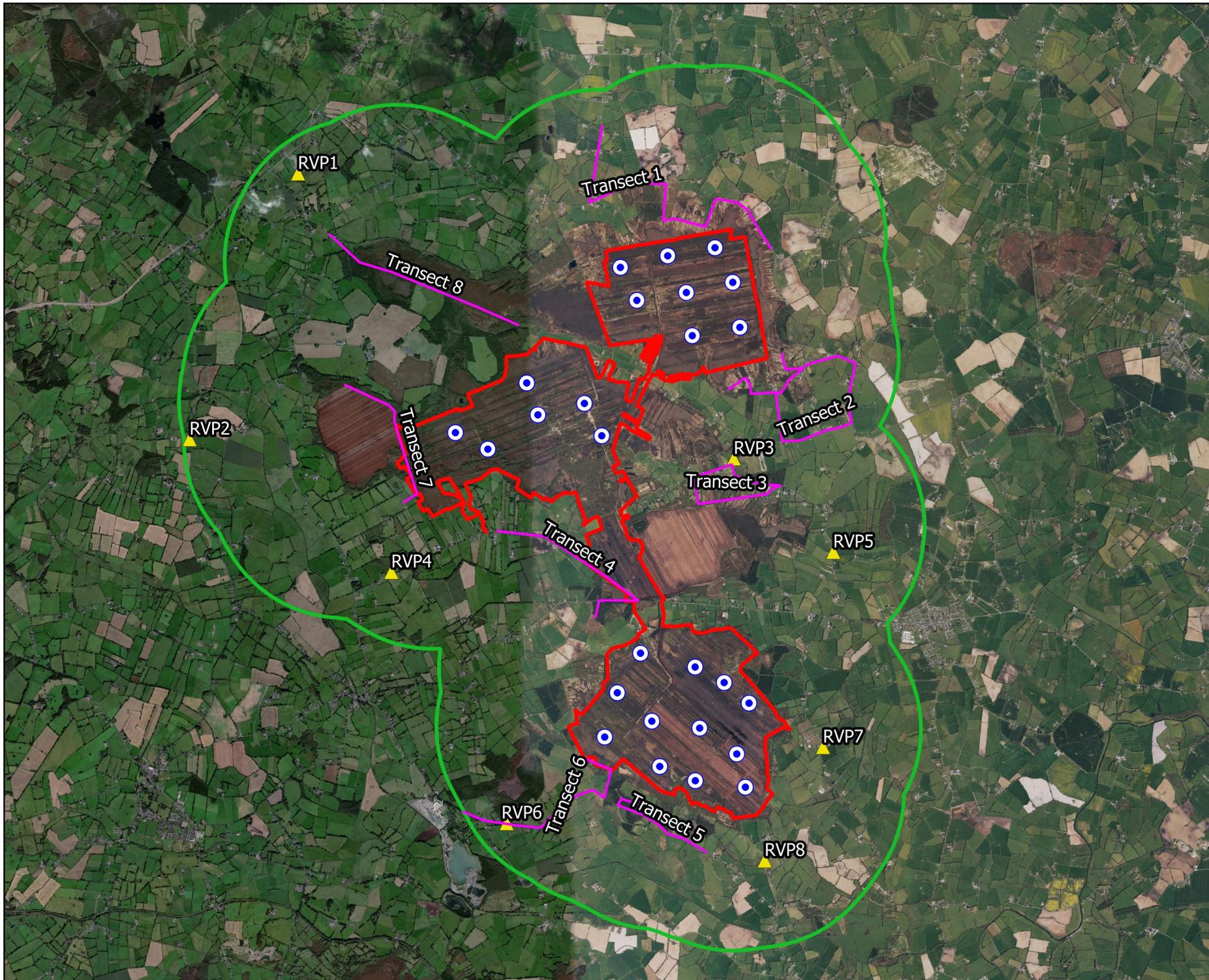


Drawing Title
Breeding Walkover Survey Area

Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
Project No. 191137	Drawing No. Fig. 7.3
Scale 1:60000	Date 14.02.23

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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Survey Area
- ▲ Breeding Raptor Vantage Point Locations
- Breeding Raptor Transects



Drawing Title

Breeding Raptor Survey Locations

Project Title

Ballivor Wind Farm

Drawn By

P. Manley

Checked By

P. Cregg

Project No.

191137

Drawing No.

Fig. 7.4

Scale

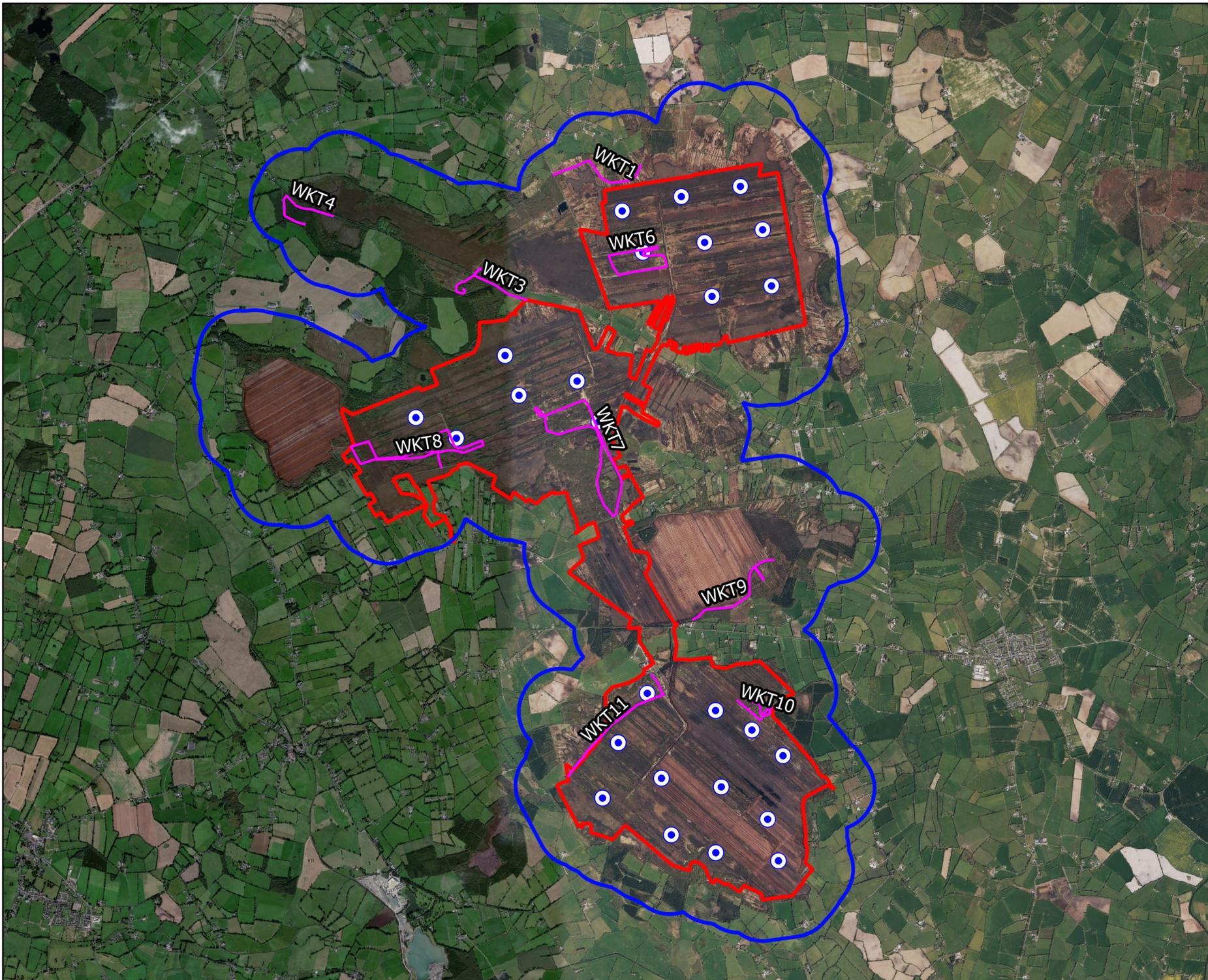
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Date

14.02.23



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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Survey Area
- Transects



Drawing Title
Breeding Woodcock Survey Area

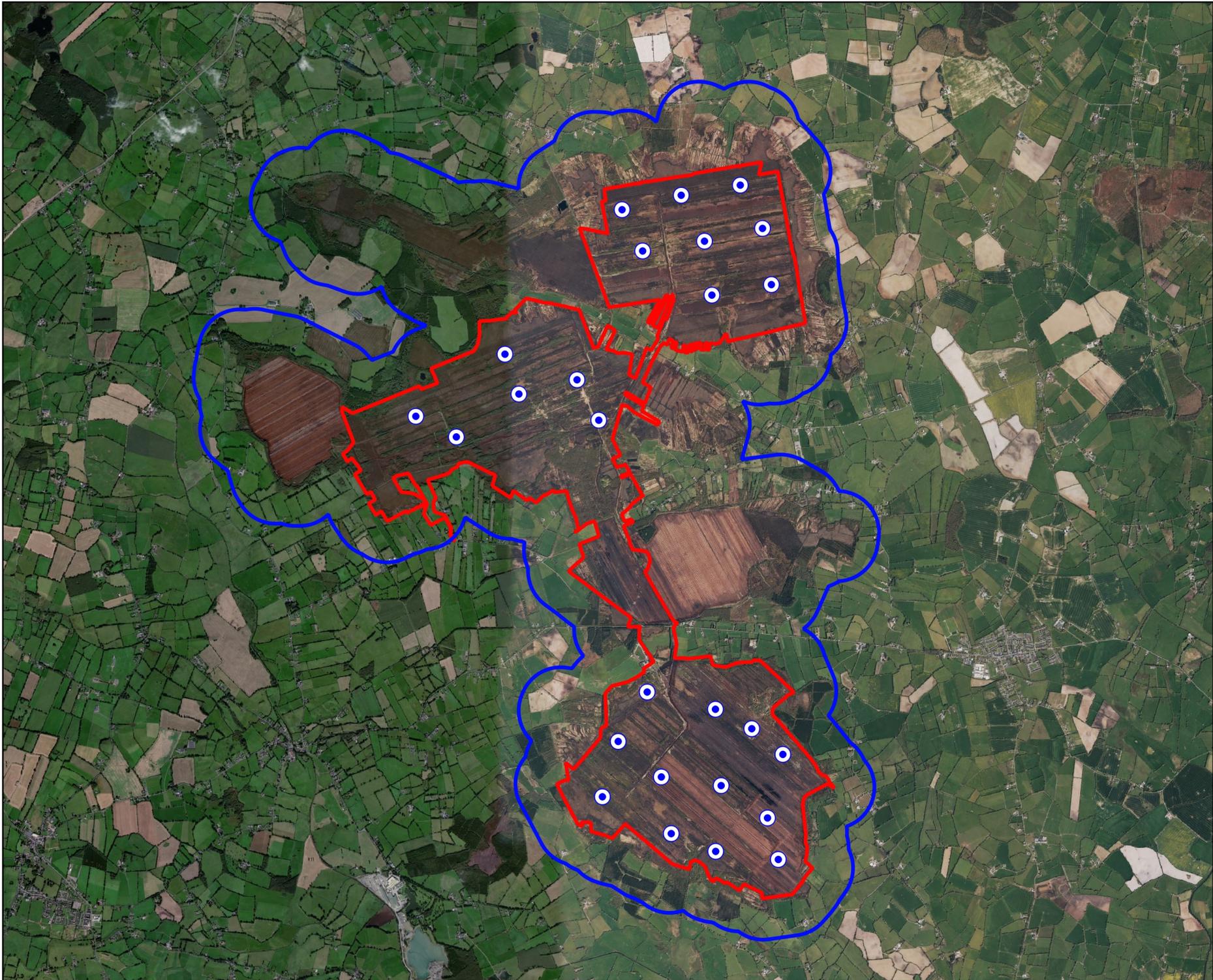
Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
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Project No. 191137	Drawing No. Fig. 7.5
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Scale 1:60000	Date 14.02.23
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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Survey Area



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Drawing Title
Winter Walkover Survey Area

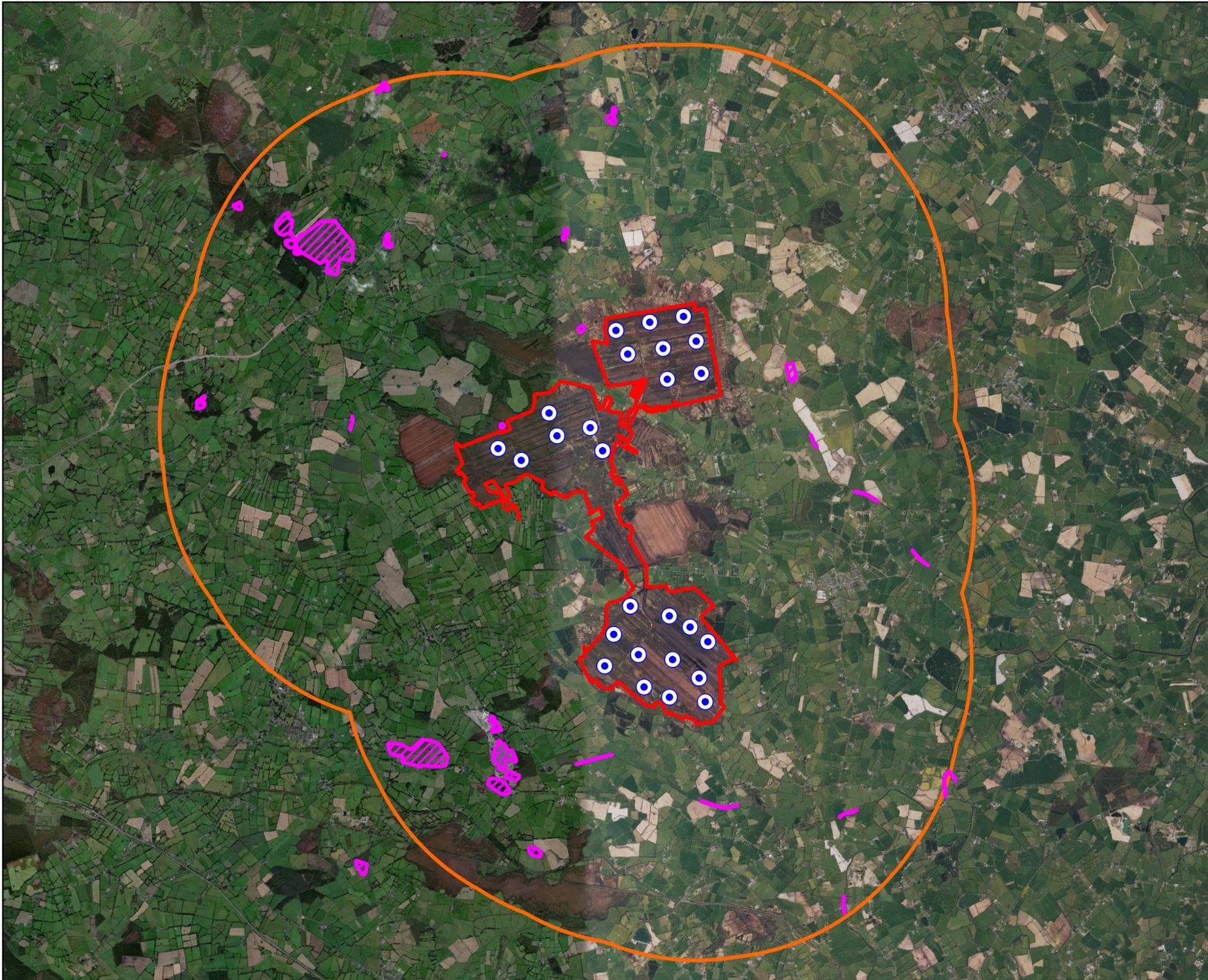
Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
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Project No. 191137	Drawing No. Fig. 7.7
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Scale 1:60000	Date 14.02.23
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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Survey Area
- Main Survey Locations

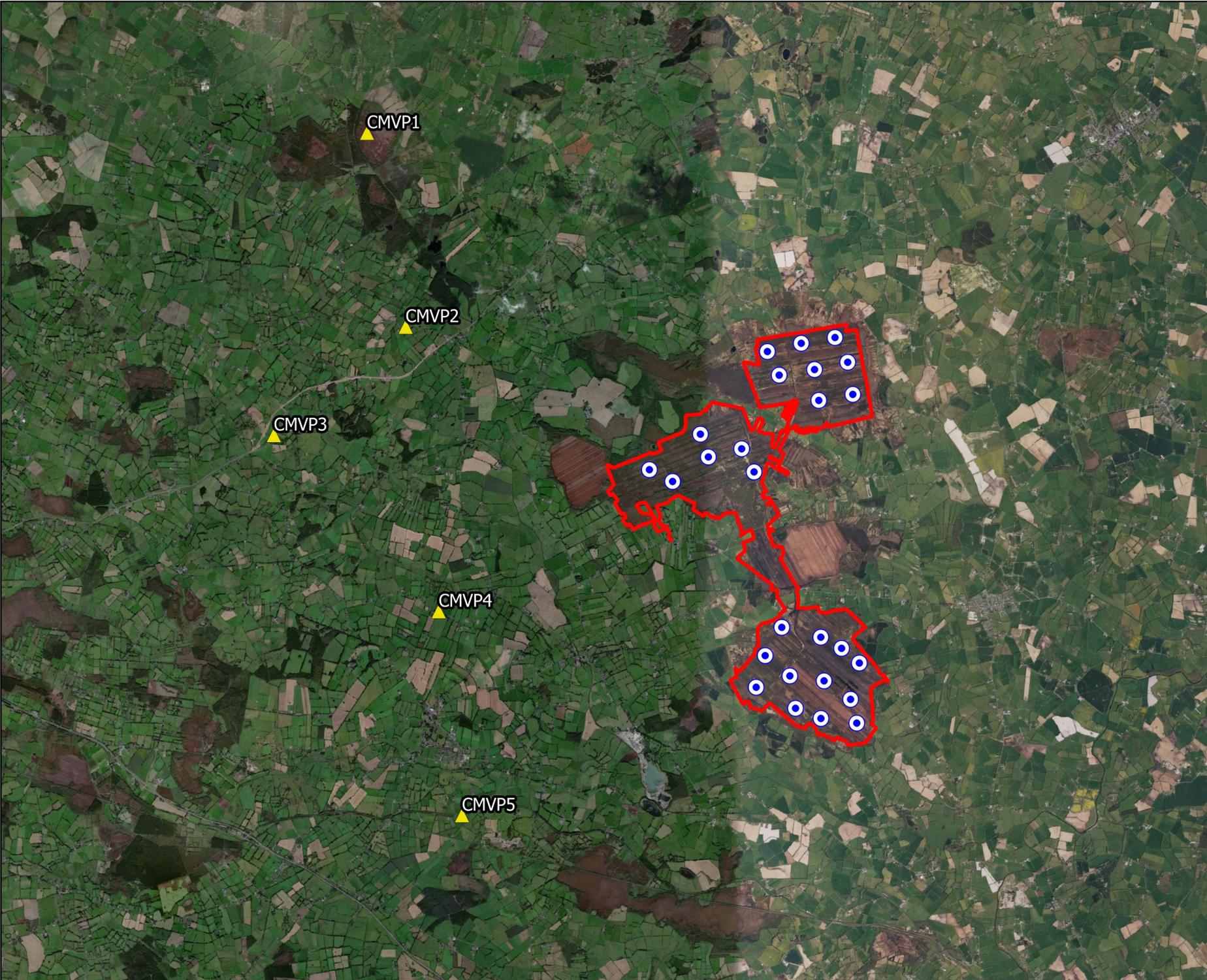


Drawing Title
Waterbird Distribution Survey Locations

Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
Project No. 191137	Drawing No. Fig. 7.8
Scale 1:105000	Date 14.02.23

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Map Legend

- Wind Farm Site
- ⊙ Proposed Turbine Layout
- ▲ Connectivity Vantage Point Survey Location



Drawing Title
Connectivity Vantage Point Survey Locations

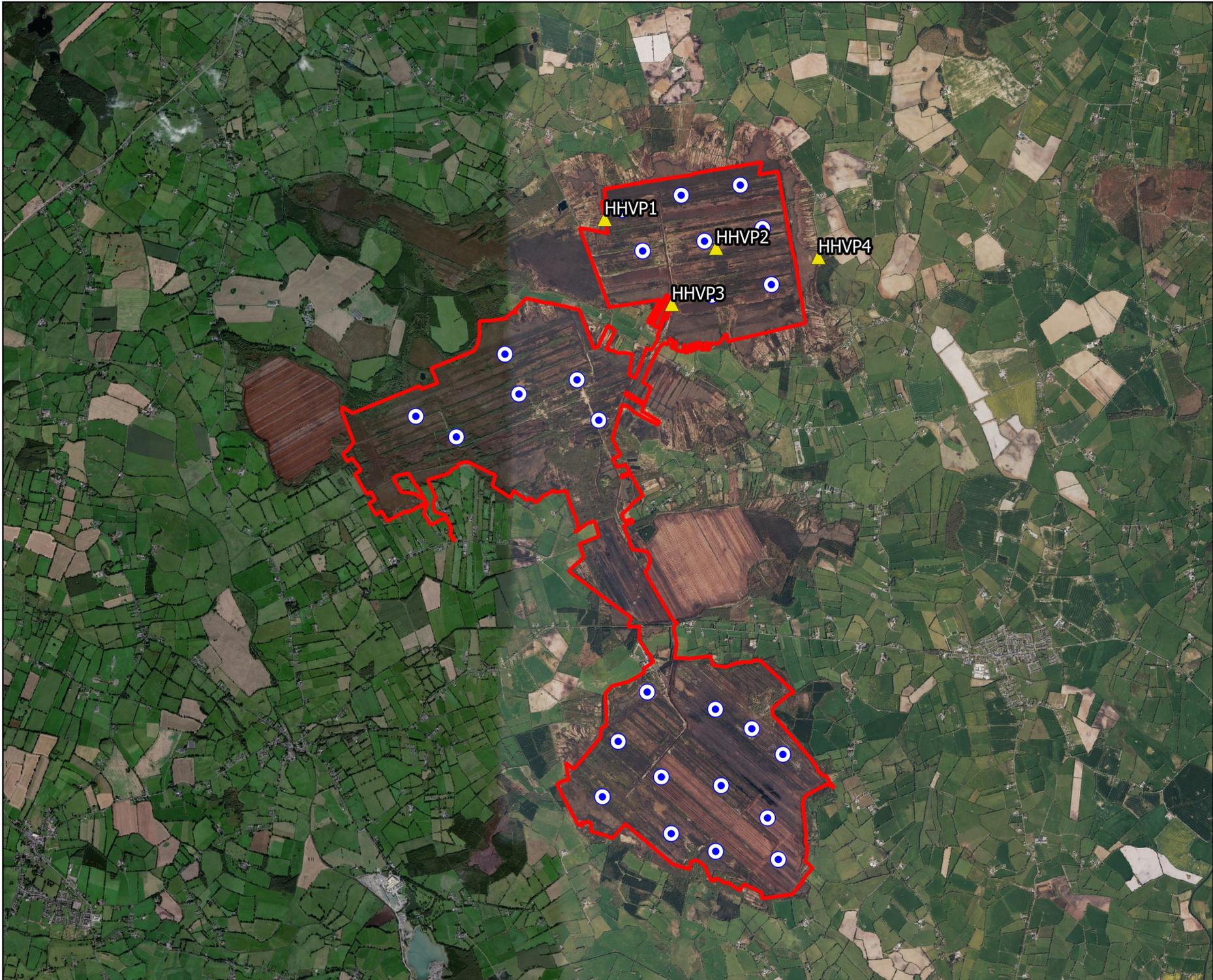
Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
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Project No. 191137	Drawing No. Fig. 7.9
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Scale 1:105000	Date 14.02.23
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Map Legend

- Wind Farm Site
- ⊙ Proposed Turbine Layout
- ▲ Hen Harrier Roost Vantage Point Locations



Drawing Title
Hen Harrier Roost Vantage Point Survey Locations

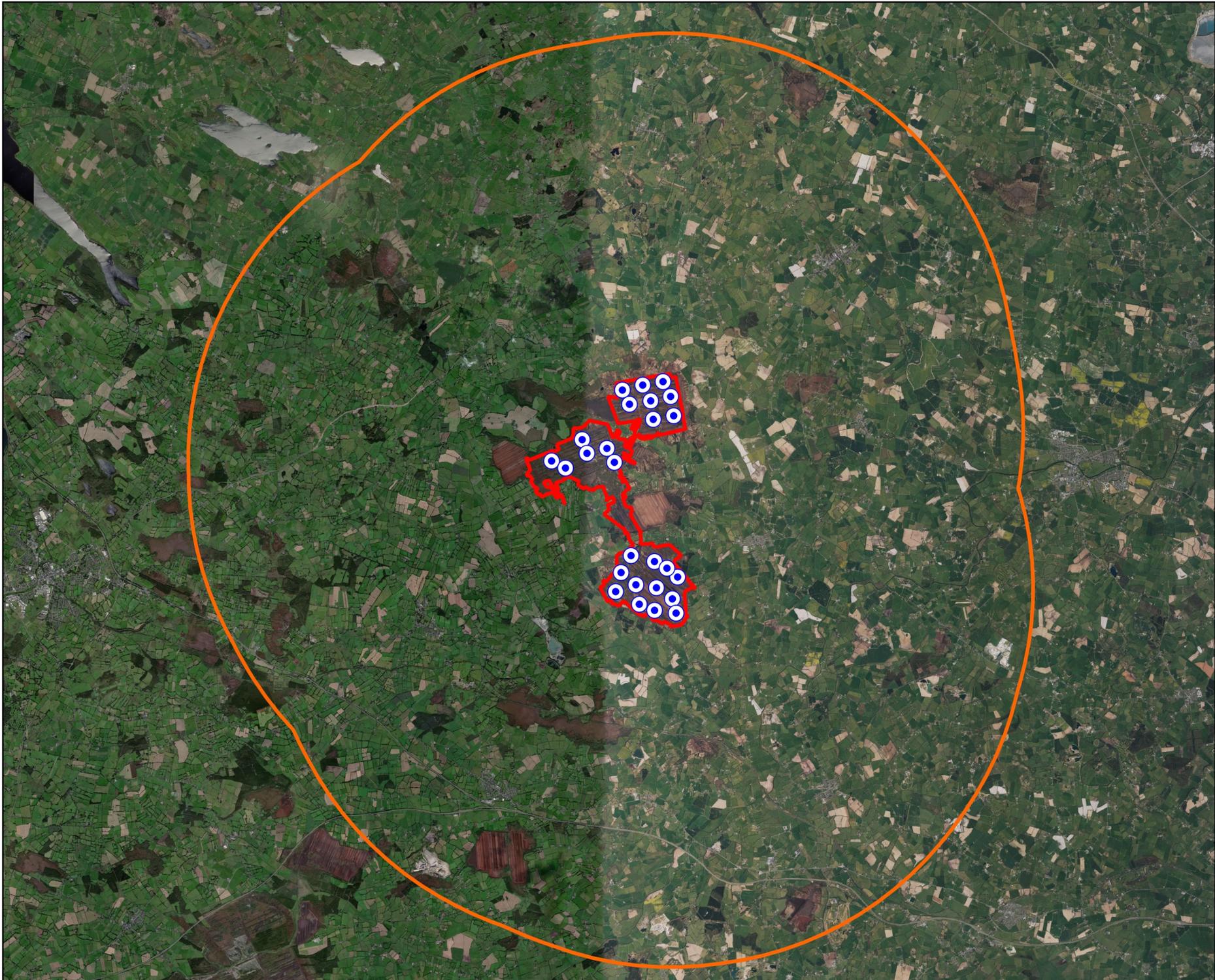
Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
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Project No. 191137	Drawing No. Fig. 7.10
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Scale 1:60000	Date 14.02.23
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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Survey Area



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Drawing Title
Wintering Golden Plover Survey Area

Project Title
Ballivor Wind Farm

Drawn By P. Manley	Checked By P. Cregg
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Project No. 191137	Drawing No. Fig. 7.11
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Scale 1:175000	Date 14.02.23
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7.2.5 Ornithological Evaluation Criteria and Impact Assessment Methodology

7.2.5.1 Potential Effects Associated with the Application Site

As per SNH Guidance (2017), wind farms present three potential risks to birds (Drewitt & Langston 2006, 2008; Band *et al.* 2007):

- **Direct habitat loss** through the construction of wind farm infrastructure;
- **Disturbance displacement** (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to turbine construction and operation. Displacement may also include barrier effects in which birds are deterred from using normal routes to feeding or roosting grounds;
- Death through **Collision** or interaction with turbine blades and other infrastructure.

For each of these three risks, the detailed knowledge of bird distribution and flight activity within and surrounding the site has been utilised to predict the potential effects of the Application Site on birds. Effects are assessed with regard to the construction phase, the operational phase and the decommissioning phase. They are also assessed cumulatively with other projects.

7.2.5.2 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories of ornithological or nature conservation value that relate to a geographical framework (e.g., international, through to local). This assessment utilises the geographical framework described in Guidelines for Assessment of Ecological Impact of National Road Schemes (NRA, 2009). The guidelines provide a basis for the determination of whether a site is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and important only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

7.2.5.3 Receptor Evaluation and Impact Assessment (Percival 2003)

Percival's (2003) methodology for assessing the effects of wind farms on birds has been applied to assess the sensitivity of a species to the development type, the magnitude of the effect and the significance of the potential impact. The following tables (Table 7-3, Table 7-4 and Table 7-5) detail the assessment criteria for each stage.

Table 7-3 Evaluation of Sensitivity for Birds (Percival 2003)

Sensitivity	Determining Factor
Very High	➤ Species that form the cited interest of SPA's and other statutorily protected nature conservation areas. Cited means mentioned in the citation text for the site as a species for which the site is designated.

Sensitivity	Determining Factor
High	<ul style="list-style-type: none"> ➤ Species that contribute to the integrity of an SPA but which are not cited as a species for which the site is designated. ➤ Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, red necked phalarope, roseate tern and chough. ➤ Species present in nationally important numbers (>1% Irish population)
Medium	<ul style="list-style-type: none"> ➤ Species on Annex 1 of the EU Birds Directive. ➤ Species present in regionally important numbers (>1% regional (county) population). ➤ Other species on BirdWatch Ireland’s red list of Birds of Conservation Concern
Low	<ul style="list-style-type: none"> ➤ Any other species of conservation interest, including species on BirdWatch Ireland’s amber list of Birds of Conservation Concern not covered above.

Table 7-4 Determination of Magnitude of Effects (Percival 2003)

Sensitivity	Description
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: < 1% population/ habitat lost

Table 7-5 Significance matrix: combining magnitude and sensitivity to assess significance (Percival 2003)

Significance		Sensitivity			
		Very High	High	Medium	Low
Magnitude	Very High	Very High	Very High	High	Medium
	High	Very High	Very High	Medium	Low
	Medium	Very High	High	Low	Very Low
	Low	Medium	Low	Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low

7.2.5.4 Impact Assessment – EPA Criteria (2022)

Effects identified as per the Percival 2003 criteria have been equated with EPA impact assessment criteria are described below and detailed in Table 7-6 and Table 7-7.

The following terms were utilised when quantifying duration and frequency of effects:

- Momentary – effects lasting from seconds to minutes.
- Brief – effects lasting less than a day.
- Temporary – effects lasting less than a year.
- Short-term – effects lasting 1 to 7 years.
- Medium term – effects lasting 7 to 15 years.
- Long term – effects lasting 15 to 60 years.
- Permanent – effects lasting over 60 years.
- Reversible – effects that can be undone, for example through remediation or restoration.
- Frequency – How often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Table 7-6 Criteria for assessing impact significance based on (EPA, 2017)

Impact Magnitude	Definition
Imperceptible Effect	An effect capable of measurement but without significant consequences
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Effect	An effect that alters the character of the environment that is consistent with existing and emerging baseline trends
Significant Effect	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound Effect	An effect which obliterates sensitive characteristics

Table 7-7 Criteria for assessing impact quality based on (EPA, 2017)

Impact Type	Criteria
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities)
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance)

EPA impact assessment criteria have been used in this assessment for consistency between the biodiversity and ornithology chapters. Percival (2003) has also been followed in the assessment of potential impacts given its specific focus on the interactions between wind farms and birds. The two assessment criteria have been used to independently characterise impacts to inform a robust assessment of potential impacts on local avian communities resulting from the Application Site.

7.2.5.5 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the numbers of individual birds, of a particular species, that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows Scottish Natural Heritage (SNH) guidance which is sometimes referred to as the Band Model (Band *et al.* (2007)).

Two stages are involved in the model:

- Stage 1: Determination of the number of birds or flights passing through the air space swept by the rotor blades of the wind turbines.
- Stage 2: Calculation of the probability of a bird strike occurring.

Please see Appendix 7-6 for full details on the collision risk modelling method.

7.2.6 Survey Justification

A comprehensive suite of bird surveys has been undertaken at the Wind Farm Site between April 2020 and September 2022. Results (outlined in Section 7.4 below) are derived from a continuous 2.5 years of surveying undertaken in line with SNH (2017) Guidance. The surveys undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Application Site on avian receptors.

7.2.6.1 Mitigation

The Application Site has been designed to specifically avoid, reduce and minimise effects on all Ornithological Receptors. Where potential effects on KORs are predicted, mitigation has been prescribed to avoid, reduce and remove such effects.

Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on the identified KORs.

The potential effects of the Application Site were considered and assessed to ensure that all effects on KORs are adequately addressed, and no significant residual effects are likely to remain following the implementation of mitigation measures and best practice measures. As discussed in further detail in Section 7.7.

7.2.6.2 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline environment; provides an accurate prediction of the likely effects of the Application Site; prescribes mitigation as necessary; and describes the predicted residual impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

No difficulties (for example technical deficiencies or lack of knowledge) were encountered while compiling the required information. No significant limitations in the scope, scale or context of the assessment have been identified. However, there was the following minor non-significant limitation in the survey scope, during the 2022 breeding season, the following vantage point surveys were not conducted for the required 36 hours as per SNH (2017): VP3, VP4, VP5, VP6, VP7, VP8, VP9, VP10 and VP11. All of these surveys were only conducted for a total of 33 hours for the breeding season, with the exception of VP11, which was only surveyed for 30 hours. An additional three hours of surveys were conducted at VP3, VP4, VP9 and VP10 in early October 2022 to make up the missed hours. Given that surveys were conducted over a 2.5 year period, which exceeds the recommended survey period of two years (SNH, 2017), the missed surveys are not a significant limitation on the scope of surveys at the Wind Farm Site.

7.3 Baseline Conditions and Receptor Evaluation

7.3.1 Identification of Designated Sites within the Likely Zone of Influence of the Development

A screening assessment and Natura Impact Statement (NIS) were prepared to provide the competent authority with the information necessary to complete an Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the EU Habitats Directive (92/43/EEC). According to EPA (2022) “A biodiversity section of an EIAR ... should not repeat the detailed assessment of potential effects on European sites contained in a NIS, but it should refer to the findings of that separate assessment” and should “incorporate their key findings as available and appropriate”. Therefore, this section provides a summary of the key screening assessment findings regarding SPAs, while a summary of findings regarding Special Areas of Conservation is provided in Chapter 6 of this EIAR. In addition, any potential impacts for SPAs are assessed in detail in the Appropriate Assessment and NIS associated with Chapter 6 of this EIAR.

Sites designated for nature conservation within the potential ZOI of the Proposed Development were identified using GIS software. The ZOI is derived utilising a precautionary approach. Initially, sites within a 15km radius of the proposed works are identified. Then designated sites located outside the 15km buffer zone are accounted for and assessed for pathways for impacts.

In addition (and in the absence of any specific European or Irish guidance), the guidance document ‘Assessing Connectivity with Special Protection Areas’ (SNH, 2016) was consulted. This document provides guidance on identifying of connectivity between the Proposed Development and SPAs. It considers the distances some species may travel beyond the boundary of their SPAs and outlines dispersal and foraging ranges. Potential effects on wetlands and supporting habitats associated with SPAs and potential indirect pathways in the form of surface water pollution are considered in the Appropriate Assessment and NIS and summarised briefly below.

Seven SPAs were located within the potential ZOI of the Wind Farm Site. There are listed and summarised in Table 7-8.

Table 7-8 Special Protection Areas (SPA) within the Zone of Influence

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
River Boyne and River Blackwater SPA (004232)	Approx. 230m from the Application Site	> Kingfisher (<i>Alcedo atthis</i>) [A229]	<p>This site has the generic conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA.” (NPWS, version 8, 2021).</p>	<p>This European Site is located approximately 230m from the proposed development site boundary at its nearest point. Taking a precautionary approach, a potential pathway for direct effects on the SCI species kingfisher, where it occurs outside the SPA, as a result of ex-situ habitat loss within the proposed development site was identified. If Kingfisher nesting habitat is present within the Wind Farm Site at the time of construction, there is potential for loss of this habitat during wind farm construction works.</p> <p>Taking a precautionary approach, a potential pathway for indirect effects on kingfisher as a result of disturbance during the construction phase of the development and collision risk during the operational stage of the development was also identified and considered.</p> <p>There is hydrological connectivity between the Wind Farm Site and this SPA via watercourses within the site boundary which discharge to the Stonyford River to the east, the Deel (Raharney) River to the west, both of which are designated as part of the SPA at this location.</p> <p>The Application Site has the potential to cause deterioration in water quality due to run off and infiltration of pollutants, including silt, hydrocarbons and cement-based products, during construction activities associated with the proposed development. These include construction of turbine hardstands, windfarm access roads, substations, borrow pits and amenity paths and associated carparks and other related activities. There is also potential for run-off of pollutants from turbine hardstand areas, access tracks and any other hard surfaces during the operational phase of the development as well as during activities associated with the decommissioning of the Wind Farm Site. Deterioration of water quality could potentially affect availability of food resources for kingfisher.</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
				<p>The works along the proposed haul route will include temporary road widening works at three locations to facilitate turbine component delivery. Although there is no direct hydrological connectivity between these works and the SPA, and the SPA or nearest watercourse with connectivity to the SPA is located >200m from any land take/road widening works, taking the precautionary approach, there is also potential for indirect effects on the SPA due to deterioration in water quality as a result of overland release of silt laden waters.</p> <p>This SPA is therefore within the likely zone of impact and following the precautionary principle the potential for significant effect on the SPA exists. Further assessment is required.</p>
Lough Derravarragh SPA (004043)	13.4 km from the Application Site	<ul style="list-style-type: none"> > Whooper Swan (<i>Cygnus cygnus</i>) [A038] > Pochard (<i>Aythya ferina</i>) [A059] > Tufted Duck (<i>Aythya fuligula</i>) [A061] > Coot (<i>Fulica atra</i>) [A125] > Wetland and Waterbirds [A999] 	<p>This site has the generic conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA.”</p> <p>This site also has a second conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the wetland habitat at lough Derravarragh SPA as a resource for the regularly</p>	<p>There will be no direct effects as this European Site which lies entirely outside of and >14km from the development footprint.</p> <p>There is no hydrological connectivity between the Application Site and the SPA which is located in a different surface water catchment to the proposed development. Therefore, no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>The Application Site lies outside the core foraging distance of the SCI species Whooper swan (core range of <5km) as per Scottish Natural Heritage Guidelines (SNH, 2016) and following extensive bird surveys undertaken by MKO, there is no evidence to suggest that the Application Site lies on a migratory/regular commuting route for this species.</p> <p>None of the other SCI species were recorded utilising the Wind Farm Site in significant numbers and the site does not support significant</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
			<p>occurring migratory waterbirds that utilise it.” (NPWS, version 8, 2021).</p>	<p>suitable habitat for pochard or tufted duck. Taking the above into consideration and given the distance between the Application Site and the SPA, i.e. >13km, there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the proposed development.</p> <p>Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the Wind Farm Site.</p> <p>There is no potential for significant effect on this European Site, it is not located within the Zone of Likely Impact and no further assessment is required</p>
Lough Owel SPA [004030]	18.3km from the Application Site	<ul style="list-style-type: none"> > Coot (<i>Fulica atra</i>) [A125] > Shoveler (<i>Anas clypeata</i>) [A056] > Wetland and Waterbirds [A999] 	<p>This site has the conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA.”</p> <p>This site also has a second conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the wetland habitat at Lough Owel SPA as a resource for the regularly occurring migratory waterbirds that utilise it.” (NPWS First</p>	<p>There will be no direct effects as this European Site lies entirely outside of and >18km from the development footprint.</p> <p>There is no hydrological connectivity between the Application Site and the SPA which is located in a different surface water catchment to the Application Site. Therefore, no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>During the extensive bird surveys undertaken by MKO, shoveler was not recorded utilising the site and coot was recorded on just a single occasion. Give the absence of/small number of observations of these species and given the distance between the proposed development and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the proposed development.</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
			order site-specific conservation objectives, version 1, 2022).	<p>Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the proposed development.</p> <p>There is no potential for significant effect on this European Site, it is not located within the Zone of Likely Impact and no further assessment is required.</p>
Lough Ennell SPA [004044]	19.8km to the west of the Application Site	<ul style="list-style-type: none"> > Pochard (Aythya ferina) [A059] > Tufted Duck (Aythya fuligula) [A061] > Coot (Fulica atra) [A125] > Wetland and Waterbirds [A999] 	<p>This site has the generic conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.”</p> <p>This site also has a second conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the wetland habitat at Lough Ennell SPA as a resource for the regularly occurring migratory waterbirds that utilise it.” (NPWS First order site-specific conservation objectives, version 1, 2022).</p>	<p>There will be no direct effects as this European Site lies entirely outside of and >19km from the development footprint.</p> <p>There is no hydrological connectivity between the Application Site and the SPA which is located in a different surface water catchment to the proposed development. Therefore, no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>During the extensive bird surveys undertaken by MKO, pochard was not recorded utilising the site and coot and tufted duck were recorded only occasionally and in small numbers. Give the absence of/small number of observations of these species and given the distance between the Application Site and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Application Site.</p> <p>Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the Application Site.</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
				There is no potential for significant effect on this European Site, it is not located within the Zone of Likely Impact and no further assessment is required.
Garriskil Bog SPA [004102]	25.2km to the west of the Application Site	<ul style="list-style-type: none"> ➤ Greenland White-fronted Goose (Anser albifrons flavirostris) [A395] 	<p>This site has the conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.” (NPWS First order site-specific conservation objectives, version 1, 2022).</p>	<p>There will be no direct effects as this European Site lies entirely outside of and >25km from the development footprint.</p> <p>There is no hydrological connectivity between the Application Site and the SPA which is located in a different surface water catchment to the Application Site. Therefore, no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>The Application Site lies outside the core foraging distance of the SCI Greenland white-fronted goose (5-8km) as per Scottish Natural Heritage Guidelines (SNH, 2016) and the species was not recorded during the extensive bird surveys undertaken by MKO. Taking the above into consideration and given the distance between the proposed development and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Application Site.</p> <p>There is no potential for significant effect on this European Site, it is not located within the Zone of Likely Impact and no further assessment is required.</p>
Lough Iron SPA [004046]	24.4km from the Application Site	<ul style="list-style-type: none"> ➤ Whooper Swan (Cygnus cygnus) [A038] ➤ Wigeon (Anas penelope) [A050] ➤ Teal (Anas crecca) [A052] ➤ Shoveler (Anas clypeata) [A056] 	<p>This site has the conservation objective:</p>	<p>There will be no direct effects as this European Site lies entirely outside of and >24km from the development footprint.</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
		<ul style="list-style-type: none"> ➤ Coot (<i>Fulica atra</i>) [A125] ➤ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ➤ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] ➤ Wetland and Waterbirds [A999] 	<p>“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.”</p> <p>This site also has a second conservation objective:</p> <p>“To maintain or restore the favourable conservation condition of the wetland habitat at Lough Iron SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.” (NPWS First order site-specific conservation objectives, version 1, 2022).</p>	<p>There is no hydrological connectivity between the Application Site and the SPA which is located in a different surface water catchment to the Application Site. Therefore, no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>The Application Site lies outside the core foraging distance of the SCI species Whooper swan (core range of <5km), golden plover (3km) and Greenland white-fronted goose (5-8km) as per Scottish Natural Heritage Guidelines (SNH, 2016). Following extensive bird surveys undertaken by MKO, there is no evidence to suggest that the Application Site lies on a migratory/regular commuting route for whooper swan or golden plover. Greenland-white fronted goose was not recorded during the MKO bird surveys undertaken.</p> <p>None of the other SCI species were recorded utilising the site in significant numbers and the site does not support significant suitable habitat for wigeon, teal or shoveler. Taking the above into consideration and given the distance between the Application Site and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the proposed development. Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the Application Site.</p> <p>There is no potential for significant effect on this European Site, it is not located within the Zone of Likely Impact and no further assessment is required</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie , 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
Boyne Estuary SPA [004046]	47.3km from the Application Site	<ul style="list-style-type: none"> > Shelduck (<i>Tadorna tadorna</i>) [A048] > Oystercatcher (<i>Haematopus ostralegus</i>) [A130] > Golden Plover (<i>Pluvialis apricaria</i>) [A140] > Grey Plover (<i>Pluvialis squatarola</i>) [A141] > Lapwing (<i>Vanellus vanellus</i>) [A142] > Knot (<i>Calidris canutus</i>) [A143] > Sanderling (<i>Calidris alba</i>) [A144] > Black-tailed Godwit (<i>Limosa limosa</i>) [A156] > Redshank (<i>Tringa totanus</i>) [A162] > Turnstone (<i>Arenaria interpres</i>) [A169] > Little Tern (<i>Sterna albifrons</i>) [A195] > Wetland and Waterbirds [A999] 	Detailed conservation objectives for this site (Version 1, February 2013) were reviewed as part of the assessment and are available at www.npws.ie	<p>No pathway for direct effects was identified as this European Site lies entirely outside of and approximately 47.3km from the Application Site boundary.</p> <p>The potential for the Application Site to result in indirect effects on this European Site was considered. The site is located >70km downstream of the Application Site. Given the significant distance between the development and the SPA, and the attenuation properties of the intervening watercourses, no potential for significant indirect effects on this European Site due to deterioration of water quality was identified.</p> <p>The site either lies outside the core foraging range (SNH 2016) or does not provide significant suitable habitat for the SCI species associated with the SPA. Therefore, no potential for significant effects on the SPA as a result of disturbance or displacement of SCI species are anticipated.</p> <p>There is no potential for significant effect on this European Site. It is not located within the Zone of Likely Impact and no further assessment is required</p>

7.3.2 Breeding and Wintering Bird Atlas Records

Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland’ (Balmer *et al.*, 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland.

Previous Bird Atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007–11. The three previously published atlases were:

- Sharrock, J.T.R. (1976) The atlas of breeding birds in Britain and Ireland.
- Lack, P.C. (1986) The atlas of wintering birds in Britain and Ireland.
- Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) The new atlas of breeding birds in Britain and Ireland: 1988-1991.

The Wind Farm Site lies within hectads² N55, N65 and N66. Table 7-9 presents a list of species of conservation interest recorded from the relevant hectads:

Table 7-9 Breeding Bird Atlas Data (Hectads N55, N65 & N66)

Species Name	Breeding Atlas 68-72			Breeding Atlas 88-91			Breeding Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	N55	N65	N66	
Barn Owl (<i>Tyto alba</i>)	-	-	Prob	-	-	-	-	-	-	RL
Corncrake (<i>Crex crex</i>)	Prob	Prob	Conf	-	-	-	-	-	-	BD
Curlew (<i>Numenius arquata</i>)	Conf	Conf	-	Seen	Seen	Seen	-	-	-	RL
Grey Partridge (<i>Perdix perdix</i>)	Conf	-	-	-	-	-	-	-	-	RL
Grey Wagtail (<i>Motacilla cinerea</i>)	Conf	-	Conf	-	-	-	Poss	-	Poss	RL
Kestrel (<i>Falco tinnunculus</i>)	Conf	Poss	Prob	Seen	Seen	Seen	Prob	Poss	Poss	RL
Kingfisher (<i>Alcedo atthis</i>)	Conf	Conf	Prob	-	Seen	Seen	Poss	-	-	BD
Lapwing (<i>Vanellus vanellus</i>)	Conf	Poss	-	Bred	-	-	-	-	-	RL
Meadow Pipit (<i>Anthus pratensis</i>)	Conf	Conf	Conf	Seen	Bred	Bred	Conf	Conf	Prob	RL
Peregrine (<i>Falco peregrinus</i>)	-	-	-	-	-	-	Poss	-	Poss	BD
Red Grouse (<i>Lagopus lagopus</i>)	-	-	Conf	-	-	-	-	-	-	RL
Snipe (<i>Gallinago gallinago</i>)	Conf	Prob	Conf	Bred	Seen	Seen	-	Prob	Prob	RL

² A hectad is a term used in describing a geographical location and is of an area 10km by 10km square.

Species Name	Breeding Atlas 68-72			Breeding Atlas 88-91			Breeding Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	N55	N65	N66	
Stock Dove (<i>Columba oenas</i>)	Conf	-	Conf	-	Seen	Seen	-	Poss	-	RL
Swift (<i>Apus apus</i>)	Conf	Conf	Conf	Bred	-	Bred	Conf	Poss	Prob	RL
Whinchat (<i>Saxicola rubetra</i>)	Conf	-	-	-	-	Seen	Prob	-	-	RL
Woodcock (<i>Scolopax rusticola</i>)	Prob	Prob	-	-	-	-	-	-	-	RL
Yellowhammer (<i>Emberiza cintrinella</i>)	Conf	Conf	Conf	Seen	Bred	Seen	Prob	Prob	Poss	RL

Seen = recorded; Poss = possible breeding; Prob = probable breeding; Conf = confirmed breeding; - = not-recorded; Bred = Breeding Record. Conservation Status: BD = Annex I of the Birds Directive, RL = BoCCI Red Listed.

Table 7-10 shows those species recorded in the relevant hectads (N55, N65 and N66) in the wintering birds' atlases that are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list.

Table 7-10 Wintering Bird Atlas Data (Hectads N55, N65 & N66)

Species Name	Wintering Atlas 81-84			Wintering Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	
Barn Owl (<i>Tyto alba</i>)	-	-	Pres	-	-	-	RL
Bewick's Swan (<i>Cygnus columbianus</i>)	-	-	Pres	-	-	-	BD
Curler (<i>Numenius arquata</i>)	-	-	-	Pres	Pres	Pres	RL
Golden Plover (<i>Pluvialis apricaria</i>)	Pres	Pres	-	-	-	-	BD
Grey Wagtail (<i>Motacilla cinerea</i>)	Pres	-	-	-	Pres	Pres	RL
Kestrel (<i>Falco tinnunculus</i>)	Pres	-	-	Pres	Pres	Pres	RL
Lapwing (<i>Vanellus vanellus</i>)	Pres	Pres	Pres	Pres	Pres	Pres	RL
Meadow Pipit (<i>Anthus pratensis</i>)	Pres	Pres	Pres	-	Pres	Pres	RL
Merlin (<i>Falco columarius</i>)	-	Pres	-	-	-	-	BD
Redwing (<i>Turdus iliacus</i>)	Pres	Pres	Pres	Pres	Pres	Pres	RL
Snipe (<i>Gallinago gallinago</i>)	Pres	Pres	-	Pres	Pres	Pres	RL
Stock Dove (<i>Columba oenas</i>)	Pres	Pres	Pres	Pres	Pres	-	RL
Whooper Swan (<i>Cygnus cygnus</i>)	-	-	-	Pres	-	Pres	BD
Woodcock (<i>Scolopax rusticola</i>)	Pres	-	-	-	Pres	-	RL
Yellowhammer (<i>Emberiza cintrinella</i>)	Pres	-	Pres	-	Pres	-	RL

Pres = present in hectad; - = not recorded. Conservation Status: BD = Annex I of the Birds Directive, RL = BoCCI Red Listed

7.3.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland and provides a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (McGuinness et al. (2015)). The criteria for estimating a zone of sensitivity (i.e. 'low', 'medium', 'high' and 'highest') is based on a review of the behavioural, ecological and distributional data available for each species.

The southern section of the development site is located within a low bird sensitivity zone (overlapping with 8 no. turbines). The remainder of the Wind Farm Site is not located within an area identified as sensitive to birds (i.e. there is no data available).

7.3.4 Irish Wetland Bird Survey (I-WeBS) Records

The Wind Farm Site is not covered by an I-WeBS site and the nearest site is located approximately 11km northwest of the Wind Farm Site at Lough Lene. Data from I-WeBS sites in County Meath and County Westmeath have been used to estimate county populations of wintering waterbirds identified as KORs, as the Wind Farm Site lies within these two counties³. Datasets for the following sites were downloaded from www.birdwatchireland.ie and reviewed:

Meath I-WeBS Sites

- > Ballyhoe Lakes
- > Black Lough (Drewstown)
- > Breakey Lough
- > Croboy Lough & Fields
- > Crossakeel
- > Donore Bog
- > Kells (Meath)
- > Lough Bane
- > Lough Brackan
- > Murphy's Quarry, Gormanstown
- > Nanny Estuary & Shore
- > Newcastle Lough
- > River Boyne
- > Wetlands at Greenan/Garrynabolie
- > White Lough
- > Whtiewood Lough

Westmeath I-WeBS Sites

- > Ballinlough (Westmeath)
- > Crowinstown Lough
- > Glen Lough
- > Lough Derravaragh
- > Lough Drin
- > Lough Ennell
- > Lough Glore
- > Lough Iron
- > Lough Lene
- > Lough Owel
- > Lough Ree (Westmeath Portion)
- > Lough Sheever
- > Plunkett's Quarry, Castletown
- > Royal Canal
- > Slevin's Lake
- > Tang River
- > Walshestown South Turlough

³ The limitations of using this data to estimate a county population is acknowledged, e.g. as all the counts in a given year were not undertaken on the same day typically there is the potential for under or over estimates, however this is the best available information.

➤ White/Annagh Lough

7.3.5 NPWS Rare and Protected Species Dataset

An information request was sent to the NPWS requesting records from the Rare and Protected Species Database. The sections below provide the records obtained from the NPWS (19th August 2020) regarding rare and protected bird species. The NPWS were again contacted on the 23rd August 2022 to determine if any new records had become available since the last communication, with a response received on 1st September 2022. The information outlined below is the most up to date information received from the NPWS.

Golden Plover

The NPWS held one record for golden plover. This was recorded in hectad N55 during the 2010 Kingfisher Assessment.

Kestrel

The NPWS held two records for kestrel. There was one recorded in both hectad N55 and N65 during the 2010 Kingfisher Assessment.

Kingfisher

The NPWS held ten records for kingfisher. The closest record to the Wind Farm Site was 400m, to the northeast. There were two records within 500m of the Wind Farm Site and a further four records within 1km of the Wind Farm Site. Nine of these records were from the 2010 Kingfisher Assessment and one record from the 2010-2011 National Otter Survey.

Lapwing

The NPWS held two records for lapwing. There was one observation in hectad N65 and one in N66. Both observations were recorded during the 2010 Kingfisher Assessment. Both observations were located partially within the Wind Farm Site, to the northeast.

Snipe

The NPWS held one record for snipe. This record was located within hectad N65 and was approximately 1.2km from the Wind Farm Site. This observation was recorded during the 2010 Kingfisher Assessment.

Yellowhammer

The NPWS held four records for yellowhammer, all from the 2010 Kingfisher Assessment. All observations were in hectad N65 and there was one observation partially within the Wind Farm Site, to the northeast.

7.3.6 Supplementary Survey Data

The target species listed below were recorded during the ornithological surveys undertaken at the Wind Farm Site between October 2019 and March 2020:

- Golden Plover
- Hen Harrier
- Merlin
- Peregrine
- Whooper Swan
- Kestrel

- > Lapwing
- > Snipe
- > Woodcock
- > Buzzard
- > Sparrowhawk

Golden Plover

Golden plover were observed on eleven occasions during the vantage point surveys between October 2019 and March 2020. Observations ranged from 7 to 30 birds. There were six observations of flocks roosting within the Wind Farm Site. All other observations were of birds commuting.

Hen Harrier

Hen Harrier were observed on five occasions during the vantage point surveys between October 2019 and March 2020. All observations were of individuals hunting or commuting.

Merlin

Merlin were only observed on one occasion during surveys at the Wind Farm Site between October 2019 and March 2020. There was an individual observed hunting in Lislogher West bog.

Peregrine

Peregrine were observed on nine occasions during the vantage point surveys between October 2019 and March 2020. All observations were of individuals hunting or commuting.

Whooper Swan

Whooper swan were observed on eight occasions during the dedicated whooper swan surveys between October 2019 and March 2020. Flocks ranged from 9 to 68 birds. There were five observations at the Kilsaran Concrete quarry, approximately 3km from the nearest proposed turbine, and three observations along the River Deel.

Kestrel

Kestrel were observed on 40 occasions during the vantage point surveys between October 2019 and March 2020. All observations were of birds commuting or hunting.

Lapwing

Lapwing were only observed on one occasion during surveys at the Wind Farm Site between October 2019 and March 2020. There was a flock of 14 birds commuting over Bracklin bog.

Snipe

Snipe were observed on 14 occasions during the winter walkover surveys during the 2019/20 winter season. Observations were of between one and 16 birds. Birds were observed in Ballivor, Bracklin, Carranstown, Lislogher and Lislogher West bogs.

Woodcock

Woodcock were observed on three occasions during surveys during the vantage point surveys between October 2019 and March 2020. All observations were of one or two birds observed on tracks in Bracklin and Lislogher West bogs.

Buzzard

Buzzard were observed on 46 occasions during the vantage point surveys between October 2019 and March 2020. Most observations were of one or two birds commuting, soaring or hunting. There was an observation of three birds displaying together over Lislogher Bog at the end of February.

Additionally, there were five observations of buzzard during the winter walkover surveys over the same period. All observations were of individuals in Ballivor, Bracklin, Carranstown, Lislogher and Lislogher West bogs.

Sparrowhawk

Sparrowhawk were observed on 35 occasions during the vantage point surveys between October 2019 and March 2020. All observations were of one or two birds commuting, hunting or soaring. There were five observations of between one and two birds displaying between January and March. Displaying birds were observed in Bracklin, Carranstown and Lislogher bogs.

Additionally, there were three observations of sparrowhawk during the winter walkover surveys over the same period. All observations were of individuals in Bracklin, Lislogher and Lislogher West bogs.

7.4

Field Survey Results

A comprehensive list of all bird species recorded during surveys is provided in Table 2 of Appendix 7-1. The target species listed below were recorded within the zone of influence of the Wind Farm Site during the core ornithological surveys (April 2020 to September 2022). The list is ordered in accordance with conservation significance: Annex I species, SCIs of designated sites, Red listed species and raptors.

- > Bewick's Swan (Annex I)
- > Golden Plover (Annex I)
- > Hen Harrier (Annex I)
- > Kingfisher (Annex I; SCI species of the River Boyne and River Blackwater SPA)
- > Little Egret (Annex I)
- > Merlin (Annex I)
- > Peregrine (Annex I)
- > Short-eared Owl (Annex I)
- > Whooper Swan (Annex I)
- > Barn Owl (BoCCI Red Listed)
- > Curlew (BoCCI Red Listed)
- > Kestrel (BoCCI Red Listed)
- > Lapwing (BoCCI Red Listed)
- > Red Grouse (BoCCI Red Listed)
- > Redshank (BoCCI Red Listed)
- > Snipe (BoCCI Red Listed)
- > Woodcock (BoCCI Red Listed)
- > Buzzard (Raptor)
- > Long-eared Owl (Raptor)
- > Sparrowhawk (Raptor)
- > BoCCI Red listed passerine species (Grey Wagtail, Meadow Pipit, Redwing, Swift, Yellowhammer)

The following sections describe the observations of each target species under the individual survey headings. Survey data and mapping for each target species is provided in the technical appendices. Appendix 7-3 presents results summary tables including:

- > Summary of vantage point survey records
- > Summary of breeding walkover survey records
- > Summary of breeding raptor survey records
- > Summary of breeding woodcock survey records
- > Summary of winter walkover survey records
- > Summary of waterbird distribution survey records
- > Summary of connectivity vantage point survey records
- > Summary of hen harrier roost survey records
- > Summary of wintering golden plover survey records
- > Summary of additional species recorded

7.4.1

Bewick's Swan

Raw Survey data for Bewick's swan is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Bewick's swan were observed on only one occasion during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.1). This observation consisted of five birds commuting across the Wind Farm Site at the potential collision height.

There were no further observations of this species.

7.4.2

Golden Plover

Raw Survey data for golden plover is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Golden plover were recorded on 271 occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.2⁴). All observations occurred during the winter or migration periods for this species (April to September). There were 120 observations within 500m of the proposed turbine layout.

There were 104 observations during the 2020/2021 winter season and 158 observations during the 2021/22 winter season. The remaining observations were during the September 2022 surveys. Flocks ranged from an individual to 1,800 birds. Most observations were of birds circling or commuting over the Wind Farm Site. There were 30 observations of birds utilising habitats within the Wind Farm Site for foraging or roosting. There were 160 observations of birds flying within the potential collision height.

Breeding Walkover Surveys

Golden plover were recorded on only one occasion during the breeding walkover surveys (see Appendix 7-4, Figure 7.3.1). This observation was of a flock of 19 birds roosting on bare peat in April. This observation is believed to be birds on passage given the flock size and time of year.

Winter Walkover Surveys

Golden plover were recorded on four occasions during winter walkover surveys (see Appendix 7-4, Figure 7.7.1). There were three observations of between six and sixteen birds commuting, one of which was within the Wind Farm Site. Additionally, a flock of 32 golden plover were flushed by the observer approximately 1.6km from the nearest proposed turbine.

Waterbird Distribution Surveys

Golden plover were observed on seven occasions during waterbird surveys throughout the entire survey period (see Appendix 7-4, Figure 7.8.1). Flock sizes ranged from 9 to 280 birds with an average flock size of 68 birds. Flocks were observed between 1.5km and 5.9km from the nearest proposed turbine.

Connectivity Vantage Point Surveys

Golden plover was observed on 25 occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.1). All observations were of birds commuting and flocks ranged from an individual to 600 birds. All observations were further than 5.2km from the nearest proposed turbine and no regularly used commuting corridors were identified.

⁴ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Wintering Golden Plover Surveys

Golden plover were only observed on one occasion during the dedicated golden plover surveys between November 2021 and April 2022 (see Appendix 7-4, Figure 7.11.1). This observation was of a flock of 100 birds within the Wind Farm Site.

Incidental Observations

There were 34 incidental observations of golden plover during all survey types (see Appendix 7-4, Figure 7.12.1). Most observations were of birds commuting or calling, with flocks ranging from an individual to 500 birds. Twenty-six of these observations were within the Wind Farm Site.

7.4.3 Hen Harrier

Raw Survey data for hen harrier is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Hen harrier were observed on 15 occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.3⁵). All observations were during the winter/migration period (September to March). Nine of these observations were of birds hunting, with the remaining observations of birds commuting within the Wind Farm Site. Fourteen observations were within 500m of the proposed turbine layout. There were six observations at the potential collision height.

Hen Harrier Roost Surveys

Hen harrier were observed on three occasions during the hen harrier roost surveys, two of which were within the Wind Farm Site (see Appendix 7-4, Figure 7.10.1). All observations were of individuals hunting or commuting. There was no evidence of roosting hen harrier observed during surveys.

Incidental Observations

There was two incidental observation of hen harrier during all other survey types (see Appendix 7-4, Figure 7.12.2). Both observations were of individuals commuting and were between 550m and 1.9km from the nearest proposed turbine.

There were no further observations of this species during any of the other surveys conducted at the Wind Farm Site between April 2020 and September 2022.

7.4.4 Kingfisher

Raw Survey data for kingfisher is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Kingfisher were observed on only two occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.4). Both observations were of individuals travelling along

⁵ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

silt ponds. There were no flights observed at the potential collision height. Both observations were outside the Wind Farm Site and further than 1.5km from the nearest proposed turbine.

Breeding Walkover Surveys

There were four observations of kingfisher during the breeding walkover surveys (see Appendix 7-4, Figure 7.3.2). All observations were in July 2020 and consisted of individuals flying, fishing or being flushed by the observer. There were two observations at the Wind Farm Site in cutover bog habitat and all observations were greater than 690m from the nearest proposed turbine.

Waterbird Distribution Surveys

Kingfisher were observed on 15 occasions during the waterbird distribution surveys, up to 5km from the Wind Farm Site (see Appendix 7-4, Figure 7.8.2). All observations were of birds travelling, hunting, perched or heard calling by the observer. Observations ranged from an individual to two birds and were between 1.8km and 6.6km from the nearest proposed turbine.

Connectivity Vantage Point Surveys

Kingfisher were only observed on one occasion during the connectivity vantage point surveys. This observation was of an individual approximately 6.8km to the southwest of the nearest proposed turbine. This observation was not mapped.

Incidental Observations

There were three incidental observations of kingfisher during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.3). All observations were of individuals commuting or being flushed by the surveyor. There were two observations within the Wind Farm Site and one observation approximately 9.7km from the nearest proposed turbine.

7.4.5

Little Egret

Raw Survey data for little egret is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Little egret were observed on only one occasion during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.5). There were two birds observed commuting within the potential collision height, approximately 880m west of the nearest proposed turbine.

Waterbird Distribution Surveys

Little egret were observed on five occasions during the waterbird distribution surveys (see Appendix 7-4, Figure 7.8.3). Flocks ranged from six to fourteen birds and were of birds roosting or feeding in flooded improved agricultural grassland. Observations were located between 4.9km and 6.7km from the nearest proposed turbine.

Connectivity Vantage Point Surveys

There were four observations of little egret during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.3). All observations were of birds travelling over improved agricultural grassland, with

flocks of between four and 25 birds. Observations were between 6.6km and 8.2km from the nearest proposed turbine.

7.4.6 Merlin

Raw Survey data for merlin is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Merlin were observed on 20 occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.6⁶). Most observations were of individuals hunting, travelling or perched. There was one observation of a merlin coming out of a possible roost site at dawn (in January 2021), approximately 280m from the nearest proposed turbine. There were no further observations of this species roosting at this location. There were 13 observations within, or partially within, 500m of the proposed turbine layout and eight observations were within the potential collision height.

Breeding Walkover Surveys

Merlin were observed on only one occasion during the breeding walkover surveys (see Appendix 7-4, Figure 7.3.3). This observation was of an individual hunting over cutover bog and scrub habitats, approximately 140m from the nearest proposed turbine. No breeding evidence was observed during these surveys.

Winter Walkover Surveys

Merlin were observed on only three occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.7.2). There were two observations of an individual travelling on the 26th of February 2021, one of which was within the Wind Farm Site and within 500m of the proposed turbine layout. The third observation was of a bird perched approximately 30m from the nearest proposed turbine.

Connectivity Vantage Point Surveys

There was only one observation of merlin during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.4). This observation was of an individual hunting approximately 6.7km southwest of the nearest proposed turbine.

Incidental Observations

There were five incidental observations of merlin during the waterbird distribution surveys and hen harrier roost surveys (see Appendix 7-4, Figure 7.12.4). There was one observation of a pair of merlin interacting on the 15th of March 2021, adjacent to the Wind Farm Site. This interaction may have been an early display flight, but there were no further observations of merlin at this location. All other observations were of one or two birds commuting or hunting. Observations ranged from 120m and 4.1km from the nearest proposed turbine, with three observations being within 500m of the proposed turbine layout.

⁶ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

7.4.7 Peregrine

Raw Survey data for peregrine is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Peregrine were observed on 86 occasions during the vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.7⁷). Most observations were of birds commuting, hunting or perched. There were three observations of an adult peregrine chasing a juvenile peregrine and another of two peregrine chasing each other. There were 50 observations of peregrine at the potential collision height. There were 53 observations recorded within, or partially within, 500m of the proposed turbine layout. There were 20 observations during the core breeding season for this species (April – August). There was no evidence of breeding recorded during these surveys, however there were three observations of adults chasing juveniles indicating successful breeding in the wider surroundings of the Wind Farm Site.

Breeding Walkover Surveys

Peregrine were observed on six occasions during the breeding walkover surveys (see Appendix 7-4, Figure 7.3.4). All observations were of individuals commuting or perched. All observations were within, or partially within, 500m of the proposed turbine layout.

Winter Walkover Surveys

Peregrine were only recorded on two occasions during winter walkover surveys (see Appendix 7-4, Figure 7.7.3). There was one observation of a bird hunting and one of a bird commuting, one of which was within the Wind Farm Site.

Connectivity Vantage Point Surveys

There were only two observations of peregrine during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.5). There was one observation was of an individual hunting, approximately 7.1km from the nearest proposed turbine and one observation of a bird commuting, approximately 5.3km from the nearest proposed turbine.

Incidental Observations

Peregrine was recorded as an incidental observation on seven occasions between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.5). There were four observations on the 25th of February 2021 during a barn owl survey. These observations were of a bird perched on a castle, approximately 3.5km from the nearest turbine, and travelling between perches. All observations were within a 30-minute period. There were two observations of individuals during waterbird distribution surveys hunting and perched, between 3.5km and 5.5km from the nearest proposed turbine. The final observation was of an individual commuting within the Wind Farm Site.

7.4.8 Short-eared Owl

Raw Survey data for short-eared owl is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

⁷ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Breeding Walkover Surveys

Short-eared owl was observed on three occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.3.5). All observations were on the 13th of June 2021, within a ten-minute period. An individual was flushed from roost and was subsequently observed travelling. All observations were within 500m of the proposed turbine layout.

Winter Walkover Surveys

Short-eared owl were only observed on one occasion during the winter walkover surveys (see Appendix 7-4, Figure 7.7.4). Two owls were flushed by the surveyor, approximately 200m from the nearest proposed turbine.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.9 Whooper Swan

Raw Survey data for whooper swan is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Whooper swan were recorded on 116 occasions during vantage point surveys (see Appendix 7-4, Figure 7.1.8). Most observations were of birds commuting or heard calling. Flocks ranged from an individual to 156 birds. There were nine observations of birds going to roost, none of which roosted within the Wind Farm Site. The majority of birds recorded were flying in the direction of the known roost location approximately 2.5km from the Wind Farm Site. In addition, there was an irregularly used roost c. 700m from the nearest proposed turbine (See Appendix 7-5, Figure 7.1.8.1). There were six observations of birds landing within the Wind Farm Site, within 500m of the proposed turbine layout. There were a total of 81 observations within the potential collision height, and 77 observations within, or partially within, 500m of the proposed turbine layout.

Winter Walkover Surveys

Whooper swan were recorded on only two occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.7.5). Both observations were of two birds commuting/calling. One observation was within 500m of the proposed turbine layout.

Waterbird Distribution Surveys

Whooper swan were observed on 38 occasions during waterbird distribution surveys throughout the survey period (see Appendix 7-4, Figure 7.8.4⁸). Flocks ranged from an individual to 270 birds. There were no observations of birds at, or within 500m of, the Wind Farm Site. Most observations related to birds feeding/roosting at Lough Analla, approximately 5.6km northwest of the nearest turbine, or roosting approximately 3km southwest of the nearest turbine.

Connectivity Vantage Point Surveys

There were 26 observations of whooper swan during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.6). Fifteen of these observations related to a roost site, approximately 5km from the nearest proposed turbine. Birds were observed using this roost on three dates, with the maximum

⁸ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

number of 81 birds. There were no observations of birds on, or within 500m of, the Wind Farm Site during these surveys.

Incidental Observations

There were 17 incidental observations of whooper swan during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.6). Observations ranged from an individual to 84 birds. There were eight observations within the Wind Farm Site, all of which were of flocks commuting or heard calling in flight only.

7.4.10 Barn Owl

Raw Survey data for barn owl is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Barn owl was observed on five occasions during the vantage point surveys between October 2019 and September 2021 (see Appendix 7-4, Figure 7.1.9). There were three observations of birds foraging, one of a bird calling and one of a pair of birds flying/calling together. There were two observations within 500m of the proposed turbine layout and no observations of birds within the potential collision height.

Barn Owl Surveys

There were 42 observations of barn owl during the dedicated barn owl surveys. All observations were related to two breeding territories, one approximately 500m from the proposed turbine layout and one approximately 3.5km of the proposed turbine layout. Begging calls were heard at both locations in 2021 and 2022, confirming successful breeding at both locations in both years. See Confidential Appendix 7-5 for details on these observations.

Incidental Observations

Barn owl was recorded on 12 occasions as an incidental observation (see Appendix 7-4, Figure 7.12.8). Most observations were of birds commuting, hunting or heard screeching. There was one observation of a barn owl at a nest hole, approximately 6.4km from the nearest proposed turbine, see Confidential Appendix 7-5 for details.

7.4.11 Curlew

Raw Survey data for curlew is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Curlew were observed on five occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.10). Observations ranged from an individual to 63 birds and were of birds commuting or being flushed from cutover bog habitat. There were three observations within 500m of the proposed turbine layout and two observations within the potential collision height. All observations were in the non-breeding season (September to March).

Winter Walkover Surveys

Curlwew were only observed on one occasion during the winter walkover surveys. A brief call was heard on the 23rd of October 2020, approximately 2.3km from the Wind Farm Site. See Appendix 7-4, Figure 7.7.6.

Waterbird Distribution Surveys

There was one observation of curlew during the waterbird distribution surveys (see Appendix 7-4, Figure 7.8.5). A flock of six birds were observed foraging in a wet pool, approximately 5km from the nearest proposed turbine.

Incidental Observations

Curlew was recorded on only one occasion as an incidental observation (see Appendix 7-4, Figure 7.12.8). A flock of 23 birds were observed commuting at Lough Glass North, approximately 16.2km from the nearest proposed turbine.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.12 Kestrel

Raw Survey data for kestrel is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Kestrel were recorded on 543 occasions during vantage point surveys (see Appendix 7-4, Figure 7.1.11⁹). Two hundred and fifty-three of these observations occurred during the core breeding season months between April and August, while there were 290 observations of kestrel during non-breeding season months (September – March). Ninety-four observations occurred during the 2020 breeding season, 94 observations occurred during the 2021 breeding season and 65 observations occurred during the 2022 breeding season (April - August). One hundred and thirty-nine observations occurred during the 2020/21 non-breeding season (September – March) and 107 observations occurred during the 2021/22 non-breeding season. In addition, there were 44 observations of kestrel during VP surveys in September 2022.

Three hundred and twenty-six observations occurred within, or partially within 500m of, the proposed turbine layout. Three hundred and thirty-eight of the observed flights occurred within, or partially within, the potential collision height. Most observations were of birds hunting, commuting or perched. There was one observation of a juvenile kestrel heard begging, confirming breeding in this location in 2021, within the Wind Farm Site. Additionally, there were observations of two juvenile birds together at this location subsequently. There was also an observation of a kestrel mobbing a buzzard, indicating a possible breeding territory nearby in 2021, approximately 1.3km from the nearest proposed turbine. In 2022, there were two observations of birds mobbing other species, indicating probable breeding at these locations, both of which were within the Wind Farm Site. There was an observation of a bird carrying prey to a nest site in 2022, confirming breeding at this location, approximately 1.9km from the nearest turbine. In summary, there was one probable and one confirmed territory in 2021 and two probable and one confirmed territory in 2022 identified during the vantage point surveys (see Confidential Appendix 7-5, Figure 7.1.11.1).

⁹ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Breeding Walkover Surveys

Kestrel were observed on 62 occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.3.6). Most observations were of individuals hunting, commuting or perched. There was one observation of a bird carrying a small prey item in June 2021, and an observation of one or two juveniles begging in the same area in July. This confirms successful breeding at this location. The recently fledged juveniles were observed in the cutover bog to the north of where the bird carrying prey was observed. The breeding territory is presumed to be in the woodland adjacent to the Wind Farm Site, assuming the fledglings only travelled a short distance (see Confidential Appendix 7-5, Figure 7.3.6.1). There was no breeding activity observed during the 2022 breeding season walkover surveys.

Breeding Raptor Surveys

Kestrel were recorded on 27 occasions during breeding raptor surveys, up to 2km from the Wind Farm Site (see Appendix 7-4, Figure 7.4.1). Fourteen observations occurring during the 2020 breeding season, six during the 2021 breeding season and seven during the 2022 breeding season. Most observations were of individuals hunting or commuting. On the 30th July 2021, two juveniles were heard begging from an area of woodland, confirming breeding in this location. This breeding territory was partially within the Wind Farm Site, and approximately 850m from the nearest proposed turbine. In 2022, There was one observation of a kestrel being agitated by the surveyor and one observation of a bird mobbing a buzzard. Both of these observations indicate probable breeding at these locations, approximately 450m and 2km from the nearest proposed turbine respectively. There were two observations of birds carrying prey, confirming breeding at these locations, approximately 500m and 4.8km from the nearest proposed turbines (see Confidential Appendix 7-5, Figure 7.4.1.1). In summary, there was one confirmed territory identified in 2021 and two probable and two confirmed territories identified in 2022 during the breeding raptor surveys.

Winter Walkover Surveys

Kestrel were recorded on nine occasions during winter walkover surveys (see Appendix 7-4, Figure 7.7.7). All observations were of birds hunting or commuting. There were six observations within 500m of the proposed turbine layout.

Connectivity Vantage Point Surveys

Kestrel were observed on six occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.6). All observations were of individuals hunting or commuting. Observations occurred between 5.8km and 10.2km from the nearest proposed turbine.

Incidental Observations

There were 28 incidental observations of kestrel during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.9). Most observations were of birds commuting, soaring or hunting. There were two observations of birds within, or partially within, 500m of the proposed turbine layout. There was a successful breeding territory identified approximately 3.2km from the nearest proposed turbines during the 2021 and 2022 breeding season. Observations relating to this breeding territory are presented in Confidential Appendix 7-5, Figure 7.12.9.1 and the breeding territory is presented in Confidential Appendix 7-5, Figure 7.12.9.2.

Breeding Summary

In summary, there were six confirmed breeding territories, one in 2020 (also occupied in 2022) and three in 2021 (one also occupied in 2022) and two additional territories in 2022. Additionally, there was one probable territory identified in 2021 and four in 2022. In all there were three confirmed and two probable

territories located within, or partially within, the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.13.1 for locations of all breeding territory locations.

7.4.13 Lapwing

Raw Survey data for lapwing is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

There were 34 observations of lapwing during the vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.12¹⁰). Flocks ranged from an individual to 145 birds. Most observations were of birds commuting, circling or roosting on the bog. There was one observation of an individual mobbing a buzzard in March 2021, this indicates a probable breeding territory at this location (see Confidential Appendix 7-4, Figure 7.1.12.1). This probable breeding territory is approximately 600m from the nearest proposed turbine. There were 15 observations of lapwing within, or partially within, 500m of the proposed turbine layout and 27 observations within the potential collision height. There were eleven observations during the core breeding months for this species (March – July), however the majority of these observations were of flocks of non-breeding birds.

Breeding Walkover Surveys

Lapwing were observed on nineteen occasions during the breeding walkover surveys (see Appendix 7-4, Figure 7.3.7). There were eight observations relating to breeding behaviour. These observations related to anxiety behaviour by adult birds in April, June and July, indicating probable nesting in the area. There were no nests or chicks observed during surveys. There was one probably breeding territory in 2020 and one in 2021. The 2020 breeding territory was located approximately 500m from the nearest turbine, and the 2021 breeding territory was located approximately 1.6km from the nearest turbine (see Confidential Appendix 7-5, Figure 7.3.7.1). The remaining observations were of flocks, of up to 22 birds, commuting, circling and roosting on the bog. There were five observations within, or partially within, 500m of the proposed turbine layout. There were no observations of lapwing during the 2022 breeding walkover surveys.

Waterbird Distribution Surveys

There were 20 observations of lapwing during the waterbird distribution surveys (see Appendix 7-4, Figure 7.8.6). Observations ranged from 1.8km to 5.1km from the nearest proposed turbine. Flocks ranged from an individual to 100 birds, and consisted of flocks roosting, feeding or calling in improved agricultural grassland or tilled arable land. In March and early April, there were birds displaying in a tilled arable field, approximately 3.3km from the nearest proposed turbine. This indicates probable breeding at this location for up to three pairs (see Confidential Appendix 7-5, Figure 7.8.6.1). However, in late April a maize crop was sown in this same field. Therefore, if lapwing had begun breeding at this location it is likely that the nests were destroyed, and the site abandoned by the birds.

Connectivity Vantage Point Surveys

Lapwing were observed on five occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.7). Observations were of between six and 70 birds commuting or roosting in improved agricultural grassland. Observations were between 5.1km and 8.3km from the nearest proposed turbine.

¹⁰ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Incidental Observations

There were 17 incidental observations of lapwing during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.10). There were five observations relating to breeding behaviour observed during breeding raptor surveys in 2020 and 2021. There were two breeding territories identified approximately 2.1km north of the nearest proposed turbine. There were two pairs observed in this location during surveys in May 2020, with one pair and four chicks observed at the end of May. There was one confirmed and one probable breeding pairs at this location. There was a probable breeding territory identified 1.6km from the nearest turbine in 2021, with an observation of a pair alarm calling and chasing a sparrowhawk at this location (see Confidential Appendix 7-5, Figure 7.12.10.1). The remaining incidental observations were of birds commuting, calling or feeding in cutover bog.

Breeding Summary

In summary, there were three breeding territories identified in 2020, two identified in 2021 and three in 2022. In 2020, there was one probable breeding territory approximately 500m from the nearest proposed turbine and two territories (one confirmed and one probable) identified in an agricultural field, approximately 2.1km north of the nearest proposed turbine. In 2021, there was a bird observed demonstrating territorial behaviour at the 2020 breeding territory, approximately 500m from the nearest turbine, in March. However, following this March 2021 observation this area was converted to improved agricultural grassland. This bird was likely one of the breeding pair from 2020 returning to the breeding grounds, however, following this alteration to the habitat birds were not subsequently recorded occupying this territory. There were no further observations of breeding lapwing at this location in 2021 or 2022. In 2021, there was one other (probable) territory identified approximately 1.6km from the nearest proposed turbine. In 2022, there was three probable territories identified in a field approximately 3.3km from the nearest proposed turbine. These territories are presumed to be unsuccessful due to the agricultural activities described above. See Confidential Appendix 7-5, Figure 7.11.2 for the locations of these breeding territories.

7.4.14 Red Grouse

Raw Survey data for red grouse is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Red grouse were observed on only one occasion during the vantage point surveys (see Appendix 7-4, Figure 7.1.13). An individual was heard calling within 500m of the proposed turbine layout on the 28th of April 2020.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.15 Redshank

Raw Survey data for red grouse is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Redshank was observed on only one occasion during the vantage point surveys. There was a flock of six birds observed commuting in September 2022.

There were no additional observations of this species during any of the other comprehensive surveys.

7.4.16 Snipe

Raw Survey data for Snipe is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Snipe were observed on 311 occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.14). There were 110 observations during the core breeding season (April – August) and 201 observations during the non-breeding season. Observations were of between one and fourteen birds, with the majority of observations being of birds commuting, calling or being flushed. There were 76 observations relating to breeding activity (i.e. birds heard drumming or chipping). There were two probable breeding territories identified in 2020, four in 2021 and nine in 2022 (see Confidential Appendix 7-5, Figure 7.1.14.1). Some of these territories had multiple observations of snipe, but there were no observations of more than a pair of birds at any one time, therefore all territories are presumed to have at least one pair of birds. There were 248 observations within, or partially within, 500m of the proposed turbine layout and 71 observations of birds within the potential collision height.

Breeding Walkover Surveys

Snipe were observed on 55 occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.3.8). There were 35 observations during the 2020 breeding season, fifteen observations during the 2021 breeding season and five during the 2022 breeding season. There were 26 observations of birds chipping or drumming, indicating probable breeding, all of which were during the 2020 breeding season surveys. From these observations, fifteen probable breeding territories were identified at the Wind Farm Site, thirteen of which were within, or partially within, 500m of the proposed turbine layout (see Confidential Appendix 7-5, Figure 7.3.8.1). There was no evidence of breeding observed during the 2021 or 2022 breeding walkover surveys. The remaining observations were of between one and ten birds travelling or flushed by the observer.

Winter Walkover Surveys

Snipe were recorded on 90 occasions during winter walkover surveys (see Appendix 7-4, Figure 7.7.8¹¹). All observations were of birds travelling or being flushed by the surveyor. Observations ranged from an individual to a flock of four birds. There were 45 observations of birds within, or partially within, 500m of the proposed turbine layout.

Waterbird Distribution Surveys

Snipe were recorded on 13 occasions during the waterbird distribution surveys (see Appendix 7-4, Figure 7.8.7). Observations ranged from an individual to three birds, and were of birds feeding, roosting or being flushed by the observer. Observations were between 2.1km and 7.5km from the nearest proposed turbine.

Connectivity Vantage Point Surveys

Snipe were recorded on 50 occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.8). Observations ranged from an individual to a flock of 35 birds, and were of birds commuting, calling or being flushed by the observer. Observations were between 4.7km and 10.3km from the nearest proposed turbine, with the majority of observations at Mullaghcroy bog, approximately 9.3km from the nearest proposed turbine.

¹¹ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Incidental Observations

There were 109 incidental observations of snipe during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.11). Observations ranged from an individual to 20 birds, and were of birds travelling, displaying or being flushed by the observer. There were 22 observations relating to breeding behaviour (i.e. birds heard drumming or chipping), most of which were during the breeding woodcock surveys. There were seven probable breeding territories identified in 2020, four in 2021 and three in 2022 (see Confidential Appendix 7-5, Figure 7.12.11.1).

Breeding Summary

In summary, there were a total of 18 probable snipe territories identified during the 2020 breeding season, seven during the 2021 breeding season and ten during the 2022 breeding season. Most territories were within the Wind Farm Site. There were only two territories located outside the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.13.3 for the locations of all snipe breeding territories.

7.4.17 Woodcock

Raw Survey data for woodcock is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Woodcock were observed on 54 occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.15¹²). Observations were of between one and three birds. There were 31 observations of birds roding (displaying), relating to one breeding territory in 2020, five breeding territories in 2021 and five breeding territories in 2022. There were nine breeding territories within 500m of the proposed turbine layout. The remaining observations were of birds travelling and on the ground. There were only ten observations outside the core breeding season for woodcock (March – July). There were 35 observations within, or partially within, 500m of the proposed turbine layout and 27 observations within the potential collision height.

Breeding Woodcock Surveys

Woodcock were observed on 206 occasions during the breeding woodcock surveys at the Wind Farm Site (see Appendix 7-4, Figure 7.5.1). One hundred and ninety-nine related to breeding behaviour (i.e. roding or chasing rival males). There were 186 observations of individuals and 13 observations of two males chasing each other. There were six breeding territories identified in 2020, ten breeding territories identified in 2021 and ten in 2022. Due to the nature of woodcock display flights, it is difficult to distinguish how many pairs are breeding within each breeding territory identified, it is presumed that at least one pair is breeding within each territory mapped. Breeding territories are presented in Confidential Appendix 7-5, Figure 7.5.1.1.

Waterbird Distribution Surveys

Woodcock were recorded on only three occasions during the waterbird distribution surveys (see Appendix 7-4, Figure 7.8.8). There were two observations of one or two birds roosting at Lough Analla, approximately 5.6km northwest of the nearest proposed turbine. Additionally, there was one observation of a bird roosting at Reynella Lake, approximately 6.3km west of the nearest proposed turbine.

¹² Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Connectivity Vantage Point Surveys

Woodcock were observed on only three occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.9). There were two observations at Mullaghcroy Bog, approximately 9.3km northwest of the nearest proposed turbine. There was one bird observed commuting in February 2021 and two birds chasing each other in May 2021. In November 2021, there was an observation of an individual commuting at Mulchanstown, approximately 6km from the nearest proposed turbine.

Incidental Observations

There were 21 incidental observations of woodcock during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.12). There were nine observations of birds roding. All other observations were of birds commuting, calling or flushed by the surveyor. There were two breeding territories identified in 2021 and three territories identified in 2022, see Confidential Appendix 7-4, Figure 7.12.12.1.

Breeding Summary

In summary, there were six breeding woodcock territories identified during 2020 breeding season, fourteen during the 2021 breeding season and eleven during the 2022 breeding season. All breeding territories were at, or within 500m of, the Wind Farm Site. All breeding territories are presented in Confidential Appendix 7-4, Figure 7.13.4.

7.4.18 Buzzard

Raw Survey data for buzzard is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Buzzard were observed on 970 occasions during vantage point surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.1.16.1¹³ (breeding season) and Figure 7.1.16.2 (non-breeding season)). Five-hundred and forty-two of these observations occurred during the core breeding season months between April and August, while there were 428 observations of buzzard during non-breeding season months (September – March). Two-hundred and eleven observations occurred during the 2020 breeding season, 187 during the 2021 breeding season and 144 during the 2022 breeding season (April - August).

There were 227 observations during the 2020/21 non-breeding season and 149 observations during the 2021/22 non-breeding season (September – March), while the remaining 52 observations occurred in September 2022. Three-hundred and thirty-two observations occurred within, or partially within, 500m of the proposed turbines. Six-hundred and seventeen of the 970 flights occurred within, or partially within, the potential collision height.

The majority of observations were of birds commuting, hunting, soaring or calling. There were five observations of breeding activity during these surveys. In 2020, there was one observation of a bird displaying, indicating probable breeding at this location and one observation of a bird carrying food, confirming breeding at this location. In 2021, there were two observations in the same area, one of a bird mobbing a peregrine in June and an observation of two juveniles flying into woodland in August, confirming breeding in this location. Additionally, there was one observation of a bird displaying, indicating probable breeding in this area. In 2022, There were four observations of birds displaying and

¹³ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

one observation of an agitated bird, indicating probably breeding at four locations. Additionally, there were four observations of juvenile birds at the Wind Farm Site in August 2022, confirming breeding but it is unknown which territories these birds originated from. Breeding territories are presented in Confidential Appendix 7-5, Figure 7.1.16.3. There were three probable breeding territories within 500m of the proposed turbines, all of which were during the 2022 breeding season.

Breeding Walkover Surveys

Buzzard were observed on 190 occasions during breeding walkover surveys (see Appendix 7.4, Figure 7.3.9). There were 83 observations in both the 2020 and 2021 breeding seasons and 24 observations during the 2022 breeding season. There were 65 observations within, or partially within, 500m of the proposed turbine layout.

The majority of observations were of birds commuting, hunting or soaring. There were twelve observations of birds entering/leaving woodlands, but no breeding evidence was observed at any of these locations. There was one observation of a juvenile bird begging during the 2022 breeding season, confirming breeding approximately 600m from the nearest proposed turbine (See Confidential Appendix 7-5, Figure 7.3.9.1).

Breeding Raptor Surveys

Buzzard were observed on 158 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7.4.2). Seventy-three observations occurred during the 2020 breeding season, 44 observations occurred during the 2021 breeding season and 41 observations during the 2022 breeding season (April – July).

Most observations were of birds commuting, hunting or soaring. There were 22 observations relating to breeding behaviour. There were two confirmed and one probable breeding territory identified in 2020, three confirmed and three probable breeding territories identified in 2021, and three confirmed and two probable breeding territories identified in 2022 (see Confidential Appendix 7-5, Figure 7.4.2.1). Confirmed breeding territories were identified from observations of birds carrying prey to nests or the presence of recently fledged chicks begging. Probable breeding territories were identified from birds displaying or showing agitated behaviour towards the observer or other bird species.

Two of the identified breeding territories were located within, or partially within, the Wind Farm Site. The remaining territories ranged from approximately 350m to approximately 3.8km from the Wind Farm Site. There was only one probable territory partially within 500m of the proposed turbine layout and there were no confirmed territories within, or partially within, 500m of the proposed turbine layout.

Winter Walkover Surveys

Buzzard were observed on 31 occasions during winter walkover surveys (see Appendix 7-4, Figure 7.7.9¹⁴). Numbers recorded ranged from an individual to five birds. There were 19 observations during the 2020/21 winter season and 12 observations during the 2021/22 winter season. All observations were of birds commuting, hunting or soaring. There were only 13 observations within, or partially within, 500m of the proposed turbine layout.

Connectivity Vantage Point Surveys

Buzzard were observed on 52 occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.10). All observations were of one or two birds commuting, soaring, hunting or perched. Observations ranged from 3.9km to 10km from the nearest proposed turbine.

¹⁴ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Incidental Observations

There were 153 incidental observations of buzzard during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.13). Twenty-seven of these were within 500m of the proposed turbine layout. The remaining observations were during surveys up to 8km from the Wind Farm Site. Observations ranged from an individual to five birds and were of birds commuting, soaring, hunting or perched.

Breeding Summary

In summary, there were two probable and two confirmed breeding territories identified in the 2020 breeding season, four probable and four confirmed breeding territories identified in the 2021 breeding season and six probable and three confirmed breeding territories in 2022. Of these, four were within the Wind Farm Site and three was partially within 500m of the proposed turbine layout. All breeding territories are presented in Confidential Appendix 7-5, Figure 7.13.5.

7.4.19 Long-eared Owl

Raw Survey data for long-eared owl is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Long-eared owl were observed on only four occasions during the vantage point surveys (see Appendix 7-4, Figure 7.1.17). There was one observation of an individual flushed from a tree and two observations of individuals hunting between August and December 2020. Additionally, there was one observation of a juvenile begging at a nest site in 2022, confirming breeding at this location (see Confidential Appendix 7-5, Figure 7.1.17.1). All observations were within, or partially within, the Wind Farm Site. The confirmed breeding territory was located within 500m of the proposed turbine layout. There were no birds recorded within the potential collision height.

Connectivity Vantage Point Surveys

There were eight observations of long-eared owl during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.11). There were seven observations relating to a bird roosting in conifers at Killulagh, approximately 6.1km west of the nearest proposed turbine. This bird was observed roosting here on five different dates between February and April 2021. The remaining observation was of an individual hunting, approximately 9.4km northwest of the nearest proposed turbine.

Incidental Observations

There were five incidental observations of long-eared owl (see Appendix 7-4, Figure 7.12.14). There were three during breeding woodcock surveys and two observations before vantage point surveys. There were two observations of individuals hunting, two of birds heard calling and one of a bird travelling.

7.4.20 Sparrowhawk

Raw Survey data for sparrowhawk is provided in Appendix 7-4. Results summary tables are present in Appendix 7-3.

Vantage Point Surveys

Sparrowhawk were recorded in flight on 162 occasions during vantage point surveys (see Appendix 7-4, Figure 7.1.18¹⁵). Seventy of these observations occurred during the core breeding season months between April and August, while there were 92 observations of sparrowhawk during non-breeding season months (September – March). Twenty-two observations occurred during the 2020 breeding season, 24 observations occurred during the 2021 breeding season and there were 24 observations during the 2022 breeding season (April - August).

Fifty-four observations occurred during the 2020/21 non-breeding season, between September 2020 and March 2021 and 28 observations occurring during the 2021/22 non-breeding season. In addition, ten observations were recorded during surveys in September 2022.

Ninety-seven flights occurred within, or partially within, 500m of the proposed turbines. Ninety observations occurred within, or partially within, the potential collision height. Most observations were of one or two birds commuting, hunting or soaring.

There were eleven observations relating to breeding behaviour. In 2020, there was one observation of a sparrowhawk carrying prey, confirming breeding in this area. The nest location was not identified as the bird was seen carrying prey across the bog and not entering a nest site. Additionally, there was one observation of a bird mobbing a buzzard, indicating probable breeding at this location. In 2021, there were three observations of displaying birds, indicating probable breeding at these three locations. Additionally, there was one observation of a bird carrying food towards a nest, confirming breeding in this area although a nest site was not located. In 2022, there were six observations of displaying birds (some of which were as early as December 2021) and one observation of a bird mobbing a buzzard. These observations relate to four probable breeding territories. Of these territories, there were seven within, or partially within, the Wind Farm Site, of which all were within, or partially within, 500m of the proposed turbine layout. Breeding territories are presented in Confidential Appendix 7-5, Figure 7.1.18.1.

Breeding Walkover Surveys

Sparrowhawk were recorded on 24 occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.3.10). There were ten observations during the 2020 breeding season, 12 observations during the 2021 breeding season and two observations during the 2022 breeding season.

Most observations were of birds hunting or commuting. There were three observations relating to breeding behaviour. There were three observations of the same bird carrying prey to a nest site in 2020. This confirms breeding at this location in 2020 (see Confidential Appendix 7-5, Figure 7.3.10.1). This territory is located approximately 2.6km from the nearest proposed turbine.

Breeding Raptor Surveys

Sparrowhawk were recorded on 17 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7.4.3). There were eight observations during the 2020 breeding season, four during the 2021 breeding season and five during the 2022 breeding season. Most observations were of individuals commuting, hunting or soaring. There were two observations of birds carrying prey into nest sites in 2020. There were two confirmed breeding territories in 2020, which were within 500m and 750m of the nearest proposed turbine (see Confidential Appendix 7-5, Figure 7.4.3.1). There was no breeding behaviour recorded during the 2021 and 2022 breeding seasons.

¹⁵ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

Winter Walkover Surveys

Sparrowhawk were observed on eight occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.7.10¹⁶). Most observations were of birds commuting or hunting. There was one observation of a pair displaying at the end of February 2021, indicating probable breeding at this location (see Confidential Appendix 7-5, Figure 7.7.10.1). There were four observations within, or partially within, 500m of the proposed turbine layout. The probably breeding territory is located partially within 500m of the proposed turbine layout.

Connectivity Vantage Point Surveys

Sparrowhawk were observed on seven occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.9.12). All observations were of birds hunting or commuting, between 4.5km and 9.7km from the nearest proposed turbine.

Incidental Observations

There were 33 incidental observations of sparrowhawk during surveys between April 2020 and September 2022 (see Appendix 7-4, Figure 7.12.15). There were nine observations within the Wind Farm Site. Most observations were of birds commuting or hunting. There was one observation of one or two juveniles calling from a woodland at Crowinstown Lough, approximately 4.4km from the nearest proposed turbine, confirming breeding at this location.

Breeding Summary

In summary, there were four confirmed and one probable breeding territories for sparrowhawk identified during the 2020 breeding season. There was one confirmed and four probable breeding territories identified during the 2021 breeding season. There were four probably breeding territories identified during the 2022 breeding season. There were eight territories within, or partially within, 500m of the proposed turbine layout. Confidential Appendix 7-5, Figure 7.13.6 presents all breeding territories identified in the vicinity of the Wind Farm Site. Additionally, there was one confirmed territory identified at Crowinstown Lough, approximately 4.4km from the nearest proposed turbine.

7.4.21 Passerines (Red Listed)

The BoCCI Red listed species grey wagtail, meadow pipit, redwing, stock dove, swift and yellowhammer were recorded during the surveys between April 2020 and September 2022. Grey wagtail were observed on 16 occasions, with up to two birds being recorded. Meadow pipit were observed on 763 occasions, with up to 230 birds being recorded. Redwing were observed on 110 occasions, with up to 200 birds being recorded. Stock dove were observed on six occasions, with up to two birds being recorded. Swift were observed on 74 occasions, with up to fourteen birds being recorded. Yellowhammer were observed on 37 occasions, with up to four birds being recorded.

¹⁶ Please note that figure numbers are a continuation from the supplementary data provided in the desk study.

7.5 Receptor Evaluation

7.5.1 Determination of Population Importance

A determination of the population importance of birds within the likely zone of influence is provided in the sections below following criteria described in Section 7.2.5. Estimates of National population sizes were obtained from the NPWS Article 12 Reporting (2013-2018) which details the status and trends of Ireland's bird species. The Application Site lies in Counties Meath and Westmeath. Where relevant, estimates for mean county populations has been derived following a review of I-WeBS sites in Counties Meath and Westmeath. The Irish Wetland Bird Survey (I-WeBS) is a national monitoring scheme coordinated by BirdWatch Ireland (BWI) in conjunction with NPWS.

7.5.1.1 Bewick's Swan

Bewick's Swan is an Annex I species that was only observed on one occasion despite undertaking a comprehensive suite of surveys over two and a half years. The Wind Farm Site is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.5.1.2 Golden Plover

Wintering

The estimated national wintering population of golden plover in Ireland is 80,707 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of golden plover is 807 birds. As per NRA 2009, a regularly occurring population of 807 golden plover is required for classification as Nationally Important. The maximum number of birds recorded within 500m of the Wind Farm Site from the winter seasons surveyed was 1,800 birds. There were nationally important numbers of golden plover at the Wind Farm Site on only two occasions. A regularly occurring Nationally Important population was not therefore observed at the Wind Farm Site.

To estimate the county population, a review of all County Meath and Westmeath I-WeBS sites was conducted. It should be noted that the population estimate based on I-WeBS figures alone is likely to be an underestimate of the county population¹⁷. This is due to the foraging ecology of wintering golden plover that will utilise agricultural grasslands and other terrestrial habitats not typically surveyed during I-WeBS counts, as this is a survey of wetland habitats. An estimate of the number of birds utilising terrestrial habitats was required to better estimate the county population.

To account (partly) for the birds that occur in terrestrial habitats that would not have been counted by I-WeBS surveyors, the golden plover that occur at the Wind Farm Site and other terrestrial locations were included in the county population estimate.

The following mean count values have been recorded for I-WeBS sites over the most recent 5-season period, i.e. for the period 2016/17 – 2020/21 (note that sites with a mean of zero birds were excluded from this list) and the mean peak count for the 2020/21 and 2021/22 winter seasons at the Wind Farm Site and other Bord na Móna properties where birds surveys have been conducted:

Meath I-WeBS Sites

- River Boyne (mean = 119)

¹⁷ As per Burke et al (2018) in relation to the golden plover count, "these estimates must be treated as conservative on the basis that they are widely disturbed in a variety of wetland and non-wetland habitats that are under-sampled during I-WeBS."

Meath Terrestrial Survey Data

- The Wind Farm Site (mean = 700¹⁸)

Westmeath I-WeBS Sites

- Lough Derravaragh (mean = 18)
- Lough Ennell (mean = 100)
- Lough Iron (mean = 75)
- Lough Owel (Mean = 12)
- Lough Ree (Westmeath Portion¹⁹) (mean = 393)
- White/Annagh Lough (mean = 113)

Westmeath Terrestrial Survey Data

- The Wind Farm Site (mean = 700)
- Culnagun Bog (mean = 400) (pers. com. Bord na Mona)
- Derryarkin Bog Group (mean = 900) (pers. com. Bord na Móna)
- Coole Wind Farm (mean = 217)

Based on the above, the mean wintering population²⁰ from Meath sites is 819, from Westmeath sites is 2,928 birds. The average population of both counties is 1,874 birds. However, as previously stated this likely remains an underestimate.

Flocks of 19 birds or more (County Importance) were recorded on 199 occasions during surveys at, or adjacent to, the Wind Farm Site. The population recorded at the Wind Farm Site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

Breeding

This species was only observed on 14 occasions during the breeding season. These observations were in April and September and consisted of flocks of between three and 1,000 birds. These observations are believed to be birds on passage given the breeding range of the species²¹, flock size, time of year and no further observations during the breeding season months of May to August inclusive.

The Wind Farm Site is of **No Ecological Importance** to this species during the breeding season.

7.5.1.3 Hen Harrier

Wintering

As per NPWS Article 12 Reporting (2013-2018), the estimated national wintering population of hen harrier in Ireland is 311-435 therefore 1% of the ROI National wintering population is 3-4 birds. A regularly occurring wintering population of 3-4 hen harrier is required for classification as Nationally/Internationally Importance.

¹⁸ Assuming an even distribution of golden plover across the Wind Farm Site, half the population was assigned to the total for County Meath and County Westmeath.

¹⁹ Lough Ree has 18 I-WeBS subsites, five of which are within County Westmeath. Assuming an even distribution of birds across these subsites, the total count for golden plover within the County Westmeath portion of Lough Ree was calculated by dividing by 18 and multiplying by five.

²⁰ Please note that these figures are estimates based on the best available information but should be interpreted with a degree of caution.

²¹ The breeding range is largely restricted to western and northern coastal counties.

There are no published figures for the Counties Meath and Westmeath population of hen harrier. Taking a precautionary approach, a regularly occurring population of just one bird is required for classification of County Importance.

Hen harrier were observed on 16 occasions during the winter season. All of these observations were of individuals hunting and commuting. There were no observations of roosting hen harrier during surveys at the Wind Farm Site.

Given that there was a regularly occurring winter population of at least one bird at the Wind Farm Site, the Wind Farm Site has been assigned **County Importance** for wintering hen harrier.

Breeding

Based on the latest Breeding Hen Harrier Survey (NPWS 2015), the ROI National breeding population is in the range of 108-157 pairs. Therefore, a single breeding pair in Ireland conforms to National/International Importance as per NRA criteria.

This species was recorded on only one occasion during the breeding season, two observations of a female on the same day. As previously discussed in Section 7.4.3, this bird was observed in September and is likely a bird that had completed breeding and is utilising the Wind Farm Site on passage or as wintering grounds.

The Wind Farm Site is of **No Ecological Importance** to this species during the breeding season, given that the species was not recorded during the core breeding months.

7.5.1.4 Kingfisher

Kingfisher is an Annex I species that was only observed on two occasions within the Wind Farm Site despite undertaking a comprehensive suite of surveys over two and a half years. Taking a precautionary approach and given the proximity of the River Boyne and River Blackwater SPA, the population recorded was assigned **Local Importance (Higher Value)**.

7.5.1.5 Little Egret

Little egret is an Annex I species that was only observed on ten occasions during the comprehensive suite of surveys over two and a half years. The closest observation to a proposed turbine was approximately 870m and was location outside the Wind Farm Site. The Wind Farm Site is of **No Ecological Importance** to this species, given that there were no observations of this species within the Wind Farm Site.

7.5.1.6 Merlin

As per the latest NPWS Article 12 reporting document, the estimated population of merlin is between 400-800 individuals. Therefore, a regularly occurring population of 4-8 birds is required to be of national importance. There are no published figures for the Counties Meath and Westmeath population of peregrine. Taking a precautionary approach a regularly occurring population of a single bird is required for classification of County Importance.

The species was recorded on 19 occasions within 500m of the proposed turbine layout, with a further 11 observations further than 500m from the proposed turbine layout. There was one observation of a pair in a possible courtship display in March 2021, but no further evidence of breeding was observed. There was one observation of a merlin leaving a roost site. Taking a precautionary approach, the population recorded was assigned **County Importance**.

7.5.1.7 Peregrine

As per the latest NPWS Article 12 reporting document, the estimated population of peregrine is 425 pairs. Therefore, as per NRA 2009, a regularly occurring population of four pairs of peregrine is required for classification as Nationally Important. There are no published figures for the Counties Meath and Westmeath population of peregrine. Assuming an even distribution of peregrine across the 26 counties of the Republic of Ireland, the population of peregrine in both counties is estimated to be 32 birds each (national population divided by 26 counties). Taking a precautionary approach and using the above as a guide; a regularly occurring population of a single bird is required for classification of County Importance.

Peregrine was observed on 69 occasions within 500m of the Wind Farm Site. The majority of these observations were of birds commuting or hunting. No breeding evidence for this species was recorded.

Taking a precautionary approach, the population recorded was assigned **County Importance**.

7.5.1.8 Short-eared Owl

Short-eared owl is an Annex I species that was only observed on four occasions, three of which were on the same date, despite undertaking a comprehensive suite of surveys over two and a half years. The Wind Farm Site is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.5.1.9 Whooper Swan

Wintering

As per the latest national wintering estimates provided in Burke et al (2021), the national wintering population of whooper swan in the Republic of Ireland is 14,467. Using these latest Whooper Swan Census figures, 1% of the National population of whooper swan is 145. Therefore, as per NRA 2009, a regularly occurring population of 145 Whooper Swans is required for classification as Nationally Important.

The Swan Census 2020 (Burke et. al., 2021) was consulted regarding the population data for whooper swan in Counties Meath and Westmeath. Based on the 2020 Swan Census data, in January 2020 the County Meath population was 119 individuals and the County Westmeath population was 982 individuals. An average population of the two counties has been used to calculate the county population threshold. The average population of both counties is 550 birds, therefore a regularly occurring population of five or more birds is required to be classified as County Importance.

Flocks of national importance were only observed at the Wind Farm Site on one occasion. There were flocks of county importance observed on 72 occasions during surveys between April 2020 and September 2022.

The flocks recorded at the Wind Farm Site were assigned **County Importance**.

Breeding

Whooper swan are a wintering species in Ireland. The Wind Farm Site is of **No Ecological Importance** for this species during the breeding season.

7.5.1.10 Barn Owl

As per the latest NPWS Article 12 reporting document, the estimated population of barn owl is between 562 and 702 pairs. Therefore, as per NRA 2009, a regularly occurring population of five pairs of barn owl is required for classification as Nationally Important.

There are no published figures for the Counties Meath or Westmeath population of barn owl. Taking a precautionary approach, a regularly occurring population of just one pair is required for classification of County Important.

There were two breeding territories for barn owl identified during surveys at the Wind Farm Site. There was one within 500m of the proposed turbine layout and one within 3.3km of the proposed turbine layout. The population at the Wind Farm Site was therefore assigned **County Importance**.

7.5.1.11 Curlew

Curlew is a BoCCI Red Listed species in Ireland. It was observed on only three occasions within, or partially within, 500m of the proposed turbine layout despite undertaking a comprehensive suite of surveys over two and a half years. The Wind Farm Site is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.5.1.12 Kestrel

As reported (2008-2012) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimates of kestrel in the Republic of Ireland is 13,500 birds. Using these latest figures, 1% of the National population of kestrel is 135 birds. Therefore, as per NRA 2009, a regularly occurring population of 135 birds is required for classification as Nationally Important.

There are no published figures for the Counties Meath and Westmeath population of kestrel. Assuming an even distribution of kestrel across the 26 counties of the Republic of Ireland²², the population of kestrel in both counties is estimated to be 519 birds each (national population divided by 26 counties). Therefore, a regularly occurring population of five birds is required for classification of County Importance.

There was a maximum of three confirmed breeding territories per year (2020–2022) identified within, or partially within, the Wind Farm Site. This indicates a resident population of six adult birds during the breeding season. This population would be bolstered by fledglings at the end of the breeding season, which will remain present at the Wind Farm Site until the start of the next breeding season, when birds become territorial again. Given that kestrel have brood sizes of four to five chicks, and a survival rate of 30% in their first year²³, it is likely that there would be a population of approximately six adults and five juvenile birds by the end of each winter season. The population recorded at the Wind Farm Site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

7.5.1.13 Lapwing

Wintering

The estimated national wintering population of lapwing in Ireland is 69,823 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of lapwing is 698 birds. As per NRA 2009, a regularly occurring population of 698 lapwing is required for classification as Nationally Important. The maximum number of birds recorded within 500m of the Wind Farm Site from the winter seasons surveyed was 145 birds. Nationally important flocks of lapwing were not observed on, or within 500m of, the Wind Farm Site.

²² While acknowledging the unfavourable conservation status of this species with an identified population decline, this remains a species with a widespread distribution in Ireland (BoCCI, 2020-2026).

²³ <https://app.bto.org/birdfacts/results/bob3040.htm>

To estimate the county population, a review of all County Meath and Westmeath I-WeBS sites was conducted. It should be noted that, the population estimate based on I-WeBS figures below is likely to be an underestimate of the county population²⁴. Similar to golden plover, wintering lapwing will utilise agricultural grasslands and other habitats not typically surveyed during I-WeBS counts. An estimate of the number of birds utilising terrestrial habitats was required to better estimate the county population.

To account (partly) for the birds that occur in terrestrial habitats that would not have been counted by I-WeBS surveyors, the lapwing that occur at the Wind Farm Site and other terrestrial locations were added to the county population estimate.

The following mean count values have been recorded for I-WeBS sites over the most recent 5-season period, i.e. for the period 2016/17 – 2020/21 (note that sites with a mean of zero birds were excluded from this list) and the mean peak count for the 2020/21 and 2021/22 winter seasons at the Wind Farm Site and other Bord na Móna properties where birds surveys have been conducted:

Meath I-WeBS Sites

- Black Lough (Drewstown) (mean = 87)
- Lough Bane (mean = 14)
- Nanny Estuary & Shore (mean = 214)
- River Boyne (mean = 117)

Westmeath Terrestrial Survey Data

- The Wind Farm Site (mean = 42²⁵)

Westmeath I-WeBS Sites

- Glen Lough (mean = 115)
- Lough Derravaragh (mean = 117)
- Lough Ennell (mean = 65)
- Lough Glore (mean = 3)
- Lough Iron (mean = 39)
- Lough Owel (Mean = 122)
- Lough Ree (Westmeath Portion²⁶) (Mean = 355)
- White/Annagh Lough (mean = 84)

Westmeath Terrestrial Survey Data

- The Wind Farm Site (mean = 42)
- Derryarkin Bog (mean = 113) (pers. com. Bord na Móna)
- Drumman Bog (mean = 160) (pers. com. Bord na Móna)

²⁴ A relatively large proportion of Lapwing are known to spend winter away from coastal wetlands, often in non-wetland habitats such as agricultural land. Therefore, this species is considered poorly monitored by wetland waterbird monitoring methods and assigning accurate national estimates of wintering populations is difficult (Delaney et al., 2009).

²⁵ Assuming an even distribution of lapwing across the Wind Farm Site, half the population was assigned to the total for County Meath and County Westmeath.

²⁶ Lough Ree has 18 I-WeBS subsites, five of which are within County Westmeath. Assuming an even distribution of birds across these subsites, the total count for lapwing within County Westmeath was calculated.

Based on the above, the mean wintering population²⁷ from Meath sites is 474 and from Westmeath sites is 1,215 birds. The average population of both counties is 845 birds. However, as previously stated this likely remains an underestimate.

Therefore, a regularly occurring population of eight or more birds (>1% of the county population, as per NRA (2009)) is required to be classified as County Importance. Flocks of eight birds or more (County Importance) were observed at the Wind Farm Site on 24 occasions during the winter period. The population recorded at the Wind Farm Site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

Breeding

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimates of lapwing in the Republic of Ireland is 520 pairs. Using these latest figures, 1% of the National population of lapwing is 5 pairs. Therefore, as per NRA 2009, a population of 5 pairs is required to be of national importance.

There are no published figures for the Counties Meath and Westmeath population of lapwing. Taking a precautionary approach, a population of one pair (>1% of the county population, as per NRA (2009)) is required for the classification of County Importance.

There were no breeding territories identified within the Wind Farm Site during the 2020, 2021 or 2022 breeding seasons. However, there were two probable breeding territories identified within 500m of the Wind Farm Site (one in 2020/21 and one in 2021). There were two additional territories located approximately 2.1km and 3.2km from the nearest proposed turbine.

Given that there was one pair of lapwing within 500m of the Wind Farm Site in both the 2020 and 2021 breeding season, the population at the Wind Farm Site was assigned **County Importance**.

7.5.1.14 Red Grouse

Red Grouse is a BoCCI Red Listed species during the breeding season in Ireland. There was only one observation of red grouse during the comprehensive suite of surveys between April 2020 and September 2022. The Wind Farm Site is of **No Ecological Importance** to this species, given that this species was only observed once on or near the Wind Farm Site.

7.5.1.15 Redshank

Redshank is a BoCCI Red Listed species during the breeding season in Ireland. There was only one observation of redshank during the comprehensive suite of surveys between April 2020 and September 2022. The Wind Farm Site is of **No Ecological Importance** to this species, given that this species was only observed once on or near the Wind Farm Site.

7.5.1.16 Snipe

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimates of snipe in the Republic of Ireland is 4,275 breeding pairs. Using these latest figures, 1% of the National population of snipe is 43 pairs. Therefore, as per NRA 2009, a regularly occurring population of 43 pairs is required for classification as Nationally Important.

²⁷ Please note that these figures are estimates based on the best available information but should be interpreted with a degree of caution.

There are no published figures for the Counties Meath or Westmeath populations of snipe. Assuming an even distribution of snipe²⁸ across the 26 counties of the Republic of Ireland, the County population of snipe is estimated to be 164 pairs in each county (national population divided by 26 counties). Therefore, a regularly occurring population of 1 pair is required for the classification of County Important.

Given that there were between seven and 18 breeding territories identified in between 2020 and 2022 at the Wind Farm Site, the population recorded was assigned **County Importance**.

7.5.1.17 **Woodcock**

Woodcock is BoCCI Red Listed during the breeding season in Ireland. There are no national estimates of the breeding population of woodcock in Ireland. There were between six and thirteen breeding territories identified at, or within 500m of, the Wind Farm Site between 2020 and 2022. Taking a precautionary approach (given the species unfavourable conservation status) the population recorded at the Wind Farm Site was assigned **County Importance**.

7.5.1.18 **Buzzard**

Buzzard is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). The population recorded across the seasons was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.1.19 **Long-eared Owl**

Long-eared Owl is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). The population recorded across the seasons was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.1.20 **Sparrowhawk**

Sparrowhawk is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). The population recorded was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.1.21 **Passerines (Red Listed)**

Grey wagtail, meadow pipit, redwing, swift and yellowhammer are red listed in Ireland. Populations recorded at the Wind Farm Site were deemed to be of no greater than **Local Importance (Lower Value)**.

²⁸ While acknowledging the unfavourable conservation status of this species with an identified population decline, this remains a species with a widespread distribution in Ireland (BoCCI, 2020-2026).

7.5.2 Identification of Key Ornithological Receptors

Table 7-11 Avifaunal Receptor Evaluation and Selection Criteria Rational

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Bewick's Swan	Annex I, EU Birds Directive; BoCCI Red List (Wintering Populations) & Irish Wildlife Act.	<u>All Seasons</u> No population of ecological importance recorded	Bewick's Swan was recorded infrequently (once) and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.1 for further detailed discussion. No pathways for significant effects were identified.	No
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List (Breeding & Wintering Populations) & Irish Wildlife Act.	<u>Wintering</u> County Importance	This species was occasionally recorded utilizing habitats on, or within 500m of, the Wind Farm Site during winter months. The potential for habitat loss cannot be excluded. An assessment of direct habitat loss is required. Birds were regularly recorded within the Wind Farm Site. The potential for displacement exists. This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.	Yes
		<u>Breeding</u> No population of ecological importance recorded	This species was recorded infrequently and in low numbers during the breeding season. There was no evidence of breeding recorded within the Wind Farm Site, or within 500m of same. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.2 for further detailed discussion. No pathways for significant effects were identified.	No

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Hen Harrier	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	<u>Wintering</u> National Importance	Hen harrier were occasionally observed hunting within the Wind Farm Site. An assessment of direct habitat loss is required. Birds were recorded within the Wind Farm Site. The potential for displacement exists. This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.	Yes
		<u>Breeding</u> No population of ecological importance recorded	Hen harrier was recorded infrequently and in low numbers during the breeding season. There were no observations during the core breeding months for this species (April to August). There is no evidence to suggest that the Wind Farm Site is of significance to this species for breeding. Please refer to Section 7.5.1.3 for further detailed discussion. No pathways for significant effects were identified	No
Kingfisher	Annex I, EU Birds Directive; SCI of the River Boyne and River Blackwater SPA; BoCCI Amber List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher Value)	Kingfisher was recorded infrequently and in low numbers. There is very limited evidence to suggest that the Wind Farm Site is of significance to this species. Notwithstanding the above, taking a highly precautionary approach, an assessment of potential impact has been undertaken for this species.	Yes
Little Egret	Annex I, EU Birds Directive & Irish Wildlife Act.	<u>All Seasons</u> No population of ecological importance recorded	Little egret were not recorded on the Wind Farm Site. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.5 for further detailed discussion. No pathways for significant effects were identified	No

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Merlin	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act	<u>All Seasons</u> County Importance	<p>This species was recorded on 17 occasions within 500m of the proposed turbine layout during surveys between April 2020 and September 2022. This species was observed hunting and roosting within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. An assessment of direct habitat loss is required.</p> <p>This species was recorded within the Wind Farm Site. An assessment of displacement effects is required.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Peregrine	Annex I, EU Birds Directive & Irish Wildlife Act.	<u>All Seasons</u> County Importance	<p>This species was recorded foraging within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. An assessment of direct habitat loss is required.</p> <p>Birds were recorded within the Wind Farm Site. Taking a precautionary approach, the potential for displacement exists.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Short-eared Owl	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act	<u>All Seasons</u> No population of ecological importance recorded	<p>Short-eared owl was recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.8 for further detailed discussion.</p> <p>No pathways for significant effects were identified</p>	No

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Whooper Swan	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act	<u>Wintering</u> Flocks of County Importance recorded	This species was occasionally recorded landing within the Wind Farm Site during the winter months. Taking a precautionary approach, an assessment of direct habitat loss is required. Birds were recorded flying over the Wind Farm Site and within 500m of the proposed turbine layout. The potential for displacement exists. This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.	Yes
		<u>Breeding</u> No population of ecological importance recorded	This species was not recorded on site or within 500m of the Wind Farm Site during the breeding season. Please refer to Section 7.5.1.9 for further detailed discussion. There is no potential for any significant effects.	No
Barn Owl	BoCCI Red Listed & Irish Wildlife Act.	<u>All Seasons</u> County Importance	Breeding territories for this species were identified approximately 500m and 3.5km from the nearest turbine and birds were observed hunting within the wind farm site. An assessment of direct habitat loss is required. Birds were recorded flying over the Wind Farm Site and within 500m of the proposed turbine layout. The potential for displacement exists. This species was not recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is not required.	Yes
Curlew	BoCCI Red Listed (Breeding & Wintering)	<u>All Seasons</u>	Curlew was recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.11 for further detailed discussion.	No

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
	Populations) & Irish Wildlife Act.	No population of ecological importance recorded	No pathways for significant effects were identified	
Kestrel	BoCCI Red Listed (Breeding Populations) & Irish Wildlife Act.	<u>All Seasons</u> County Importance	<p>There were up to two kestrel territories identified within the Wind Farm Site and up to five within the immediate surroundings of the Wind Farm Site. Additionally, kestrel were observed hunting within the wind farm site regularly all year round. The potential for habitat loss cannot be excluded. An assessment of direct habitat loss is required.</p> <p>There was a resident population kestrel within the Wind Farm Site. An assessment of displacement effect is required.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Lapwing	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act.	<u>Wintering</u> County Importance	<p>This species was occasionally recorded landing on, and within 500m of, the Wind Farm Site winter months. Taking a precautionary approach, an assessment of direct habitat loss is required.</p> <p>Birds were recorded flying over the Wind Farm Site and within 500m of the proposed turbine layout. The potential for displacement exists.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
		<u>Breeding</u> County Importance	The 2020 and 2021 breeding territories for lapwing were located within 500m of the Wind Farm Site. Given the proximity of these territories to the Wind Farm Site, it is likely that these birds are foraging within the	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			<p>Wind Farm Site. Taking a precautionary approach, an assessment of direct habitat loss is required.</p> <p>Birds were recorded flying over the Wind Farm Site and within 500m of the proposed turbine layout. The potential for displacement exists.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	
Red Grouse	BoCCI Red Listed (Breeding Populations) & Irish Wildlife Act.	<p><u>All Seasons</u></p> <p>No population of ecological importance recorded</p>	<p>Red grouse was only observed on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.14 for further detailed discussion.</p> <p>No pathways for significant effects were identified.</p>	No
Redshank	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act.	<p><u>All Seasons</u></p> <p>No population of ecological importance recorded</p>	<p>Redshank was only observed on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.15 for further detailed discussion.</p> <p>No pathways for significant effects were identified.</p>	No
Snipe	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act.	<p><u>All Seasons</u></p> <p>County Importance</p>	<p>There were between seven and nineteen breeding territories identified on, or within 500m of, the Wind Farm Site. An assessment of direct habitat loss is required.</p> <p>The species was recorded within the Wind Farm Site. An assessment of displacement effect is required.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Woodcock	BoCCI Red Listed (Breeding Populations)	<u>Breeding</u> County Importance	<p>There were between six and seventeen breeding territories identified on, or within 500m of, the Wind Farm Site between the 2020 and 2022 breeding seasons. An assessment of direct habitat loss is required.</p> <p>The species was recorded within the Wind Farm Site. An assessment of displacement effect is required.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Buzzard	BoCCI Green List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher Value)	<p>Buzzard are resident at the wind farm site and utilize it for breeding and hunting. The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required.</p> <p>The species was recorded within the Wind Farm Site. An assessment of displacement effect is required.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Long-eared Owl	BoCCI Green List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher Value)	<p>Long-eared owl are resident at the wind farm site and utilize it for breeding and hunting. The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required.</p> <p>The species was recorded within the Wind Farm Site. An assessment of displacement effect is required.</p> <p>This species was not recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is not required.</p>	No

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Sparrowhawk	BoCCI Amber List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher Value)	<p>Sparrowhawk are resident at the wind farm site and utilize it for breeding and hunting. The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required.</p> <p>The species was recorded within the Wind Farm Site. An assessment of displacement effect is required.</p> <p>This species was recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Passerines (Red Listed)	BoCCI Red List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Lower Value)	As per SNH guidance, it is generally considered that passerine species are not significantly impacted by wind farms primarily due to their large populations.	No

7.5.3 Key Ornithological Receptor Sensitivity Determination

Criteria developed by Percival (2003) is presented in Table 7-3 (Section 7.2.5.3) for assessing bird sensitivity within the Application Site. The sensitivity of each KOR is outlined below:

Very High Sensitivity KORs include:

- Kingfisher (SCI of the River Boyne and River Blackwater SPA)

High Sensitivity KORs include:

- Hen Harrier (ecologically sensitive species)

Medium Sensitivity KORs include:

- Golden Plover (Annex I; EU Birds Directive)
- Merlin (Annex I; EU Birds Directive)
- Peregrine (Annex I; EU Birds Directive)
- Whooper Swan (Annex I; EU Birds Directive)
- Barn Owl (BoCCI Red Listed)
- Kestrel (BoCCI Red Listed)
- Lapwing (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)
- Woodcock (BoCCI Red Listed)

The remaining KORs identified in the Application Site were classified as Low Sensitivity:

- Buzzard
- Long-eared Owl
- Sparrowhawk

7.6 Potential Effects

This section of the assessment of effects is structured as follows:

- Assessment of ‘Do nothing’ Effect (Please also refer to Chapter 3).
- Assessment of effects in relation to Key Ornithological Receptors
- Assessment of effects in relation to sites designated for nature conservation.
- Summary of potential effects associated with the Application Site.

All elements of the Application Site have been considered in assessing effects on ecological receptors, including: 26 no. turbines with a blade tip height 200m, a substation, 2 no. borrow pits and all ancillary infrastructure. A detailed description of the Application Site is included in Chapter 4 of this EIAR.

7.6.1 Do-Nothing Effect

If the Wind Farm Site were not to proceed, the site would continue to be managed under the requirements of the relevant IPC licence and therefore the ongoing site management and environmental monitoring, peat stockpile removal (due to be completed by 2024), and wind measurement would continue. In addition, if the Wind Farm Site were not to proceed, the implementation of peatland rehabilitation plans as required under IPC License would occur. Likewise, the PCAS scheme in adjacent Bogs (where selected) would continue to be implemented. These land uses and activities will also continue if the Wind



Farm Site does proceed. If the Wind Farm Site were not to proceed, the opportunity to capture part of Meath and Westmeath’s valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

7.6.2 Effects on Key Ornithological Receptors during Construction and Operation

7.6.2.1 Golden Plover (Wintering)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>The majority of observations were of golden plover commuting or circling over the Wind Farm Site. There were only 31 observations of golden plover utilizing habitats on, or within 500m of, the Wind Farm Site. The majority of these observations were of flocks roosting on open peat areas of the cutover bog.</p> <p>The land lost to the development footprint is small (i.e. 32.4ha/1.8% of Wind Farm Site) relative to the total area within the Wind Farm Site.</p> <p>The species was not dependent on the Wind Farm Site for foraging during the wintering period. Large numbers of golden plover were observed adjacent to the Wind Farm Site, foraging in agricultural grassland, particularly to the north of the site. Extensive areas of suitable foraging and roosting habitat will remain post construction including Ballivor West, Carranstown and Lislogher West bogs and no significant impacts are predicted.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect
Disturbance	<p>Research indicates that this species is susceptible to disturbance impacts during the construction works (Pearce-Higgins et al., 2012). This species was not regularly recorded utilising habitats within the site boundary for roosting or foraging. Significant areas of suitable roosting and foraging habitat for the species occur in the wider landscape and will be retained.</p> <p>In the event of displacement, there are extensive areas of suitable habitat in the wider area including Ballivor West, Carranstown and Lislogher West bogs which total approximately 618.7 ha. This would likely render such an effect</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	inconsequential. Furthermore, peatland rehabilitation (Peatland Climate Action Scheme ²⁹ (PCAS)) at the adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species. Significant disturbance effects are not anticipated.		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>A review of 29 other studies suggests Golden Plover will approach wind turbines to an average distance of 175 m in non-breeding season (Hötker et al. 2006). Only 79 of the 310 observations of golden plover were within 175m of the proposed turbine layout during surveys between April 2020 and September 2022.</p> <p>There were a large number of observations adjacent to the Wind Farm Site, in agricultural grassland, particularly to the north of the site. There were also a significant number of observations at Carranstown Bog, outside the Wind Farm Site.</p> <p>In the event of displacement, there are extensive areas of suitable habitat in the wider area including Ballivor West, Carranstown and Lisclogher West bogs which total approximately 618.7 ha. This would likely render such an effect inconsequential. Furthermore, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect

²⁹ <https://www.bnmpcas.ie/>

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>There is no evidence to suggest that the Application Site lies on a migratory/regular commuting route for the species therefore barrier effect is not anticipated.</p> <p>Significant displacement effects are not predicted.</p>		
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7-6.</p> <p>The collision risk assessment has followed a precautionary approach and utilises flight observations recorded across the winter season and the autumn and spring migration period (i.e. September to April inclusive).</p> <p>A key factor in calculating the predicted rate of collisions for a given species is the application of an avoidance rate. The avoidance rate accounts for the ability of a bird to take evasive action to avoid a collision with a turbine. Where species-specific avoidance rates are available these rates are usually very high, e.g. all swan species have been shown to avoid colliding with operating turbines 99.8% of the time. Until recently a species-specific avoidance rate has not been available for golden plover. A review of golden plover collision avoidance from four UK wind farms has been undertaken and is outlined in Appendix 7-6. The output of this new research was a golden plover avoidance rate of 99.8%. This avoidance rate was used in the collision risk analysis.</p> <p>The collision risk has been calculated at a rate of 15.527 collisions per year. Annual mortality of adult golden plover has been calculated at 27% per annum (Sandercock, 2003). If 15.527 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the local population (i.e. 1,874 birds (please see Section 7.5.1.2 for further</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	<p>Long-term Slight Negative Effect</p>



Potential effects during the construction and operational phases of the Application Site	Significance (Percival 2003)	Significance (EPA 2022)
details)) by 3.1%. The predicted collision risk is therefore of low magnitude as per Percival (2003).		

7.6.2.2 Hen Harrier (Wintering)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>The Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for wintering hen harrier.</p> <p>No confirmed roosting sites were recorded within the Wind Farm Site, or within 2km of same, between April 2020 and September 2022.</p> <p>Hen harrier were observed hunting within the wind farm site, however, the land lost to the development footprint is small (i.e. 32.4ha/1.8% of the Wind Farm Site) relative to the total area within the Wind Farm Site.</p> <p>Given that hen harrier were only observed on 18 occasions at the Wind Farm Site, this limits the potential for construction works to result in ecologically significant habitat loss for hen harrier. Furthermore, there is an abundance of suitable habitat in the wider surroundings of the Wind Farm Site. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>Significant effects are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Low</i></p> <p>The cross tabulation of a <i>High</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect
Disturbance	<p>As previously discussed, no confirmed hen harrier roosting sites were recorded within a 2km radius of the Wind Farm Site. Foraging or commuting hen harrier were infrequently recorded within the Wind Farm Site (only on 18 occasions over 30 months).</p> <p>Therefore, based on the survey data, there is little potential for significant disturbance effects given that hen harrier were not dependent on the habitats</p>	<p>The magnitude of the effect is assessed as <i>Low</i></p> <p>The cross tabulation of a <i>High</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	located in close proximity to development infrastructure for foraging or roosting. Significant effects are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>No evidence of roosting was recorded within the Wind Farm Site or to a 2km radius of the site. Hen harrier have been recorded to be subject to displacement impacts within a 500m radius of turbines (Pearce-Higgins et al., 2009). However, foraging/commuting hen harrier were infrequently recorded within the Wind Farm Site and were only recorded within 500m of the proposed turbine layout on 17 occasions.</p> <p>Significant effects are not predicted given the low numbers recorded and infrequency of these observations.</p>	<p>The magnitude of the effect is assessed as <i>Low</i></p> <p>The cross tabulation of a <i>High</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect
Collision	<p>The species was recorded flying with the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7-6.</p> <p>The collision risk has been calculated at a rate of 0.003 collisions per year, or one bird every 339 years. The predicted collision risk is insignificant over the 30-year life-time of the proposed wind farm.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>.</p> <p>The cross tabulation of a <i>High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Long-term Imperceptible Negative Effect

7.6.2.3 Kingfisher (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Kingfisher were only observed within the Wind Farm Site on two occasions during surveys. Both observations were along drainage ditches. Given the ecology of kingfisher, habitat use at the Wind Farm Site is limited to watercourses and drainage ditches. All watercourses within the Wind Farm Site are subject to a 50m buffer from the development footprint, therefore there will be no habitat loss in relation to watercourses. Kingfisher were infrequently observed utilising drainage ditches at the Wind Farm Site. However, drainage ditches are a suboptimal habitat for kingfisher and significant areas of more suitable habitat will remain within, and adjacent to, the Wind Farm Site post construction. Significant habitat loss effects are not predicted.	<p>The magnitude of the effect is assessed as <i>Negligible</i>.</p> <p>The cross tabulation of <i>Negligible</i> sensitivity species and <i>Very High</i> Impact corresponds to a Low effect significance.</p>	Long-term Imperceptible Negative Effect
Disturbance	<p>Goodship and Furness (2022), found that kingfisher showed a low to medium sensitivity to human disturbance, with birds being disturbed by human activity between 9.5m and 24.6m. Therefore, the construction activity is therefore unlikely to deter flight activity within the Wind Farm Site.</p> <p>Furthermore, the habitats within the Wind Farm Site are suboptimal for kingfisher and there will be substantial areas of undisturbed suitable habitat within the Wind Farm Site and the wider surroundings during the construction phase. Significant disturbance during the construction phase is not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>.</p> <p>The cross tabulation of <i>Negligible</i> sensitivity species and <i>Very High</i> Impact corresponds to a Low effect significance.</p>	Short-term Imperceptible Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	Kingfisher were not observed within the Wind Farm Site with any regularity, disturbance displacement associated with operational turbines will not result in a measurable reduction in the number of Kingfisher within the Wind Farm Site.	The magnitude of the effect is assessed as <i>Negligible</i> .	Long-term Imperceptible Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	Furthermore, the habitats within the Wind Farm Site are suboptimal for kingfisher and there will be substantial areas of suitable habitat within the Wind Farm Site and the wider surroundings during the operational phase. Significant displacement is not predicted.	The cross tabulation of <i>Negligible</i> sensitivity species and <i>Very High</i> Impact corresponds to a Low effect significance.	
Collision	This species was not recorded flying at potential collision height during the extensive vantage point survey work undertaken at the Wind Farm Site. Collision related mortality is not likely to significantly impact this species.	No Effect	No Effect

7.6.2.4 Merlin (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>Merlin were recorded on 30 occasions during surveys between April 2020 and September 2022. Most observations were of individual birds recorded commuting or hunting. This species was only observed on 20 occasions within, or partially within, 500m of the proposed turbine layout.</p> <p>There was one observation of a courtship display in March 2021, adjacent to the Wind Farm Site. There was no further evidence of breeding throughout either breeding season surveyed at the Wind Farm Site. Given how early this courtship was observed within the breeding season, and that there were no further observations of merlin at this location, it is assumed that there was no breeding attempt at this location.</p> <p>There was one observation of a merlin leaving a roost site within the Wind Farm Site. This roost site was not recorded to be active on the repeat visits to this location subsequently. It is therefore concluded that this is not a roost that is regularly used by this species.</p> <p>Significant effects are not predicted particularly given the low levels of activity recorded within the Wind Farm Site. Extensive areas of suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect
Disturbance	Merlin were infrequently observed within the Wind Farm Site, with one observation of a courtship display adjacent to the Wind Farm Site and one	The magnitude of the effect is assessed as <i>Low</i> .	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>observation of a bird leaving a roost within the Wind Farm Site. Subsequent surveys did not identify further/ongoing breeding or roosting activity.</p> <p>Significant effects are not anticipated particularly given the low levels of activity recorded within the Wind Farm Site. Moreover, there is an abundance of suitable habitat in the surrounding area. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>Significant disturbance effects are not predicted.</p>	<p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>Merlin were infrequently observed within the Wind Farm Site, with one observation of a courtship display adjacent to the Wind Farm Site and one observation of a bird leaving a roost within the Wind Farm Site. As previously outlined, subsequent surveys did not identify further/ongoing breeding or roosting activity.</p> <p>Significant effects are not predicted particularly given the low levels of activity recorded within the Wind Farm Site. Furthermore, there is an abundance of suitable habitat in the surrounding area. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>Significant displacement effects are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Collision	<p>The species was recorded flying with the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7-6.</p> <p>The collision risk has been calculated at a rate of 0.014 collisions per year, or one bird every 71 years. The predicted collision risk is insignificant over the 30-year life-time of the proposed wind farm.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>.</p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	<p>Long-term Imperceptible Negative Effect</p>

7.6.2.5 Peregrine (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Peregrine were recorded on 103 occasions during surveys between April 2020 and September 2022. Most observations were of birds commuting or foraging within the Wind Farm Site. While there were occasional observations of this species foraging within the Wind Farm Site during the breeding season, no evidence of breeding activity was recorded. This species is unlikely to be dependent on the onsite habitats, given the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (e.g. bog/heath/ grassland/ coniferous plantation). Significant effects are not predicted.	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance	Long-term Slight Negative Effect
Disturbance	There was no evidence of breeding activity recorded. There were 61 observations of this species within 500m of the proposed turbine layout throughout the entire survey period: April 2020 to September 2022. Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the Wind Farm Site, particularly given peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock et. al 2007). Significant disturbance effects are not anticipated.	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	There was no evidence of breeding recorded. In total, this species was recorded on 61 occasions within 500m of the proposed turbine layout between April 2020 and September 2022. The availability of alternative suitable habitat in the surroundings, limit the potential for significant displacement effects. Furthermore, peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock et. al 2007). It is, therefore, reasonable to conclude that following a period of habituation, the population will become	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance	Long-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	accustomed to the wind farm in the landscape. Significant displacement effects are not predicted.		
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7-6.</p> <p>The collision risk has been calculated at 0.224 collisions per year or one bird every 4 years. Annual mortality of adult peregrine has been calculated at 19% per annum (Craig et al, 2004). If 0.224 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. 32 birds (please see 7.5.1.7 for further details)) by 3.7%. The predicted collision risk is therefore low in the context of the county population.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect

7.6.2.6 Whooper Swan (Wintering)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>There were no observations of whooper swan roosting within the Wind Farm Site. There were only six observations of birds landing within the Wind Farm Site during surveys between April 2020 and September 2022.</p> <p>The species was not dependent on the Wind Farm Site for foraging or roosting during the wintering period. Therefore, habitat loss due to the development footprint will have limited impact on whooper swan, given how infrequently these habitats are utilised by the species.</p> <p>No significant effects are predicted.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>.</p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance.</p>	Long-term Imperceptible Negative Effect
Disturbance	<p>There were only six observations of birds landing within the Wind Farm Site during surveys between April 2020 and September 2022. This is a very low rate of occurrence and demonstrates a lack of dependence of whooper swan on the habitats of the Wind Farm Site.</p> <p>As per McGuinness et al (2015) the zone of sensitivity for the species is 600m. An irregularly used and regularly used roost sites were identified approximately 700m north, 2.5km south and 5km west of the nearest proposed turbines. No displacement is predicted to occur at these roosts given the considerable separation distances involved.</p> <p>This species was recorded in flight within 600m of the Wind Farm Site on 87 occasions. Numbers recorded ranged from an individual to a flock of 156 birds. A study undertaken by Rees (2005) in relation to whooper swan behavioural responses to human activity suggests that swans become less sensitive to disturbance if the frequency of daily disturbance is high. Rees et al. (2006) conducted a study at Black Cart Special SPA near Glasgow in relation to</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>whooper swan behavioural and disturbance responses to different types of human activity. The study was undertaken over three winters (from 1997/98 to 1999/00) at agricultural lands used by whooper swan. The study found that activities relating to cars, tractors, bicycles, farm workers on foot and cattle (livestock) exhibited the least disturbance to whooper swan flocks (within 100m disturbance distance bands). The Wind Farm Site was subject to regular peat/turf extraction activity and the construction will require works similar to those described in the Rees assessment. Significant disturbance to whooper swan is therefore not anticipated as the populations are expected to become habituated to the levels of disturbance that will be present during the construction phase.</p>		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>There were only six observations of birds landing within the Wind Farm Site during surveys between April 2020 and September 2022. This is a very low rate of occurrence and demonstrates a lack of dependence of whooper swan on the habitats of the Wind Farm Site.</p> <p>As per McGuinness et al (2015) the zone of sensitivity for the species is 600m. No evidence of roosting activity was recorded within the Wind Farm Site, or within 600m of the proposed turbine layout. An irregularly used and two regularly used roost site was identified approximately 700m north, 2.5km south and 5km west respectively of the nearest turbines. No displacement is predicted to occur at these roosts given the considerable separation distance involved.</p> <p>This species was recorded in flight within 600m of the proposed turbine layout on 87 occasions. Numbers recorded ranged from an individual to a flock of 156 birds. Observations of whooper swan non-breeding activity from 8 European studies have given a mean minimum avoidance distance of 150 m from the base of wind turbines (Hötker et al. 2006). Only 47 of the observed flights of whooper</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>swan were recorded within 150m of the proposed turbine layout across the two winters surveyed. This amount of flight activity is very low relative to the survey effort undertaken.</p> <p>There is no evidence to suggest that the Wind Farm Site lies on a migratory/regular commuting route for the species therefore barrier effect is not anticipated. Additionally, during the connectivity vantage point surveys, no commuting corridor between the wind farm site and the SPAs to the west including Lough Derravarragh SPA were identified. Significant displacement effects are not anticipated at any geographical scale given the infrequency of observations within 150m of the proposed turbine layout and the infrequent use of habitats within the Wind Farm Site by this species.</p>		
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7-6.</p> <p>The collision risk has been calculated at a rate of 1.342 collisions per year. Annual mortality of adult whooper swan has been calculated at 20% per annum (Brazil, 2003). If 1.342 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. c.550 (please see 7.5.1.9 for further details)) by 1.22%. The predicted collision risk is therefore low in the context of the county population.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Effect

7.6.2.7 Barn Owl (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>There was one breeding site identified within the Wind Farm Site and another 3.5km from the nearest proposed turbine. There is no infrastructure proposed in either location.</p> <p>Barn owl were observed irregularly foraging within the Wind Farm Site, but given the nocturnal nature of this species, it is likely to be under recorded during surveys.</p> <p>The land lost to the development footprint is small (i.e. 32.4ha/1.8% of the Wind Farm Site) relative to the total area within the Wind Farm Site. Furthermore, The Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for foraging barn owl. There is an abundance of suitable habitat (agricultural grassland) in the wider surroundings of the Wind Farm Site. Significant effects on foraging barn owl are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i></p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect
Disturbance	<p>There were two breeding sites identified, one within the Wind Farm Site and one 3.5km from the nearest proposed turbine. As per Ruddock & Whitfield (2007), barn owl have a limit of disturbance at 50-100m, with many nest sites not being disturbed until a human was within 10m during the study. However, the Forestry Commission of Scotland (2006)³⁰ recommends a 250m disturbance buffer around a known nest site where operations should be limited.</p> <p>The nearest proposed infrastructure is approximately 215m from the nest site. This pair is considered to be resistant to disturbance, given their tolerance to</p>	<p>The magnitude of the effect is assessed as <i>Medium</i></p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance</p>	Short-term Slight Negative Effect

³⁰ <https://forestry.gov.scot/images/corporate/pdf/Guidancenote32BirdDisturbance.pdf>

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>the ongoing disturbance at their chosen nesting location with regular human activity (please refer to Confidential Appendix 7-5 for location details), it is not anticipated that the additional activity in the area during the construction phase will have a significant impact on this nesting pair.</p> <p>In addition, no significant impacts are predicted for the nest 3.5km from the nearest turbine given the considerable separation distance involved.</p> <p>As previously outlined, the Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for foraging barn owl. There is an abundance of suitable habitat (agricultural grassland) in the wider surroundings of the Wind Farm Site.</p>		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>There were two breeding sites identified, one c.500m and one 3.5km from the nearest proposed turbine. The Forestry Commission of Scotland (2006) recommends a 250m disturbance buffer around a known nest site where operations should be limited. Therefore, no significant impacts are predicted for either nest given the considerable separation distance between the nest site and the nearest proposed turbine.</p> <p>Additionally, as previously detailed, the Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for foraging barn owl. There is an abundance of suitable habitat (agricultural grassland) in the wider surroundings of the Wind Farm Site.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i></p> <p>The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance</p>	Long-term Slight Negative Effect
Collision	This species was not recorded flying at potential collision height during the extensive vantage point survey work undertaken at the Wind Farm Site. Collision related mortality is not likely to significantly impact this species,	No Effect	No Effect



Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	particularly given this species flies at low elevation when foraging. (Barn Owl Trust, 2021 ³¹)		

³¹ <https://www.barnowltrust.org.uk/hazards-solutions/barn-owls-wind-turbines/>

7.6.2.8 Kestrel (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>There were up to three confirmed and four probable breeding territories for kestrel identified during surveys between April 2020 and September 2022. During the 2021 breeding season, there was a confirmed breeding territory located within 500m of the proposed turbine layout. There was one breeding territory identified partially within 500m of the proposed turbine layout during the 2020 and 2022 breeding season. This territory is within woodland adjacent to the Wind Farm Site. In 2022, there were three probable breeding territories within, or partially within, 500m of the proposed turbine layout.</p> <p>There will be minimal loss of suitable breeding habitat, given the extent of suitable woodland habitat greater than 500m from the proposed turbine layout. Direct loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the development footprint is small (i.e. 32.4ha/1.8% of Wind Farm Site) relative to the total area within the Wind Farm Site.</p> <p>Substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Wind Farm Site and the wider surroundings post-construction. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>Significant impacts are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>The Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local kestrel population. As previously discussed, there were up to eight kestrel territory identified per year at the Wind Farm Site. There was a</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p>	Short-term Moderate Negative Effect on the availability of nesting habitat

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>maximum of four (four in 2022, one in 2021 and one in 2020) breeding territories within, or partially within, 500m of the proposed turbine layout. Given that kestrel have brood sizes of four to five chicks, and a survival rate of 30% in their first year³², it is likely that there would be a population of approximately eight adults and six juvenile birds by the end of the winter season. Therefore, 2.7% of the county population (i.e. 14 of c.519 birds (please see Section 7.5.1.12 for further details)) could be impacted.</p> <p>Significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. Onsite habitats are not considered unique to the Wind Farm Site. Significant disturbance effects are not predicted at the county, national or international scale.</p>	The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.	
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	Raptor studies have generally found only low levels of turbine avoidance (Hötker et al. 2006; Madders & Whitfield 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins et.al 2009). Moreover, significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. Onsite habitats are not considered unique to the Wind Farm Site. Significant displacement effects are not predicted at the county, national or international scale.	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7-6.	The magnitude of the effect is assessed as <i>Low</i> .	Long-term Slight Negative Effect

³² <https://app.bto.org/birdfacts/results/bob3040.htm>

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>The collision risk has been calculated at a rate of 2.21 collisions per year. Annual mortality of adult kestrel has been calculated at 31% per annum (Village, 1990). If 2.21 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. c.519 birds (please see Section 7.5.1.12 for further details)) by 1.37%. The predicted collision risk is therefore low in the context of the county population.</p>	<p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	

7.6.2.9 Lapwing (Breeding)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>The majority of observations of lapwing during the breeding season were of birds commuting over the Wind Farm Site or utilizing lands adjacent to the Wind Farm Site (with most of these relating to non-breeding flocks). There were only two observations of birds utilizing habitats within the Wind Farm Site for roosting. Both observations were on the same day and was of a total of 24 birds.</p> <p>All breeding territories identified were not within the Wind Farm Site and therefore no (physical) loss of breeding habitat is anticipated. Significant habitat loss effects are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>Hotker et al. (2006) undertook a meta-analysis of existing literature on disturbance distances. This review reported from the 13 studies examined the mean disturbance distance for breeding lapwing was 108m.</p> <p>The 2020 breeding territory was approximately 450m from the nearest proposed infrastructure and approximately 600m from the nearest proposed turbine. The second breeding territory was approximately 2km from the nearest proposed infrastructure (turbine). The 2021 breeding territory was approximately 175m from the nearest proposed infrastructure and approximately 1.5km from the nearest proposed turbine. In 2022, there were no territories identified within 3.3km of the turbines.</p> <p>Significant disturbance effects are not anticipated given the separation distances involved.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
<p>Displacement & Barrier Effect</p>	<p>Several studies of wind energy infrastructure and its impact on bird populations have found no discernible impact on populations of breeding Lapwings, either through collision, disturbance displacement or avoidance (Winkelman 1992; Ketzenberg et al. 2002; Pearce-Higgins et al. 2009).</p> <p>Hotker et al. (2006) undertook a meta-analysis of existing literature on disturbance distances. This review reported from the 13 studies examined the mean disturbance distance for breeding lapwing was 108m. Pearce-Higgins et al. (2009) found no significant relationship between distance to wind farms and changes on occurrence.</p> <p>The presence of the wind farm is not expected to deter lapwing from breeding adjacent to the Wind Farm Site during the operational phase of the wind farm development, given the separation distance from the breeding territories to the proposed turbines. Langston et al. (2003) found that Lapwing nesting occurred slightly closer to turbines possibly as a result of the creation of preferred areas of shorter vegetation.</p> <p>Overall, significant displacement of breeding lapwing is not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	<p>Long-term Slight Negative Effect</p>
<p>Collision</p>	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a rate of 0.145 collisions per year. Annual mortality of lapwing has been calculated at 29.5% per annum (Peach et al, 1994). If 0.145 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. c.40 birds (please see Section 7.5.1.13 for further details)) by</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	<p>Long-term Slight Negative Effect</p>



Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	1.23%. The predicted collision risk is therefore low in the context of the county population.		

7.6.2.10 Lapwing (Wintering)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	The majority of observations of lapwing were of birds commuting over the Wind Farm Site or utilizing lands adjacent to the Wind Farm Site. There were no observations of birds utilizing habitats within the Wind Farm Site for roosting or foraging during the winter season. Significant habitat loss effects are not predicted, given that the habitats within the Wind Farm Site are little used by this species during the winter.	The magnitude of the effect is assessed as <i>Negligible</i> . The cross tabulation of <i>Medium</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance.	Long-term Imperceptible Negative Effect
Disturbance	There was no evidence to suggest that wintering lapwing were utilizing the Wind Farm Site for foraging or roosting with any regularity. The majority of observations were of birds commuting over the Wind Farm Site, and these flights are unlikely to be impacted by construction works. Significant disturbance effects are not anticipated.	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	This species was not observed to regularly utilise any areas of the Wind Farm Site during winter months but was primarily recorded travelling over the Wind Farm Site. There are extensive areas of suitable habitat in the wider area, outside any potential displacement buffer, should any potential displacement effect occur. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.	Long-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Collision	<p>This species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a rate of 2.64 collisions per year. Annual mortality of lapwing has been calculated at 29.5% per annum (Peach et al, 1994). If 2.64 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e., c.845 birds (please see Section 7.5.1.13 for further details)) by 1.06%. The predicted collision risk is therefore low in the context of the local population.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Low</i> Impact corresponds to a Low effect significance.</p>	<p>Long-term Slight Negative Effect</p>

7.6.2.11 Snipe (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>Snipe were regularly recorded during surveys, with observations of drumming or calling snipe during the breeding season frequently recorded. In 2020, nineteen breeding territories were identified, all of which were within, or partially within, the Wind Farm Site. In 2021, seven breeding territories were identified, six of which were within, or partially within, the Wind Farm Site. In 2022, ten breeding territories were identified, nine of which were within, or partially within, the Wind Farm Site.</p> <p>The loss of breeding habitat will be minimal as the infrastructure is confined to a narrow corridor (i.e., 32.4ha/1.8% of Wind Farm Site). Significant areas of suitable nesting and foraging habitat will continue to remain post construction and there is an abundance of suitable habitat in the surrounding area. Significant habitat loss effects are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>Pearce-Higgins et. al (2009), found that breeding snipe showed significant avoidance of turbines extending to a distance of 400m, and there is also evidence of avoidance of access tracks. In 2020, there were fifteen territories within, or partially within, 400m of the proposed turbine layout. In 2021, there were five territories within, or partially within, 400m of the proposed turbine layout. In 2022, there were nine territories within, or partially within, 400m of the proposed turbine layout.</p> <p>Disturbance associated with construction works will result in a measurable reduction in the breeding density of snipe onsite/around the margins of the Wind Farm Site. However, substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Wind Farm Site and the wider surroundings post-construction. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>(complete) and Bracklin west (beginning 2023) is likely to increase the value and carrying capacity³³ of these (formerly cutover) habitats for this species.</p> <p>Significant disturbance during the construction phase is not predicted at the county, national or international scale.</p>		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>Snipe breeding density can be reduced by 50% within 400m of turbines (Pearce-Higgins et. al 2009), Disturbance displacement associated with operational turbines will result in a measurable reduction in the breeding density of snipe onsite/around the margins of the Wind Farm Site.</p> <p>However, substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Wind Farm Site and the wider surroundings post-construction. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value and carrying capacity of these (formerly cutover) habitats for this species.</p> <p>Significant displacement is not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7.6.	The magnitude of the effect is assessed as <i>Negligible</i> .	Long-term Imperceptible Negative Effect

³³ The carrying capacity of an area is the maximum population size that can be sustained by that area.

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>It is acknowledged that the predicted number of transits, and hence the predicted rate of collision for snipe may be underestimated, as flight activity for this species is predominantly crepuscular in nature while the VP surveys are largely diurnal (Table 1.4, SNH (2017)).</p> <p>The collision risk has been calculated at a rate of 0.237 collisions per year. Annual mortality of snipe has been calculated at 37.5% per annum (Spence, 1988). If 0.237 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. c.328 birds (please see Section 7.5.1.16 for further details)) by 0.19%. The predicted collision risk is therefore negligible in the context of the county population.</p>	<p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance.</p>	

7.6.2.12 Woodcock (Breeding)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>This species was regularly recorded during the 2020, 2021 and 2022 breeding seasons at the Wind Farm Site. Numerous roding male woodcock were recorded. These observations indicate that woodcock bred within the Wind Farm Site. There were six breeding territories identified at, or within 500m of, the Wind Farm Site in 2020, fourteen in 2021 and eleven in 2022.</p> <p>Sections of the site are dominated by scrub and immature birch woodland which provide suitable breeding habitat for woodcock. Ten breeding territories were identified which overlap with the development footprint.</p> <p>The construction of the Wind Farm Site will result in a measurable reduction in the breeding habitat onsite/around the margins of the Wind Farm Site. However, potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Wind Farm Site nor rare locally. In addition, extensive areas of suitable foraging and nesting habitat will remain post construction. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value and carrying capacity of these (formerly cutover) habitats for this species. Considering the above, no significant habitat loss is predicted.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>This species was regularly recorded during the 2020, 2021 and 2022 breeding seasons at the Wind Farm Site. Numerous roding male woodcock were recorded, with six breeding territories identified in 2020, fourteen in 2021 and eleven in 2022.</p> <p>The construction of the Wind Farm Site will result in a measurable reduction in the breeding habitat onsite/around the margins of the Wind Farm Site. However,</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	<p>potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Wind Farm Site nor rare locally. For example, and as previously outlined there are peatland rehabilitation schemes (PCAS) proposed on adjacent peatland and the site itself is anticipated will re-vegetate with birch-dominated scrub and woodland over time as is typical in areas where peat cutting has ceased. Overall, there is likely to be an increase in the availability of suitable habitat locally.</p> <p>Significant disturbance impacts are not anticipated.</p>		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>As previously outlined, this species was regularly recorded during the 2020, 2021 and 2022 breeding seasons at the Wind Farm Site. Numerous roding male woodcock were recorded, with six breeding territories identified in 2020, fourteen in 2021 and eleven in 2022.</p> <p>The construction of the Wind Farm Site will result in a measurable reduction in the breeding habitat onsite/around the margins of the Wind Farm Site. However, potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Wind Farm Site nor rare locally. For example, and as previously outlined there are peatland rehabilitation schemes (PCAS) proposed on adjacent peatland and the site itself is anticipated will re-vegetate with birch-dominated scrub and woodland over time as is typical in areas where peat cutting has ceased. Overall, there is likely to be an increase in the availability of suitable habitat locally.</p> <p>Significant displacement impacts are not anticipated.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Medium</i> sensitivity species and <i>Medium</i> Impact corresponds to a Low effect significance.</p>	Long-term Slight Negative Effect



Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Collision	This species was not recorded flying at potential collision height during the extensive VP survey work undertaken at the Wind Farm Site. Collision related mortality is not likely to significantly impact woodcock.	No Effect	No Effect

7.6.2.13 Buzzard (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. The construction of the wind farms site will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e., 32.4ha/1.8% of Wind Farm Site) relative to the total area within the Wind Farm Site.</p> <p>There were one probable breeding territories partially within the Wind Farm Site during the 2020 breeding season, two probable breeding territories partially within the Wind Farm Site during the 2021 breeding season and two probable breeding territories partially within the Wind Farm Site during the 2022 breeding season (see Confidential Appendix 7-5, Figure 7.13.5). There were no confirmed breeding territories within the Wind Farm Site in any of these years.</p> <p>Given the lack of suitable breeding habitat within the Wind Farm Site (i.e., no mature woodland/treelines), significant loss of breeding habitat is not anticipated. Direct loss of potential foraging habitat to the footprint of the Wind Farm Site will be minimal. Significant effects are not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>Onsite areas and to a 500m radius of the Wind Farm Site has hosted between two and four breeding pairs of buzzard between 2020 and 2022 (see Confidential Appendix 7-5, Figure 7.13.5). In addition, this species was regularly recorded within the Wind Farm Site during the breeding and wintering season. The disturbance associated with construction works will result in a measurable reduction in the breeding density of buzzard onsite and a reduction in the amount of available foraging habitat around the margins of the Wind Farm Site. However, these lands (e.g., cutover bog, scrub and adjacent woodland and farmland) are not considered unique to the Wind Farm Site or rare in the wider</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	surroundings. Significant displacement effects are not predicted at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. As previously discussed, there were two probable and two confirmed breeding territories identified in the 2020 breeding season, four probable and four confirmed breeding territories identified in the 2021 breeding season and six probable and three confirmed breeding territories in 2022. These territories ranged from partially within the Wind Farm Site to up to 4km from the Wind Farm Site (see Confidential Appendix 7-5, Figure 7.13.5).</p> <p>Pearce-Higgins (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. There was only one probable breeding territory identified partially within 500m of the proposed turbine layout in both 2020 and 2021. Additionally, there were two probable territories partially within 500m of the proposed turbine layout in 2022. Extensive areas of suitable foraging and breeding habitat exist and will remain in the wider area (i.e. outside 500m from the proposed turbine layout).</p> <p>Additionally, there were 436 observations of buzzard within 500m of the proposed turbine layout. There will be a measurable reduction in the frequency of commuting and foraging buzzard within 500m of the proposed turbine layout. However, onsite habitats are not considered unique to the Wind Farm Site and there is an abundance of suitable habitat for this species greater than 500m from the proposed turbine layout within the Wind Farm Site and its surroundings.</p> <p>Significant displacement effects are not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a rate of 2.48 collisions per year. The favourable conservation status of this species (Green-listed BoCCI) limits the potential for ecologically significant effects to result. The loss of 2.48 birds per year from the local population of a Green-listed (BoCCI) species is considered of low significance.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Low</i> Impact corresponds to a Very Low effect significance.</p>	<p>Long-term Slight Negative Effect</p>

7.6.2.14 Long-eared Owl (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>This species was recorded infrequently during surveys at the Wind Farm Site. A nest site was located within the Wind Farm Site, approximately 160m from the nearest proposed turbine.</p> <p>Long-eared owl were observed irregularly foraging and commuting within the Wind Farm Site, but given the nocturnal nature of this species, it is likely to be under recorded during surveys.</p> <p>The land lost to the development footprint is small (i.e. 32.4ha/1.8% of the Wind Farm Site) relative to the total area within the Wind Farm Site. Furthermore, the Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for foraging long-eared owl. There is an abundance of suitable habitat (scrub and woodland) in the wider surroundings of the Wind Farm Site. Significant effects on long-eared owl are not predicted.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>There was a breeding site identified within the Wind Farm Site. As per Ruddock & Whitfield (2007), long-eared owl have a limit of disturbance at 50-100m during incubation and 150-300m during chick rearing.</p> <p>The nearest proposed infrastructure is approximately 80m from the nest site. Therefore, it is likely that this pair will be displacement from this nest site during the construction phase of the Wind Farm Site. However, there is an abundance of suitable nesting habitat (scrub and woodland) greater than 300m from the proposed development footprint.</p> <p>As previously outlined, the Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for foraging long-eared owl. There is an abundance of suitable habitat (scrub and woodland) in the wider surroundings</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Short-term Slight Negative Effect

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
	of the Wind Farm Site. Significant effects are not predicted at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>There was a breeding site identified within the Wind Farm Site. As per Ruddock & Whitfield (2007), long-eared owl have a limit of disturbance at 50-100m during incubation and 150-300m during chick rearing. The nearest proposed turbine is approximately 160m from the nest site. Therefore, it is likely that this pair will be displacement from this nest site during the operational phase of the Wind Farm Site. However, there is an abundance of suitable nesting habitat (scrub and woodland) greater than 300m from the proposed turbine layout.</p> <p>Additionally, as previously detailed, the Wind Farm Site is dominated by formerly milled cutover bog, this habitat is sub-optimal for foraging long-eared owl. There is an abundance of suitable habitat (scrub and woodland) in the wider surroundings of the Wind Farm Site. Significant effects are not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Slight Negative Effect
Collision	This species was not recorded flying at potential collision height during the extensive vantage point survey work undertaken at the Wind Farm Site. Collision related mortality is not likely to significantly impact this species.	No Effect	No Effect

7.6.2.15 Sparrowhawk (All Seasons)

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	<p>This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. The construction of the Wind Farms Site will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e., 32.4ha/1.8% of the Wind Farm Site) relative to the total area within the Wind Farm Site.</p> <p>Within, or partially within, the wind farm site there was one confirmed breeding territory identified in 2020, four probable breeding territories identified in 2021 and three probable breeding territories identified in 2022 (see Appendix 7-4, Figure 7.11.6). There is potential for the loss of nesting habitat within the Wind Farm Site. However, these lands (e.g. cutover bog and scrub) are not considered unique to the Wind Farm Site or rare in the wider surroundings.</p> <p>Significant population level effects are not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Slight Negative Effect
Disturbance	<p>Breeding sparrowhawk were recorded during the 2020, 2021 and 2022 breeding seasons. Construction activity adjacent to the nest sites within the Wind Farm Site could potentially cause disturbance of breeding and foraging sparrowhawk. The disturbance associated with construction works will result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Wind Farm Site. However, these lands (e.g., cutover bog and scrub) are not considered unique to the Wind Farm Site or rare in the wider surroundings.</p> <p>Significant population level disturbance effects are not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Short-term Slight Negative Effect
Operational Phase			

Potential effects during the construction and operational phases of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Displacement & Barrier Effect	<p>As previously discussed, the Wind Farm Site hosts breeding and foraging sparrowhawk. Displacement from turbines is not reported for sparrowhawk, however, it is assumed for the purposes of the assessment that sparrowhawk show avoidance to a distance of 500m from turbines as with other raptors (Pearce-Higgins et al., 2009).</p> <p>There was one territory within 500m of the proposed turbine layout in 2020, four in 2021 and three in 2022. The disturbance associated with operational turbines will result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Wind Farm Site. Notwithstanding this, extensive areas of suitable foraging habitat exist and will remain in the wider area (i.e. outside 500m from the proposed turbine layout). Moreover, onsite habitats are not considered unique to the Wind Farm Site with significant areas of similar habitats available in Ballivor West, Carranstown and Lisclogher West bogs.</p> <p>Significant population level displacement effects are not predicted at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Medium</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Slight Negative Effect
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A “Random” collision risk analysis has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a rate of 0.097 collisions per year, or one collision every ten years. The loss of 0.097 birds from the local population of a Green-listed (BoCCI) species is considered insignificant.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>.</p> <p>The cross tabulation of <i>Low</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance.</p>	Long-term Imperceptible Negative Effect



7.6.3 Effects on Key Ornithological Receptors during Decommissioning

7.6.3.1 All Species

Potential effects during the decommissioning phase of the Application Site		Significance (Percival 2003)	Significance (EPA 2022)
Decommissioning Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	No Effect	No Effect
Disturbance	As above for construction phase for each species listed as a KOR.	As above for construction phase for each KOR	As above for construction phase for each KOR

7.6.4 Effects on Designated Areas

Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation and decommissioning of the Application Site does not adversely affect the integrity of any European sites in light of their conservation objectives.

Following an examination, evaluation and analysis, in light of best scientific knowledge and the conservation objectives of the site, and, on the basis of objective information, having taken into account the relevant mitigation measures, it can be concluded that the Application Site will not have an adverse impact on any European Sites, either alone or in combination with other plans or projects (see Section 7.11 for further details).

7.6.5 Effects Associated with the Turbine Delivery Route

To facilitate the delivery of large turbine components and other abnormal loads during the construction of the wind farm, this application includes for the construction of:

- Junction between the R156 and the R161 approximately 6.5km southwest of Trim: The junction accommodation works will comprise the road-widening within third-party land in order to facilitate turning of delivery vehicles carrying turbine components and other abnormal loads, from the R161 onto the R156 as well as the provision of off-road parking and storage facilities. The proposed widening will measure 3,751m² and the area of land take for the proposed parking and storage facilities measure 5,375 m².
- East of Ballivor Village on the R156: Accommodating works will be required on the R156 approximately 3.6km east of Ballivor Village. Here, road-widening within third-party land will be required in order to facilitate turning west of delivery vehicles carrying turbine components and other abnormal loads, toward Ballivor Village on the R156. The land take will also provide off-road parking and storage facilities. The proposed accommodation works area on the road will measure 1,809m² and the area of land take for the proposed parking and storage facilities will measure 6,770m².
- On the R156 in between the proposed component entrances to Ballivor and Carranstown Bogs, existing visibility is currently impacted by a trough and rise in the road. An assessment of the vertical alignment shown indicates that a 44m section of the R156 impedes on required sightlines and as a result, a maximum reduction of approximately 0.47m for 44m along the R156 is required in this area.

The majority of habitats along the turbine delivery route are of low ecological value (i.e. existing roads/tracks, agricultural land) and do not have the potential to support species of conservation interest in the area. On a precautionary basis, it is assumed that some temporary displacement may occur during construction works. However, given the extent of suitable habitat in the wider area; significant displacement effects are not predicted. The turbine delivery route does not have the potential to result in any significant habitat loss or displacement of any KOR species.

As per Percival (2003) the magnitude of the effect on KOR is assessed as **Negligible**. The cross tabulation of a **Very High** sensitivity species (e.g. kingfisher) and **Negligible** impact corresponds to a **Low Effect Significance**. Kingfisher was used as an example as it is one of the highest sensitivity species identified as a KOR at this site. The significance of the potential impact is classed as a **Short-term Slight Negative** effect following EPA criteria (2022).

7.7 Mitigation and Best Practice Measures

This section describes the measures that are in place to mitigate adverse negative effects associated with the Application Site on avian receptors. Effects on avian receptors have been addressed in two ways:

- Design of the Application Site.
- Management of the development phases.

7.7.1 Mitigation by Design

The project design has followed the basic principles outlined below to eliminate the potential for significant effects on avian receptors:

- The Proposed Development avoids wildlife refuge sites (e.g. waterbodies)
- Hard standing areas have been designed to the minimum size necessary to minimise habitat loss.

7.7.2 Mitigation During Construction, Operation and Decommissioning

The following section describes the mitigation and best practice measures to be implemented during each phase of the Application Site.

7.7.2.1 Construction Phase Mitigation and Best Practice Measures

The following measures are proposed for the construction phase:

- A Construction and Environmental Management Plan (CEMP) has been prepared. The CEMP will be in effect prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. The CEMP is included as an Appendix to Chapter 4.
- Construction works will begin outside the bird nesting season as defined by the Wildlife Act 1976 as amended (1st of March to the 31st of August).
- All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with the European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001 (S.I. No. 632/2001) and other relevant legislation.
- An Ecological Clerk of Works (ECoW) will be appointed. Duties will include:
 - Oversee a pre-construction transect/walkover bird survey is undertaken, to avoid significant effects on breeding birds will be avoided. Further details are provided in Section 7.9 below.
 - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Application Site.
 - Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise.
 - Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.

- Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.

7.7.2.2 Operational Phase Mitigation

No operational phase impacts requiring mitigation were identified. However, monitoring in line with best practice is proposed, please see Section 7.9 below for details.

7.7.2.3 Decommissioning Phase Mitigation

During the decommissioning phase, disturbance limitation measures will be as per the construction phase described in Section 7.7.2.1. Please also see Section 3 of the Decommissioning Plan for further details.

7.8 Compensation and Best Practice Measures

7.8.1 Kestrel

As outlined in Section 7.6.2.8, there is the potential for short term moderate negative effect (EPA, 2022) on the availability of nesting habitat for kestrel during the construction phase. It is proposed to provide replacement nest sites in the form of kestrel nest boxes at a ratio of 5:1 or twenty nest boxes to compensate for the loss. Kestrel are known to readily accept nest boxes (Valkama & Korpimäki, 1999; Fay et al., 2019) and achieve greater reproductive success there than in natural sites (Korpimäki, 1983; Fargallo et al., 2009).

The peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown East (complete) and Bracklin West (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for foraging kestrel. However, the availability of suitable nesting sites is potentially a limiting factor on breeding kestrel populations (Fargallo et al., 2001). By siting the proposed kestrel nesting boxes in Carranstown East and Bracklin West there is the potential to significantly increase the carrying capacity of the local bog complex overall. Nesting boxes will be in place the winter before the first breeding season of the construction phase. This location has not only been selected due the suitability of the habitat but also these bogs are sufficiently distance from the proposed development to avoid impacts.

This measure compensates for the loss of kestrel nesting habitat resulting from the construction of the proposed development.

By proposing the replacement nest boxes at a ratio of 5:1, there is the potential for additional nesting sites being create for other raptor species recorded locally in the unoccupied nest boxes. Such nest boxes could be used by barn owl and long-eared owl. To ensure the availability of nesting sites does not become a factor limiting local population growth for kestrel the occupancy of all nest boxes will be monitored annually. As required additional nest boxes will be provided annually such that there is always a surplus of 20% of unoccupied nest boxes to allow for population growth and to avoid inter-specific competition for nest sites.

7.8.1.1 Implementation and Installation

As per the RSPB recommendations³⁴, the following are prerequisites for the programme of kestrel nest box installation:

- The nest boxes will be built of an exterior grade plywood or other robust timber. Preservative can extend the life of the box but will only be applied to the outside of the box. Only use selected water-based preservatives, which are known to be safe for animals, such as Sadolin. CCA pressure-treated timber will not be used. The nest box design should follow the RSPB design recommendations:
<https://www.rspb.org.uk/birds-and-wildlife/advice/how-you-can-help-birds/nestboxes/nestboxes-for-owls-and-kestrels/kestrel-nestboxes/>
- As previously outlined, the nest boxes must be in place the winter before the first breeding season of the construction phase.
- The nest box should be located with clear flight paths on a pole specifically erected for the purpose away from woodland edges to avoid predation of nests by pine martens, with the entrance facing away from the prevailing wind direction.
- The nest boxes should be securely attached and sited a minimum of 5m high.
- Angle the box so that the floor slopes slightly away from the entrance. To ensure that the eggs remain in the sheltered end of the box should they roll.
- The floor panel of the nest box should be replaced if it shows signs of rotting.
- Annual monitoring will be scheduled to record information on occupancy, to inform the installation of additional nest boxes and to clean out a build-up of debris as required.

7.8.2 Best Practice Measures

The following measures are proposed for the benefit of local biodiversity and are not proposed to mitigate or compensate for any identified significant effects.

7.8.2.1 Barn Owl

Two barn owl nest sites were identified during the surveys of the Application Site. Like kestrel, the availability of suitable nest sites has the potential to limit local population growth. It is proposed to install ten barn owl nest boxes. The design for the nest boxes will follow the recently published, ‘*Guidance Document for the Barn Owl Nest Box Action*’. Full details are provided in that document³⁵. It is proposed to site five number nest boxes each in Carranstown East and Lislogher West bogs. These sites were selected due to their relative proximity to the occupied nests (Please see Confidential Appendix 7-5 for details) which makes them more likely to be encountered by barn owls and as they are sufficiently distant from the Application Site to avoid impacts. The location of the nest boxes will be registered with BirdWatch Ireland, through their request for barn owl nests information portal: <https://survey123.arcgis.com/share/f0cac6f49de44d9c9fd60ca1195b4096>. The installation will follow the same procedure as for the kestrel nest boxes, please see Section 7.8.1.1 for details.

7.8.2.2 Sharing Ecological Data

As a measure to support conservation research and policy, it is proposed to submit the pre-planning survey data and information to the National Biodiversity Data Centre (NBDC) on relevant ecological records, for example, information on the location of breeding territories and nest sites of bird species of

³⁴ <https://www.rspb.org.uk/birds-and-wildlife/advice/how-you-can-help-birds/nestboxes/nestboxes-for-owls-and-kestrels/providing-nest-sites-for-bigger-birds/>

³⁵ Lusby and McCarthy, BirdWatch Ireland (2022) *Guidance Document for the Barn Owl Nest Box Action*.



conservation concern. The submission of the data will follow relevant standards and will be provided in the preferred NBDC excel template. This measure will be fulfilled within the first year of the construction phase in the event of a successful application.

7.9 Monitoring

7.9.1 Commencement and Construction

Taking a precautionary approach, it is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm. Any requirement for construction works to run into the subsequent breeding season following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern. The survey will aim to identify sensitive sites e.g. nests or roosts depending on the season in question.

Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase survey no works shall be undertaken within a species-specific buffer (as per Goodship, N.M. and Furness, R.W. 2022) in line with best practice. No works within the buffer zone shall be permitted until it can be demonstrated that that birds of conservation concern are no longer reliant on the roost/nest site.

7.9.2 Post Construction

A detailed Bird Monitoring Programme has been prepared for the operational phase of the Application Site, please refer to Appendix 7-7 for further details. The programme of works will monitor parameters associated with a collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the lifetime of the wind farm. Monitoring measures are broadly based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed:

- Monthly flight activity surveys: vantage point surveys.
- Breeding Bird surveys: Adapted Brown & Shepard
- Annual kestrel nest box monitoring
- Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.

The proposed programme of monitoring was not proposed in response to any identified significant effect but rather as a best practice measure (SNH, 2009). The monitoring is comprehensive and considered entirely adequate in this regard. The results of this monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

7.9.3 Decommissioning

Taking a precautionary approach, it is proposed that works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Decommissioning monitoring surveys will be undertaken prior to works associated with decommissioning at the wind farm. The surveys will include a thorough walkover survey to a 500m radius of the development footprint and all works areas, where access allows. Any requirement for decommissioning works to run into the subsequent breeding season following commencement will be subject to a repeat of the decommissioning bird surveys to confirm the absence of breeding birds of conservation concern. If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the decommissioning phase. If it is found to be active during the decommissioning phase survey, no works shall be undertaken within a species-specific



buffer (as per Goodship, N.M. and Furness, R.W. 2022), in line with industry best practise. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Please also see Section 3 of the Decommissioning Plan for further details.

7.10 Residual Effects

The following species were identified as KORs and were subject to detailed impact assessment:

- > Golden Plover
- > Hen Harrier
- > Kingfisher
- > Merlin
- > Peregrine
- > Whooper Swan
- > Barn Owl
- > Kestrel
- > Lapwing
- > Snipe
- > Woodcock
- > Buzzard
- > Long-eared Owl
- > Sparrowhawk

Taking into consideration the effect significance levels identified and the proposed best practice, mitigation and compensation; significant residual effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

As per Percival 2003 criteria, effect significance of greater than **Low** was not identified for any KOR.

As per EPA 2017 criteria, effect significance of greater than **Slight** was not identified for any KOR.

7.11 Cumulative Effects

As per NatureScot guidance on “*Assessing the Cumulative Impacts of onshore Wind Energy Developments*” (SNH, 2012), cumulative effects arising from two or more developments may be:

- **Additive** (i.e., a multiple independent additive model)
- **Antagonistic** (i.e., the sum of impacts are less than in a multiple independent additive model)
- **Synergistic** (i.e., the cumulative impact is greater than the sum of the multiple individual effects)

7.11.1 Other Plans and Projects

Assessment material for this in combination impact assessment was compiled on the relevant developments within the vicinity of the Wind Farm Site and was verified on the 17/02/2023. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. The projects and plans considered in relation to the potential for in-combination or cumulative effects and for which all relevant data was reviewed (e.g. individual EISs/EIARs, layouts, drawings etc.). All plans and projects reviewed are outlined below.

7.11.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Meath County Development Plan 2021-2027.
- Westmeath County Development Plan 2021-2027
- National Biodiversity Action Plan 2017-2021

These policies and objectives of these plans have been taken into account in this cumulative assessment.

7.11.1.2 Projects Considered in the Cumulative Impact Assessment

NatureScot guidance “*Assessing the Cumulative Impacts of onshore Wind Energy Developments*” (SNH, 2012; 2018) was consulted while undertaking the cumulative assessment. SNH (2012; 2018) emphasises that its priority is to ‘*maintain the conservation status of the species population at the national level.*’ However, it is acknowledged that consideration should also be allowed for impacts at the regional level ‘*where regional impacts have national implications (for example where a specific region holds the majority of the national population)*’. Following the guidance of SNH (2012), the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor. Please note that a 25km radius of the Wind Farm Site was considered a reasonable approximation of the size of a county and a 5km radius of the Wind Farm Site was considered a reasonable approximation for the local level.

To conduct the cumulative impact assessment, Meath and Westmeath County Councils online planning registers, relevant EIAR (or historical EIS) documents, planning application details and planning drawings in the vicinity of the Wind Farm Site and all associated works were reviewed to identify past and future projects, their activities and their environmental impacts. The findings of this review are outlined in the following sections for forestry and agricultural practices, other developments/land uses, and other wind farm developments.

Forestry and Agricultural Practices

Some areas within the surrounding area are planted with commercial forestry, i.e. predominantly along the eastern boundary of the Application Site. The forestry works (felling/planting) associated with the forestry in the wider surroundings of the Wind Farm Site will be subject to relevant licencing and guidance from the Forestry Service.

The remaining land use in the surrounding area is predominantly agriculture in the form of livestock grazing. These applications and land uses have also been taken into account in this cumulative assessment.

Other Developments

The review of the Meath and Westmeath County Council planning registers document relevant general development planning applications in the vicinity of the Wind Farm Site and all its associated works, most of which relate to the provision and/or alteration of housing, agriculture-related structures and community facilities. More detail on the nature of these developments can be found in Chapter 2, Section 2.5. Owing to the scale and nature of these development significant cumulative impacts are not anticipated.

Bord na Móna Peatland Climate Action Scheme (PCAS)

The PCAS scheme is supported by Government through the Climate Action Fund and Ireland’s National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC). Please see <https://www.bnmpcas.ie/> for details. The National Parks and Wildlife Service (NPWS) acts as the Scheme regulator and there is ongoing engagement with the EPA. This scheme is in addition to the IPC licence requirements and therefore does not form part of the proposed Ballivor Wind Farm application. Peatlands adjacent to the Application Site are included in the scheme. For example, peatland rehabilitation (Peatland Climate Action Scheme (PCAS)) at the offsite but adjacent Carranstown east (complete) and Bracklin west (beginning 2023) aims to optimise climate action benefits of rewetting the former industrial peat production areas by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop.

The measures proposed will set sites on an accelerated trajectory towards the development of a variety of compatible habitats including developing natural peatland, wetland and woodland. This will provide habitat for a range of species that depend on these habitats, including some species that are rare and protected. In relation to birds, it is anticipated that the rehabilitated peatlands will be of particular benefit to waders and raptors (e.g. snipe, woodcock, lapwing and kestrel). The newly restored habitat is likely to provide breeding and resting locations for these species.

This scheme has been considered in this cumulative assessment.

Other Wind Farm Developments

The wind farm projects within a 25-kilometre radius of the Wind Farm Site are provided in Table 7-12 below and are presented in terms of their proximity to the Wind Farm Site and whether the project is permitted/operational or pending/under appeal. A total of seven wind farms, and 70 existing/permitted turbines and 54 proposed/pending turbines fall within a 25-kilometre radius of the proposal as detailed in Table 7-12.

Table 7-12 Wind Farms Within 25km of the development site

Wind Farm	Status	No. of Turbines	Separation Distance of Nearest Turbines
Bracklyn	Permitted	11	521m
Milltown Pass	Proposed	7	13.7km
Yellowriver	Permitted	29	15.9km
Ballydermot	Proposed	47	21.3km
Cushaling/Cloncant	Permitted	9	24.1km

Wind Farm	Status	No. of Turbines	Separation Distance of Nearest Turbines
Cloncreen	Operational	21	24.5km
Total Existing		21	
Total Permitted		49	
Total Proposed		54	

Bracklyn Wind Farm

The potential for the Application Site to result in significant cumulative or in combination effects when assessed alongside Bracklyn Wind Farm, which is c. 515m from the nearest proposed turbine, was considered. The EIAR³⁶ for Bracklyn wind farm was consulted. Bracklyn wind farm shared the following key ornithological receptors with Ballivor wind farm: hen harrier, woodcock, golden plover, lapwing, snipe, kestrel, barn owl, whooper swan, merlin, peregrine, buzzard and sparrowhawk. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be of low significance for woodcock and kestrel, and negligible/not significant for hen harrier, golden plover, lapwing, snipe, barn owl, whooper swan, merlin, peregrine, sparrowhawk and buzzard. Disturbance/displacement and barrier effect were assessed to be of low significance for golden plover, woodcock, negligible/not significant for hen harrier, kestrel, barn owl, whooper swan, merlin, peregrine, sparrowhawk and buzzard.

The cumulative assessment for the Bracklyn wind farm assessed the in-combination collision risk and the in-combination barrier effect of the wind farm when wind farms within 50km were taken into consideration. It was concluded that given the low density of wind farms and the location of the midlands SPAs, likely significant effects due to displacement and collision risk on species associated with these SPAs can be ruled out. Ballivor wind farm was assessed as part of the cumulative assessment. It was concluded that the combined collision risk for golden plover and kestrel may lead to an increase in significance of effect. Breeding woodcock are also likely to have increased significance of effect with regard to collision risk and displacement effects. These three species are discussed further in Section 7.11.2 of this EIAR chapter.

Based on this information, as well as the location of Bracklyn Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Application Site when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

Milltown Pass Wind Farm

The potential for the Application Site to result in significant cumulative or in combination effects when assessed alongside Milltown Pass Wind Farm, which is c.13.7km from the nearest proposed turbine, was considered. Milltown Pass Wind Farm is at the preplanning stage and therefore no planning application has been lodged and no impact assessment has been completed.

However, given the location of the wind farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Application Site when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

Yellowriver Wind Farm

The potential for the Application Site to result in significant cumulative or in combination effects when assessed alongside Yellowriver wind farm, which is c. 15.9km from the nearest proposed turbine, was

³⁶ <https://www.pleanala.ie/en-ie/case/311565>

considered. The Environmental Impact Statement³⁷ was reviewed. Additionally, the planning file was reviewed on the An Bord Pleanála³⁸ website and the Inspector's Report was reviewed for any information regarding impacts on birds. Yellowriver wind farm shared the following key ornithological receptors with Ballivor wind farm: lapwing, kestrel, whooper swan, golden plover, hen harrier and snipe. Residual effects no greater than Low were predicted at the Yellowriver Wind Farm for habitat loss, disturbance/displacement and collision risk. The EIS concluded that "the proposed project will not result in any residual significant impacts on the terrestrial ecology of the area". The inspector was satisfied that there would be no significant impacts on birds due to the wind farm, if all mitigation measures outline were put in place.

Based on this information, as well as the location of Yellowriver Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Application Site when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

Ballydermot Wind Farm

The potential for the Application Site to result in significant cumulative or in combination effects when assessed alongside Ballydermot Wind Farm, which is c.21.3km from the nearest proposed turbine, was considered. Ballydermot wind farm is at the preplanning stage and therefore no planning application has been lodged and no impact assessment has been completed.

However, given the location of the wind farm, the considerable separation distance, and the lack of significant residual impacts on bird species associated with the Application Site when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

Cushaling/Cloncant Wind Farm

The potential for the Application Site to result in significant cumulative or in combination effects when assessed alongside Cushaling/Cloncant Wind Farm, which is c.24.1km from the nearest proposed turbine, was considered. The EIAR³⁹ for Cushaling/Cloncant wind farm was consulted. Cushaling/Cloncant wind farm shared the following key ornithological receptors with Ballivor wind farm: golden plover, whooper swan, peregrine, lapwing, woodcock, buzzard, kestrel, sparrowhawk and snipe. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be Low (as per Percival, 2003) for peregrine, and Very Low (as per Percival, 2003) for golden plover, whooper swan, lapwing, buzzard, kestrel and snipe. Disturbance/displacement was assessed to be Low (as per Percival, 2003) for golden plover, whooper swan, peregrine, woodcock and Very Low (as per Percival, 2003) for lapwing, buzzard, kestrel, sparrowhawk and snipe.

The cumulative assessment for the Cushaling/Cloncant wind farm assessed the cumulative disturbance, displacement, habitat loss and barrier effects of the wind farm when wind farms within 15km were taken into consideration. It was concluded that there would be no significant cumulative barrier effects anticipated given that no important migratory routes were identified. It was concluded that there was no potential for significant cumulative disturbance, displacement or habitat loss effects given the separation distance of the other wind farms in this assessment.

Based on this information, as well as the location of Cushaling/Cloncant Wind Farm, the considerable separation distance and the lack of significant residual impacts on bird species associated with the

³⁷ <http://www.yellowriverwindfarm.com/files/EIS/16.%20EIS.pdf>

³⁸ <https://archive.pleanala.ie/en-ie/case/PA0032>

³⁹ <https://www.pleanala.ie/en-ie/case/306924>

Application Site when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

Cloncreen Wind Farm

The potential for the Application Site to result in significant cumulative or in combination effects when assessed alongside Cloncreen Wind Farm, which is c.24.5km from the nearest proposed turbine, was considered. The EIS⁴⁰ for Cloncreen wind farm was consulted. Cloncreen wind farm shared the following key ornithological receptors with Ballivor wind farm: whooper swan, golden plover, lapwing, snipe, woodcock, peregrine, hen harrier, kestrel, sparrowhawk and buzzard. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be Low (as per Percival, 2003) for golden plover lapwing, woodcock, and Very Low (as per Percival, 2003) for whooper swan, snipe, peregrine, hen harrier, kestrel, sparrowhawk and buzzard. Disturbance/displacement was assessed to be Low (as per Percival, 2003) for whooper swan, golden plover, lapwing, woodcock, peregrine, hen harrier, and Very Low (as per Percival, 2003) for snipe, kestrel, sparrowhawk and buzzard.

The cumulative assessment for the Cloncreen wind farm assessed the cumulative collision risk and the cumulative disturbance and displacement and habitat loss of the wind farm when wind farms within 15km were taken into consideration. It was concluded that cumulative collision mortality in combination with other wind farms is of low concern. The disturbance and displacement and habitat loss were also deemed to be of low concern. The barrier effect of the Cloncreen wind farm in combination with other windfarms was deemed to be of low significance.

Based on this information, as well as the location of Cloncreen Wind Farm, the considerable separation distance and the lack of significant residual impacts on bird species associated with the Application Site when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

⁴⁰ <https://www.pleanala.ie/en-ie/case/PA0047>

7.11.2 Assessment of Cumulative Effects

There were fourteen key ornithological receptors (KOR) identified at the Wind Farm Site: golden plover, hen harrier, kingfisher, merlin, peregrine, whooper swan, barn owl, kestrel, lapwing, snipe, woodcock, buzzard, long-eared owl and sparrowhawk. Construction disturbance is a short-term impact and does not need to be considered in the cumulative assessment. For most KOR species collision risk no greater than Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) were predicted. Cumulative collision risk is therefore not considered further given these predicted impacts are effectively zero. The collision risk for golden plover, peregrine, whooper swan, kestrel and lapwing is predicted to be Low (as per Percival 2003 criteria) and Long-term Slight (as per EPA 2022 criteria). The cumulative effects of collision risk for these species are detailed below.

A key consideration in the assessment of the potential for cumulative impacts to result in significant effects is proximity. There is only one wind farm within 5km of the Wind Farm Site. With a further five wind farms located between 5km and 25km of the Wind Farm Site. It is noted that all of these are greater than 13km away. The assessment of cumulative effects on key ornithological receptors is provided in Table 7-13 below. In particular, cumulative habitat loss, displacement and collision risk (as relevant) associated with operational turbines is assessed.

Table 7-13 Assessment of cumulative effects on key ornithological receptors

KOR	Evaluation of Cumulative Impacts	Determination
Golden Plover (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Bracklyn wind farm is located partially within open farmland and is therefore suitable for foraging and roosting golden plover. However, the habitats at Ballivor wind farm (bogland) and Bracklyn wind farm (farmland) are not considered to be a scarce resource in the area. Extensive areas of suitable foraging habitat will remain post construction, of both wind farms, and there is an abundance of suitable habitat in the surrounding area, including Ballivor West, Carranstown and Lislogher West bogs which total approximately 618.7 ha. This would likely render such an effect inconsequential. Furthermore, peatland rehabilitation (Peatland Climate Action Scheme⁴¹ (PCAS)) at the adjacent Carranstown east (complete)</p>	Significant cumulative impacts are not predicted to occur at the county scale.

⁴¹ <https://www.bnmpcas.ie/>

KOR	Evaluation of Cumulative Impacts	Determination
	<p>and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>The predicted collision risk at Bracklyn wind farm was 0.23 birds per year. This in combination with the collision risk at Ballivor wind farm will result in a combined total of 15.757 birds per year. The addition of the low number of collisions at Bracklyn is insignificant. Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.</p> <p>Milltown Pass Wind Farm is located within commercial forestry, which is of limited ecological value for golden plover. The Yellowriver Wind Farm is located within commercial forestry and farmland. Cushaling/Cloncant Wind Farm is located within farmland habitats, while Cloncreen and Ballydermot are located within cutover bog habitats. These habitats are suitable for foraging and roosting golden plover. However, given the separation distance and that these habitats (cutover bogs and farmland), the sub-optimal value of cutover bog habitats and the fact that they are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km) Furthermore, no significant effects were reported for any of the wind farm located to a 25km radius (county scale) of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.</p>	
<p>Hen Harrier (County Importance)</p>	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Foraging hen harrier was infrequently recorded within the Wind Farm Site. Hen harrier have been recorded to be subject to displacement impacts within a 500m radius of turbines (Pearce-Higgins et al.,</p>	<p>Significant cumulative impacts are not predicted to occur at the county scale.</p>

KOR	Evaluation of Cumulative Impacts	Determination
	<p>2009). The amount of foraging habitat that will be (potentially) subject to disturbance displacement impacts is insignificant relative to the abundance of suitable habitat in the wider surroundings.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Kingfisher (Local Importance)	<p>The potential for local developments (>5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site was considered.</p> <p>The Application Site is sited predominantly in a cutover bog with a mixture of scrub and woodland habitats throughout, habitat types that are suboptimal for kingfisher. Significant disturbance impacts associated with operational turbines are not anticipated at the Wind Farm Site. Similar displacement impacts are predicted on other Wind Farm Sites locally.</p> <p>Additionally, suitable kingfisher habitat is not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.</p>	Significant cumulative impacts are not predicted to occur at the local scale.
Merlin (County Importance)	The potential for local developments to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site was considered.	Significant cumulative impacts are not predicted to occur at the county scale.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>Bracklyn Wind Farm is located within habitats of limited ecological value for merlin (improved agricultural grassland, tillage and commercial forestry). It is noted that there is potential for displacement of this species from open areas around the margins of the Bracklyn wind farm development. However, these areas are small relative to the abundance of open habitat present in the wider surroundings. This in combination with the low significant loss of habitat relating to the Ballivor wind farm, will not result in any increased significance for this species. No significant attribution to cumulative habitat loss is predicted.</p> <p>Milltown Pass, Yellowriver and Cushaling/Cloncant Wind Farms are within habitats of limited ecological value for merlin (improved agricultural grassland and commercial forestry). Cloncreen and Ballydermot Wind Farms are located within cutover bog habitats. These habitats are suitable for foraging and roosting merlin. However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located to a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Peregrine (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Bracklyn Wind Farm is within habitats of limited ecological value for peregrine (improved agricultural grassland, tillage and commercial forestry). It is noted that there is potential for displacement of this species from open areas around the margins of the Bracklyn Wind Farm development. However, these areas are small relative to the abundance of open habitat present in the wider surroundings. This in combination with the low significant loss of habitat relating to the Ballivor Wind Farm, will not result in any increased significance for this species. No significant attribution to cumulative habitat loss is predicted. Peregrine</p>	Significant cumulative impacts are not predicted to occur at the county scale.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>observations at Bracklyn Wind Farm were sufficiently irregular that no collision risk model was run, as it is perceived to be of no significance. Therefore, there will be no significant cumulative impacts on collision risk for this species. Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.</p> <p>Milltown Pass, Yellowriver and Cushaling/Cloncant Wind Farms are within habitats of limited ecological value for peregrine (improved agricultural grassland and commercial forestry). Cloncreen and Ballydermot Wind Farms are located within cutover bog habitats. These habitats are suitable for foraging peregrine. However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located to a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Whooper Swan (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Whooper swan were only recorded on two occasions during three years of surveys at Bracklyn wind farm. Impacts on whooper swan were assessed to be not significant at Bracklyn wind farm. Whooper swan observations at Bracklyn Wind Farm were sufficiently irregular that no collision risk model was run, as it is perceived to be of no significance. Therefore, there will be no significant cumulative impacts on collision risk for this species. Notwithstanding this, the result of operational phase bird monitoring will be reported</p>	Significant cumulative impacts are not predicted to occur at the county scale.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.</p> <p>Milltown Pass Wind Farm is within habitats of limited ecological value for whooper swan (commercial forestry). Yellowriver, Cushaling/Cloncant, Cloncreen and Ballydermot Wind Farms are located within habitats suitable for foraging whooper swan (farmland and bog habitats). However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located to a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Barn Owl (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Bracklyn wind farm is partially improved agricultural grassland and tillage, these habitats are suitable for foraging barn owl. However, these areas are small relative to the abundance of suitable foraging habitat present in the wider surroundings and the Bracklyn EIAR assessed the wind farm to have no significant impacts on this species. This in combination with the low significant loss of habitat relating to the Ballivor wind farm, will not result in any increased significance for this species. No significant attribution to cumulative habitat loss is predicted.</p> <p>Milltown Pass, Cloncreen and Ballydermot Wind Farms are within habitats of very limited ecological value for barn owl (commercial forestry and bog habitats). Yellowriver and Cushaling/Cloncant, Wind Farms are located within habitats suitable for foraging barn owl (farmland). However, given the separation</p>	Significant cumulative impacts are not predicted to occur at the county scale.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located to a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Kestrel (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>The Application Site is sited predominantly in a cutover bog with a mixture of scrub and woodland habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. The proposed installation of kestrel nest boxes is predicted to increase the local kestrel population. Displacement impacts are predicted on other Wind Farm Sites locally. However, given these habitat types are not a rare habitat type locally and the proposed provision of nest boxes significant cumulative impacts are not predicted.</p> <p>The predicted collision risk at Bracklyn wind farm was 0.22 birds per year. This in combination with the collision risk at Ballivor wind farm will result in a combined total of 2.43 birds per year. The addition of the low number of collisions at Bracklyn is insignificant. Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.</p> <p>Milltown Pass Wind Farm is within habitats of limited ecological value for kestrel (commercial forestry). Yellowriver, Cushaling/Cloncant, Cloncreen and Ballydermot Wind Farms are located within habitats suitable for foraging and breeding kestrel (farmland and bog habitats). However, given the separation</p>	Significant cumulative impacts are not predicted to occur at the county scale.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.</p>	
Lapwing (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Bracklyn wind farm is located partially within open farmland and is therefore suitable for foraging and roosting lapwing. However, the habitats at Ballivor wind farm (bogland) and Bracklyn wind farm (farmland) are not considered to be a scarce resource in the area. Extensive areas of suitable foraging/roosting and nesting habitat will remain post construction, of both wind farms, and there is an abundance of suitable habitat in the surrounding area including Ballivor West, Carranstown and Lisclogher West bogs which total approximately 618.7 ha. This would likely render such an effect inconsequential. Furthermore, peatland rehabilitation (Peatland Climate Action Scheme⁴² (PCAS)) at the adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>The predicted collision risk at Bracklyn wind farm was 0.03 birds per winter and 0.021 per breeding season. This in combination with the collision risk at Ballivor wind farm will result in a combined total of 2.67 birds per winter and 0.166 birds per breeding season. The addition of the low number of collisions at Bracklyn is insignificant. Notwithstanding this, the result of operational phase bird monitoring will be</p>	Significant cumulative impacts are not predicted to occur at the county scale.

⁴² <https://www.bnmpcas.ie/>

KOR	Evaluation of Cumulative Impacts	Determination
	<p>reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.</p> <p>Milltown Pass Wind Farm is within habitats of limited ecological value for lapwing (commercial forestry). Yellowriver, Cushaling/Cloncant, Cloncreen and Ballydermot Wind Farms are located within habitats suitable for foraging and breeding lapwing (farmland and bog habitats). However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Snipe (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Bracklyn wind farm is located partially within open farmland and is therefore suitable for foraging and breeding snipe. However, the habitats at Ballivor wind farm (bogland) and Bracklyn wind farm (farmland) are not considered to be a scarce resource in the area. Extensive areas of suitable foraging and nesting habitat will remain post construction, of both wind farms, and there is an abundance of suitable habitat in the surrounding area including Ballivor West, Carranstown and Lislogher West bogs which total approximately 618.7 ha. This would likely render such an effect inconsequential. Furthermore, peatland rehabilitation (Peatland Climate Action Scheme⁴³ (PCAS)) at the adjacent Carranstown east (complete)</p>	Significant cumulative impacts are not predicted to occur at the county scale.

⁴³ <https://www.bnmpcas.ie/>

KOR	Evaluation of Cumulative Impacts	Determination
	<p>and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>Milltown Pass Wind Farm is within habitats of limited ecological value for snipe (commercial forestry). Yellowriver, Cushaling/Cloncant, Cloncreen and Ballydermot Wind Farms are located within habitats suitable for foraging and breeding snipe (farmland and bog habitats). However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
Woodcock (County Importance)	<p>The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site were considered.</p> <p>Bracklyn wind farm is located within, or partially within, commercial forestry and is therefore suitable for nesting woodcock. However, the habitats at Ballivor wind farm and these wind farms are not considered to be a scarce resource in the area. Extensive areas of suitable nesting habitat will remain during the operational phase of these wind farms and there is an abundance of suitable habitat in the surrounding area, including Ballivor West, Carranstown and Lisclogher West bogs which total approximately 618.7 ha. This would likely render such an effect inconsequential. Furthermore, peatland rehabilitation (Peatland</p>	Significant cumulative impacts are not predicted to occur at the county, national or international scale.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>Climate Action Scheme⁴⁴ (PCAS)) at the adjacent Carranstown east (complete) and Bracklin west (beginning 2023) is likely to increase the value of these (formerly cutover) habitats for this species.</p> <p>Cushaling/Cloncant Wind Farm is within habitats of limited ecological value for woodcock (Farmland). Milltown Pass and sections of the Yellowriver Wind Farms are located within habitats suitable for breeding woodcock (commercial forestry). Additionally, there are some areas of suitable breeding habitat within Cloncreen and Ballydermot Wind Farms (areas of scrubs or adjacent forestry). However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Ballivor Wind Farm, significant cumulative impacts are not anticipated.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius of the Wind Farm Site.</p> <p>Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.</p>	
<p>Buzzard (Local Importance)</p>	<p>The potential for local developments (>5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site was considered.</p> <p>The Application Site is sited predominantly in a cutover bog with a mixture of scrub and woodland habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. The disturbance associated with operational turbines will result in a measurable reduction in the breeding density of buzzard onsite. Similar displacement impacts are predicted on other Wind Farm Sites locally.</p>	<p>Significant cumulative impacts are not predicted to occur at the local scale.</p>

⁴⁴ <https://www.bnmpcas.ie/>

KOR	Evaluation of Cumulative Impacts	Determination
	<p>However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.</p>	
<p>Long-eared Owl (Local Importance)</p>	<p>The potential for local developments (<5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site was considered.</p> <p>The Application Site is sited predominantly in a cutover bog with a mixture of scrub and woodland habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. No significant impacts on long-eared owl are predicted at the Wind Farm Site. Similar displacement impacts are predicted on other Wind Farm Sites locally.</p> <p>Additionally, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.</p>	<p>Significant cumulative impacts are not predicted to occur at the local scale.</p>
<p>Sparrowhawk (Local Importance)</p>	<p>The potential for local developments (<5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Application Site was considered.</p> <p>The Application Site is sited predominantly in a cutover bog with a mixture of scrub and woodland habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. The disturbance</p>	<p>Significant cumulative impacts are not predicted to occur at the local scale.</p>



KOR	Evaluation of Cumulative Impacts	Determination
	<p>associated with operational turbines will result in a measurable reduction in the breeding density of sparrowhawk onsite. Similar displacement impacts are predicted on other Wind Farm Sites locally.</p> <p>However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.</p> <p>No significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Application Site, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.</p>	

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Conclusion

Following consideration of the residual effects (post-mitigation), it is concluded that the Application Site will not result in any significant negative effects on any of the identified KORs.

Provided that the Application Site is constructed, operated and decommissioned in accordance with the design, best practice and mitigation measures that are described within this application, significant individual or cumulative effects on ornithology are not anticipated at the international, national or county scales or on any of the identified KORs.