Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Lackareagh Wind Farm, Co. Clare

Chapter 7 –Birds

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7. BIRDS

7.1 Introduction

This chapter assesses the likely significant impacts of the Proposed Project on avian receptors.

Particular attention has been paid to bird species with national and international protection under the Irish Wildlife Acts 1976-2022 and the European Union (EU) Birds Directive (2009/147/EC). Where potential impacts on avian receptors are identified, mitigation is described, and the residual effects are assessed. Cumulative effects of wind energy developments within a 25km radius of the Proposed Project have also been assessed.

This chapter is supported by Technical Appendices 7-1 to 7-7. Technical Appendix 7-1 to 7-4 contains 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 and roosting sites. Appendix 7-6 contains the Collision Risk Assessment (CRA) document which illustrates how the collision risk modelling was undertaken for the Proposed Project. Appendix 7-7 contains the bird monitoring programme. The Proposed Wind Farm and survey radii are provided in Figures 7.1 – 7.10 below.

The chapter is structured as follows:

- The Introduction provides a description of the Proposed Project and the relevant legislation, guidance and policy context.
- The Assessment Approach and Methodology section is a comprehensive description of the ornithological surveys and impact assessment methodology used to inform a robust assessment of potential impacts of the Proposed Project on birds.
- The Baseline Ornithological Conditions section describes the existing bird population at the Proposed Project site.
- The Receptor Evaluation section identifies key ornithological receptors and determines their sensitivity.
- The Potential Impacts section details the impact assessment (including direct habitat loss, disturbance/displacement and collision risk). Impacts are described with regard to each phase of the Proposed Project: construction, operation and decommissioning.
- The Mitigation and Best Practice Measures section describes proposed mitigation and best practice measures to ameliorate the identified impacts.
- The Monitoring section outlines a schedule for monitoring birds during each phase of the Proposed Project if planning permission is granted: commencement and construction, operation and decommissioning.
- The Residual Effects section considers the implications of the proposed mitigation, best practice, enhancement measures and monitoring.
- Finally, the Cumulative Effects section fully assesses potential cumulative effects of the Proposed Project in combination with other projects.
- The Conclusion provides a summary statement on the overall significance of predicted effects on birds.

As detailed in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm' and 'Proposed Grid Connection Route' and 'the site'.

- Where the 'Proposed Project' is referred to, this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of this EIAR.

- Where 'proposed development' is referred to, this encompasses everything within the red line boundary of the planning application i.e., wind farm infrastructure, proposed onsite 38kV substation and BESS compound.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hardstanding areas, including access roads, underground cabling, permanent meteorological mast, temporary construction compound, junction accommodation works, peat and spoil management, tree felling, site drainage, operational stage signage, battery energy storage system, proposed onsite 38kV substation, lookout point viewing deck, all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Grid Connection Route' is referred to, this refers to the underground 38kV cabling connecting to the existing Ardnacrusha 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection Route is described in detail in Chapter 4 of this EIAR.
- Where 'the site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green, as shown in Figure 1-1 of Chapter 1.

The following other definitions are used in this chapter:

- The "Zone of Influence" (ZOI) for individual ornithological receptors refers to the area within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular species and were assigned in accordance with best available guidance (SNH, 2016 and McGuinness et al., 2015), adopting a precautionary approach.
- "Key Ornithological Receptor" (KOR) is defined as a species occurring within the zone of influence of the Proposed Project upon which potential impacts are anticipated and assessed.

7.1.1 Description of the Proposed Project

A full description of the Proposed Project is provided in Chapter 4 of this EIAR. In brief, the applicant is seeking a ten-year planning permission for a project consisting of seven turbines and the associated ancillary infrastructure. The turbines will be between 102.5 and 105m at hub height, with 3 blades of a diameter between 149m and 155m, giving a maximum rotor height of between 179.5m and 180m, and minimum rotor height of between 25m and 30.5m. The Proposed Project will have an operation life of 35 years from the date of commissioning.

7.1.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of EU Environmental Impact Assessment Directive 2014/52/EU. The following key legislative provisions are applicable to habitats and fauna in Ireland:

- The Wildlife Act 1976. This Act was revised in October 2022 to present amendments since enactment.
- The Birds Directive (EU Directive 2009/147/EC on the conservation of wild birds).
- 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 regulations were amended in 2013 (290/2013 and 499/2013), 2015 (355/205) as well as Chapter 4 of the Planning, Heritage and Broadcasting (Amendment) Act 2021 (11/2021) and in 2021 (293/2021).
- 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

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 and as detailed in Section 1.2.1 in Chapter 1 of this EIAR:

- 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 (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.
- Clare County Development Plan 2023-2029

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Kathryn Sheridan (MSc.), Project Ornithologist of MKO and reviewed by Patrick Manley (BSc.), Senior Ornithologist and Padraig Cregg (MSc.), Principal Ornithologist. All are suitably qualified ornithologists with experience in completing avifaunal assessments and competent experts for the purposes of the preparation of this EIAR. The scope of works and survey methodology was devised by Padraig Cregg and is fully compliant with recent NatureScot (formerly Scottish Natural Heritage) guidance (SNH, 2017). Field surveys were undertaken by Aoife Crowe, Andre Robinson, Ciaran McKenna, John Curtin, Jonah Gaine, John Hehir, Jack Kennedy, Jamie Quirke, Louis DeVries, Roisin Towe, Sheriene Acun, Sean O'Brien, Tony Kenneally, and Tom Ryan. Surveyors are competent experts in the field of ornithological surveys.

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 use the Proposed Wind Farm. The assessment included a thorough review of the available ornithological data including:

- Designated sites within the likely ZOI of the Proposed Project.
- Bird atlases.
- Bird sensitivity mapping tool.
- Online web-mappers from the National Biodiversity Data Centre.
- Irish Wetland Bird Survey (I-WeBS) data.
- Review of specially requested records from the National Parks and Wildlife Service Rare and Protected Species Database.
- The 2022 National Survey of breeding Hen Harrier in Ireland
- Carrownagowan Wind Farm EIAR[1]

[1] *Carrownagowan Wind Farm EIAR was discussed in the desk study as it is probable that breeding hen harrier activity observed in the surrounding area of the Proposed Wind Farm is associated with the breeding territories located in Carrownagowan, All relevant projects in a 25km radius of the Proposed Wind Farm were considered at the desk study stage and assessed in Section 7.9 of this chapter.*

7.2.2 Consultation

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 Chapter 2 of this EIAR. Table 7-1 below provides a list of the organisations consulted with regard to ornithology during the scoping process and notes where scoping responses were received. The table also notes where responses were not 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; Chapter 2 describes where the comments raised in the scoping responses received have been addressed.

Table 7-1 Consultation responses

	Consultee	Response
01	An Taisce	Automatic reply, 6th December 2022
02	BirdWatch Ireland	Consulted. No response to date
03	British Trust for Ornithology	No response to date
04	National Parks and Wildlife Service	Response received 19th January 2023, reference to breeding peregrine 3.8km from development boundary
05	Department of Agriculture, Food and the Marine	Consulted. No response to date
06	Department of Culture, Heritage, and the Gaeltacht	Consulted. No response to date
07	Irish Peatland Conservation Council	Consulted. No response to date
08	Irish Red Grouse Association	Consulted. No response to date
09	Irish Raptor Study Group	Consulted. No response to date
10	Forestry Service	Response received 5th December 2022, no relevance to birds
11	Irish Wildlife Trust	Response received 22nd December 2022; no data provided

7.2.3 Identification of Target Species and Key Ornithological Receptors

Following a comprehensive desk study, initial site visits and consultation, a list of "target species" likely to occur in the ZOI of the Proposed Project was compiled. Bird surveys conducted in the site of the Proposed Wind Farm were then specifically designed to survey for these target species, in accordance with SNH (2017). The target species list was drawn from:

- Species listed on 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 in Ireland (BoCCI).
- Raptors and species that are particularly sensitive to wind farm developments.

Following analysis of field survey data (described below), a precautionary screening approach was followed to identify KORs: the list of target species observed during surveys (see Appendix 7-1) was refined to KORs, excluding those for which pathways for a significant effect could not be identified.

7.2.4 Field Surveys

Field surveys were undertaken during the survey period September 2020 to May 2023, consisting of two breeding seasons (April – September) and three non-breeding seasons (October – March). The data provided in the field surveys is robust and allows clear, precise and definitive conclusions to be made on the avian receptors identified within the site of the Proposed Wind Farm.

The survey work that was undertaken between September 2020 and May 2023 forms the core dataset for the assessment of impacts on ornithology. In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with the guidance document 'Recommended bird survey methods to inform impact assessment of onshore wind farms' (SNH, 2017). The various ornithological surveys undertaken at the Proposed Wind Farm and hinterland are described in detail below. The proposed cable routes were surveyed as part of a multidisciplinary walkover (details in Chapter 6 of this EIAR).

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visit described in the previous sections (Section 7.2.1 to 7.2.3), the assemblage of bird species in the environs of the Proposed Wind Farm and the likely importance of the Proposed Wind Farm for these species was ascertained. Then, adopting a precautionary approach, a site-specific scope for ornithological surveys was devised.

7.2.4.1.1 *Vantage Point Surveys*

Vantage point surveys were undertaken in accordance with SNH (2017) to monitor flight activity within the Proposed Wind Farm site and to a 500m radius of the potential turbine locations. Surveys were conducted from five fixed point vantage points between October 2020 and September 2021 with comprehensive coverage of the Proposed Wind Farm site (Figure 7-1). In October 2021, the number of vantage points was reduced to three, as a result of updates to the boundary of the Proposed Wind Farm site (Figure 7-2). The vantage point locations were selected by undertaking a viewshed analysis (described below) and confirmed by a reconnaissance visit and initial field surveys to ensure that the proposed turbine layout was adequately surveyed.

Viewsheds were identified and calculated using visibility analysis over raster DEM (Version 1.8) in QGIS (Version 3.28) using a notional and precautionary layer suspended at 25m. While the relevance of being able to view as much of the site to ground level is acknowledged, the SNH guidance emphasises the importance of having visibility of the 'collision risk volume' when the data is to be used to estimate the risk of birds colliding with operating turbines. Therefore, the viewshed analysis aims to identify the most suitable locations to site vantage points such that the airspace of the turbine rotor swept area is in view using the fewest possible number of vantage points. The vantage point locations were tested for visibility coverage by creating a viewshed point 1.75m in height (to represent the height of observer) on a map using 10m contours terrain data. The relative height of any surrounding trees and its effects on visibility is also accounted for in the analysis. Using the ZTV software, a viewshed of 360° was produced calculating an area 25m from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180° to give the viewshed. The visible viewshed from September 2020 to September 2021 is presented in Figure 7-1a and 7-2a. Viewsheds from updated vantage point locations is presented in Figure 7-2a. The updated vantage point locations provide adequate coverage of the Proposed Wind Farm site.

Survey methodology followed SNH (2017). The surveyor collected data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e. 6 hours total) per month. Surveys were conducted from October 2020 to March 2023 inclusive, and were scheduled to provide a minimum of 36 hours per winter or breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity (Table 7-2).

Table 7-2 Vantage point survey watch duration.

Survey Season and Number of Vantage Points (VPs)	Effort per Vantage Point (VP)
Winter Season 2020/2021 (5 VPs)	36[2] hours per VP
Breeding Season 2021 (5 VPs)	36[3] hours per VP
Winter Season 2021/2022 (3 VPs)	36 hours per VP
Breeding Season 2022 (3 VPs)	36 hours per VP
Winter Season 2022/2023 (3 VPs)	36 hours per VP

Flight activity of target species was mapped and recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the site. Bands were split into 0-15m, 15-25m, 25-200m and >200m. All flight activity within a height band 25-200m is considered to be within the potential collision height (PCH) with regard to the turbine swept area (lowest swept height 25m, maximum tip height 180m). In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat. The survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions.

7.2.4.1.2 Winter Walkover Surveys

Winter walkover surveys were undertaken to record the presence of bird species within the Proposed Wind Farm site to a 500m radius, including areas between vantage point locations. The methodology was adapted from the breeding walkover methodology outlined in Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021). Transect routes were walked across different habitat complexes within the survey area where access allowed. All target species were recorded and mapped. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Winter walkover surveys were conducted in daylight hours over four visits between October and March (i.e., four visits in winter 2021/2022 and four visits in winter 2022/2023). Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-3 shows the transect routes.

7.2.4.1.3 Breeding Walkover Surveys

Breeding walkover surveys were undertaken to determine probable and confirmed breeding bird activity within the Proposed Wind Farm site and to a 500m radius. The methodology was based on Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitat. Transect routes were walked across different habitat complexes within the survey area where access allowed. Using binoculars, the surveyor regularly scanned the surroundings of each transect for target species. All target species were mapped, and breeding status was assigned following British Trust for Ornithology (BTO) breeding status codes[4] . In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Breeding walkover surveys were conducted in daylight over four visits during the core breeding season months April to July. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-4 shows the transect routes.

7.2.4.1.4 Waterbird Distribution and Abundance Surveys

[2] *Only 24 survey hours were completed for VP5, however the minimum requirement of two years' of bird surveys (SNH, 2017) was exceeded and VP5 was removed from survey scope in October 2021.*
[3] *Only 30 survey hours were completed for VP1, however the minimum requirement of two years' of bird surveys (SNH, 2017) was exceeded and VP1 was removed from survey scope in October 2021.*
[4] https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence

Waterbirds include: swans, geese and ducks; cormorant, shag, divers and grebes; auks and seabirds; gulls, terns and skuas; herons, egrets and crane; rails and crakes; waders; and kingfisher. Significant wetlands and waterbodies within 5km of the Proposed Wind Farm site were surveyed for waterbirds during the 2020/2021, 2021/2022 and 2022/2023 winter and passage seasons (August to May inclusive) to provide information on their distribution in relation to the Proposed Wind Farm site. The area surveyed exceeds the 500m for foraging waterbirds and 1km for roosting waterbirds requirements of SNH (2017).

Survey methodology follows Gilbert *et al.* (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021). Surveys were undertaken during daylight hours from suitable vantage points at wetlands and waterbodies. All target waterbird species were recorded and mapped. Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2. Figure 7-5 shows the surveyed area.

7.2.4.1.5 Hen Harrier Roost Surveys

Hen harrier roost surveys were undertaken within the Proposed Wind Farm site and to a 2km radius. These surveys aimed to identify active winter hen harrier roosts near or within the Proposed Wind Farm site. Survey methodology followed Gilbert *et al.* (1998) and O'Donoghue (2019). Roost watches of 2-3 hours were conducted at six hen harrier vantage point locations from dusk until last visible light during which all hen harrier observations were recorded and mapped.

Each hen harrier vantage point was surveyed once per month during the winter season between October and March inclusive (in winter 2020/2021, 2021/2022 and 2022/2023). Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-6 shows the hen harrier vantage point locations.

7.2.4.1.6 Breeding Raptor Surveys

Raptors include all harrier, falcon, buzzard, eagle, hawk, owl, kite and osprey species. Breeding raptor surveys were undertaken within the Proposed Wind Farm site and to a 5km radius to identify occupied territories and monitor their breeding success near or within the Proposed Wind Farm. Survey methodology followed Hardey *et al.* (2013). Breeding raptor watches of three hours (supplemented by transects if necessary) were conducted during daylight at eight locations. All raptor species observed were recorded and mapped and breeding status was assigned following BTO breeding status codes. Surveyors did not approach nest sites to avoid disturbance.

Each breeding raptor location was surveyed once per month during the core breeding season between April and July. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-7 shows the breeding raptor locations.

7.2.4.1.7 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken within the Proposed Wind Farm site and to a 500m radius. The aim of the survey was to identify breeding woodcock territories within the Proposed Wind Farm site by locating roding (breeding display) males. Survey methodology followed Gilbert *et al.* (1998): the surveyor walked transects within the survey area for two hours from dusk until last visible light during which all woodcock observations were mapped, with particular reference to roding observations.

Each transect was surveyed on three occasions during the core breeding season for this species of May and June. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-8 shows the transect routes.

7.2.4.1.8 Breeding Red Grouse Surveys

Breeding red grouse surveys were undertaken within the Proposed Wind Farm site and to a 500m radius. The aim of the survey was to identify breeding red grouse territories within the Proposed Wind Farm site by using an auditory lure of a recording of a 'rival' red grouse male to elicit a response from the territory holder within the survey area. Survey methodology followed Cummins *et al.* (2010): the surveyor walked transects 150m apart through suitable bog and heath habitat, where access allowed, stopping every 100m to broadcast lure calls for 30 seconds and listening for responses. Call-backs and flying by the territory holder in response to the lure were recorded and mapped. The surveys were conducted in February 2021, February 2022 and February 2023 and all surveys were conducted under National Parks and Wildlife Service licence[5]. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-9 shows the transect routes.

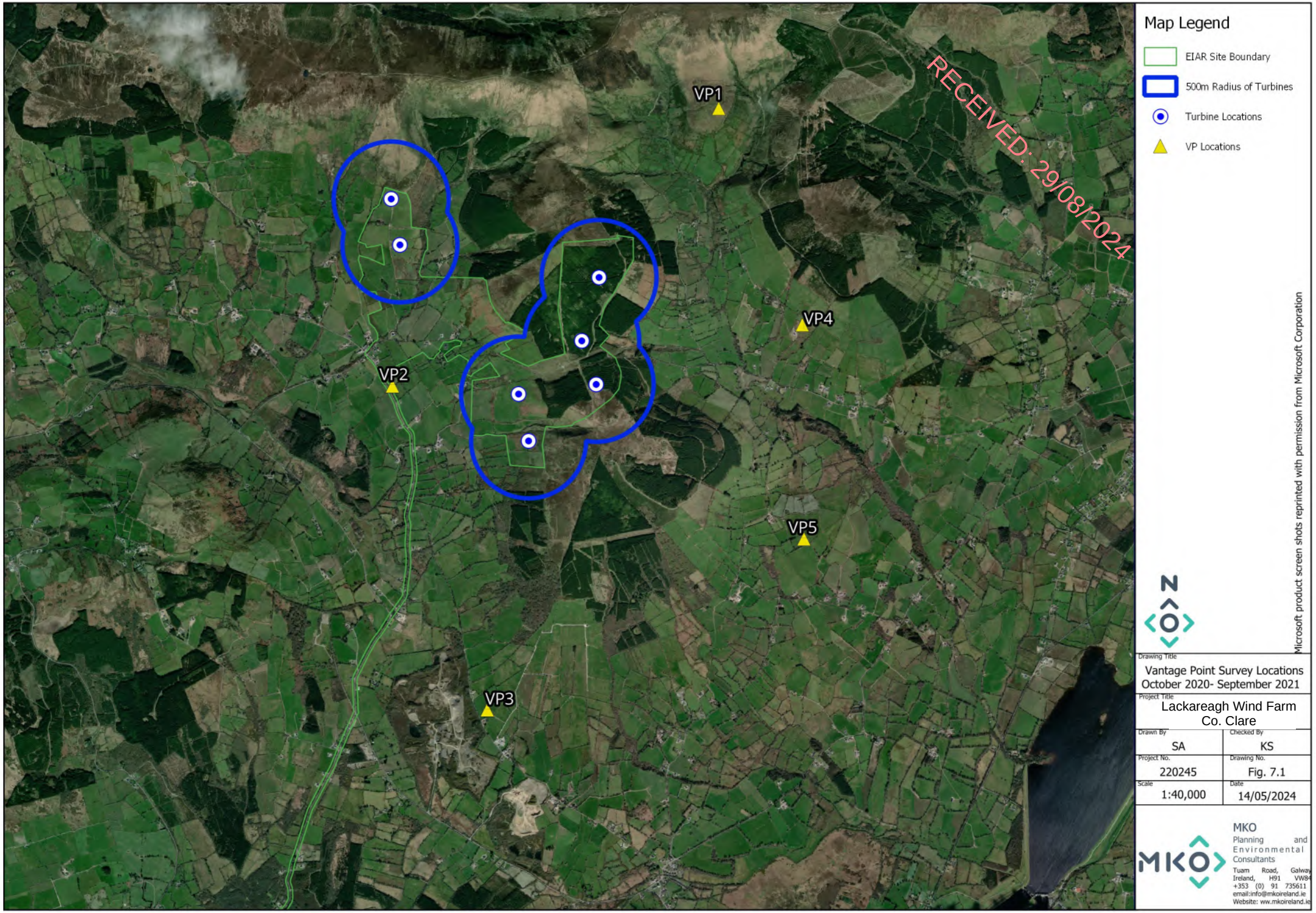
7.2.4.1.9 *Breeding Barn Owl Survey*

Breeding barn owl surveys were undertaken within the Proposed Wind Farm site and to a 2km radius. The aim of the survey was to identify breeding barn owl territories near or within the Proposed Wind Farm site by locating nest sites. Survey methodology followed Transport Infrastructure Ireland (TII) (2021) with surveys conducted at a sufficient distance to not cause disturbance to nests (20m – 50m from the site) and surveys in 2022 were conducted under licence[6] to allow for a search of barn owl pellets, feathers or whitewash. 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 on four occasions during the core breeding season April to July. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-10 shows the surveyed area.

7.2.4.1.10 *Multidisciplinary Walkover Survey*

The Proposed Grid Connection Route was surveyed in September 2022, September 2023 and February 2024 through a multidisciplinary walkover survey. The site was systematically walked, while the surveyor recorded a range of protected species, including birds. Further details on this survey are available in the Biodiversity Chapter (Chapter 6 of this EIAR).

[5] *Licence numbers 072/2020, 40/2021 and 18/2023.*
[6] *Licence number 73/2022*


VP1
VP2
VP3
VP4
VP5
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Map Legend
EIAR Site Boundary
500m Radius of Turbines
Turbine Locations
VP Locations
Microsoft product screen shots reprinted with permission from Microsoft Corporation
N
Drawing Title
Vantage Point Survey Locations
October 2020- September 2021
Project Title
Lackareagh Wind Farm
Co. Clare
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Project No.
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Fig. 7.1
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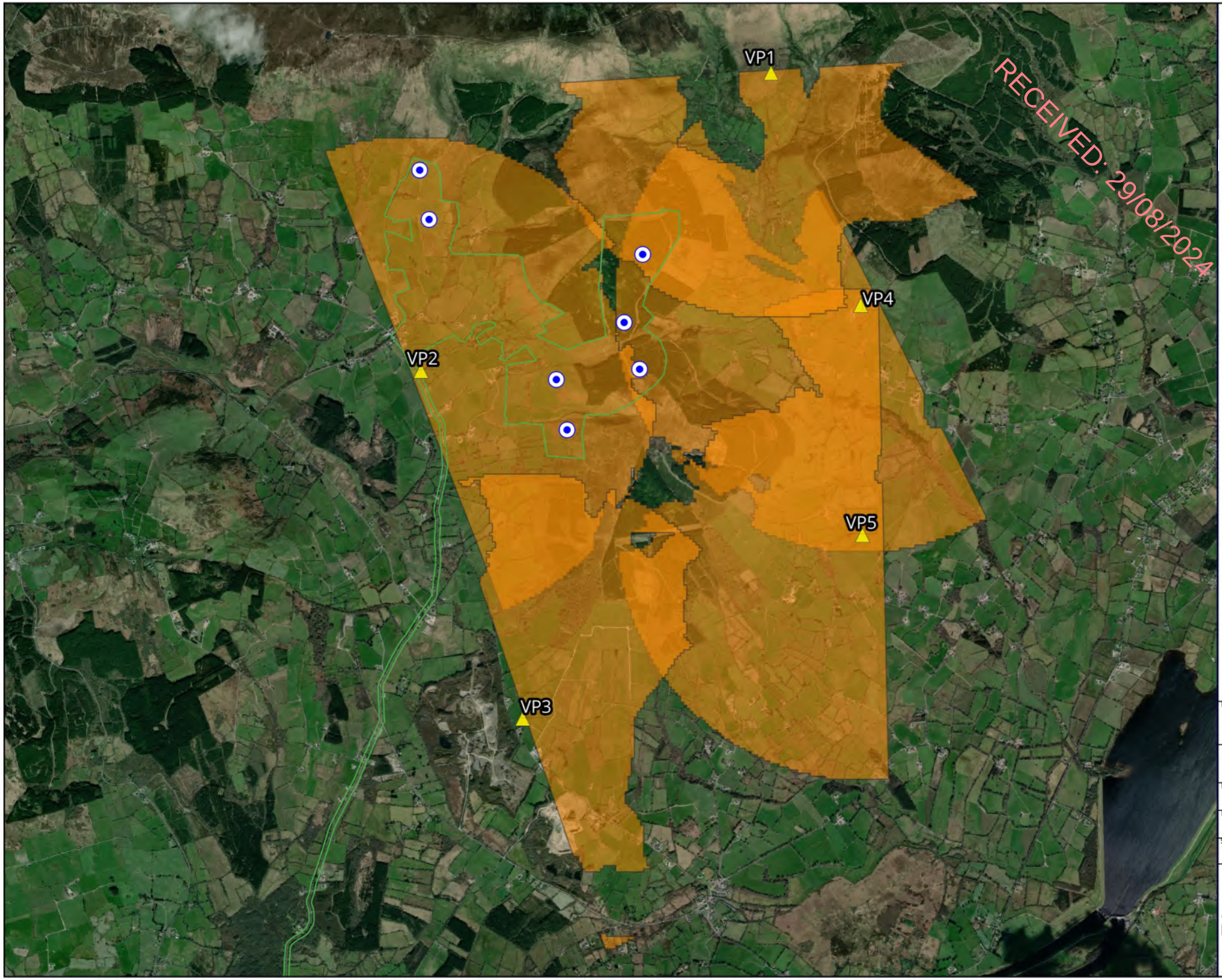

Map Legend

- EIAR Site Boundary
- Turbine Locations
- VP Locations
- viewshed coverage area

N

Drawing Title
Viewsheds
October 2020- September 2021

Project Title
Lackareagh Wind Farm
Co. Clare

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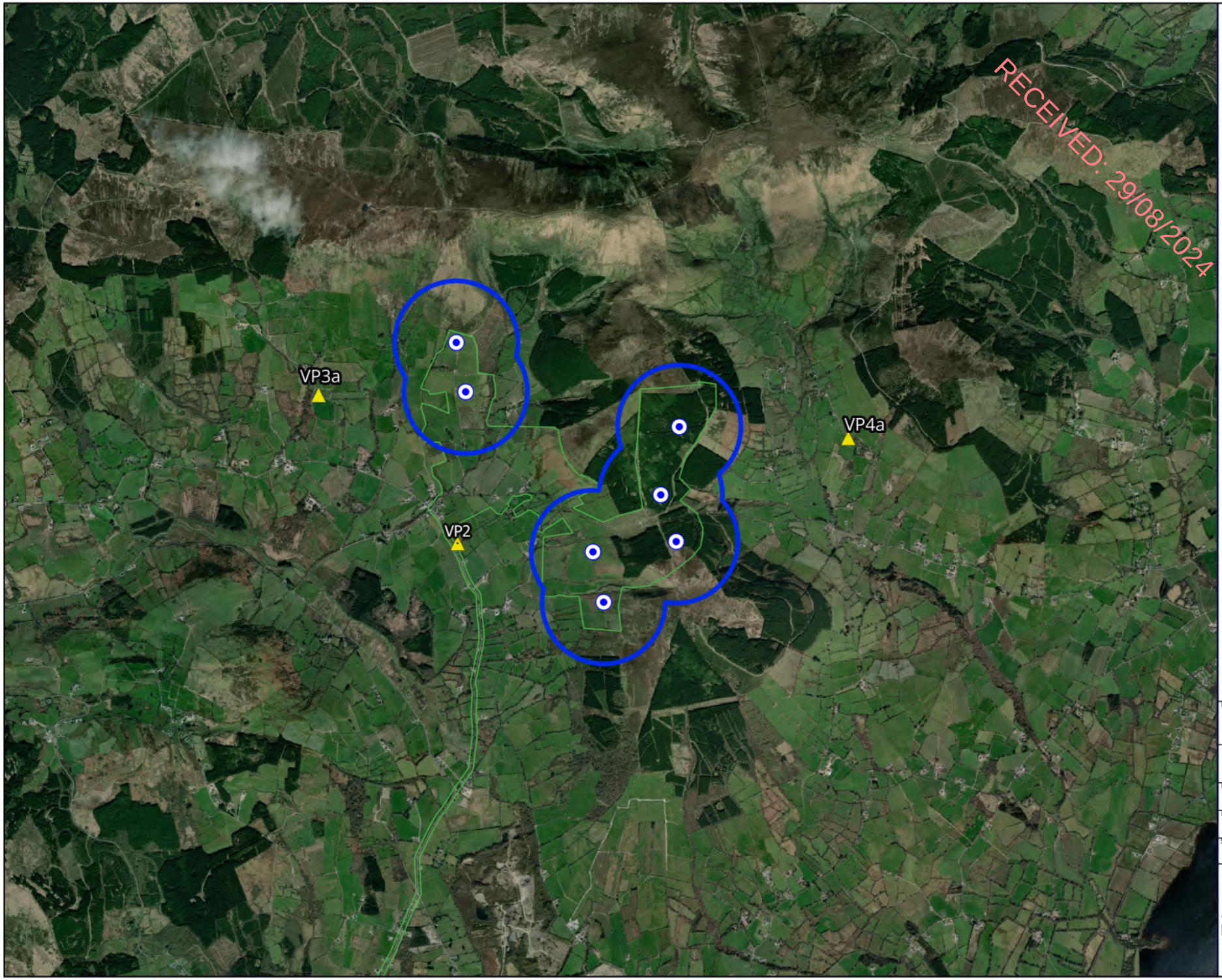

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Map Legend

- EIAR Site Boundary
- 500m Radius of Turbines
- Turbine Locations
- VP Locations

N

Drawing Title
Vantage Point Survey Locations
October 2021- May 2023

Project Title
Lackareagh Wind Farm
Co. Clare

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Project No.	Drawing No.
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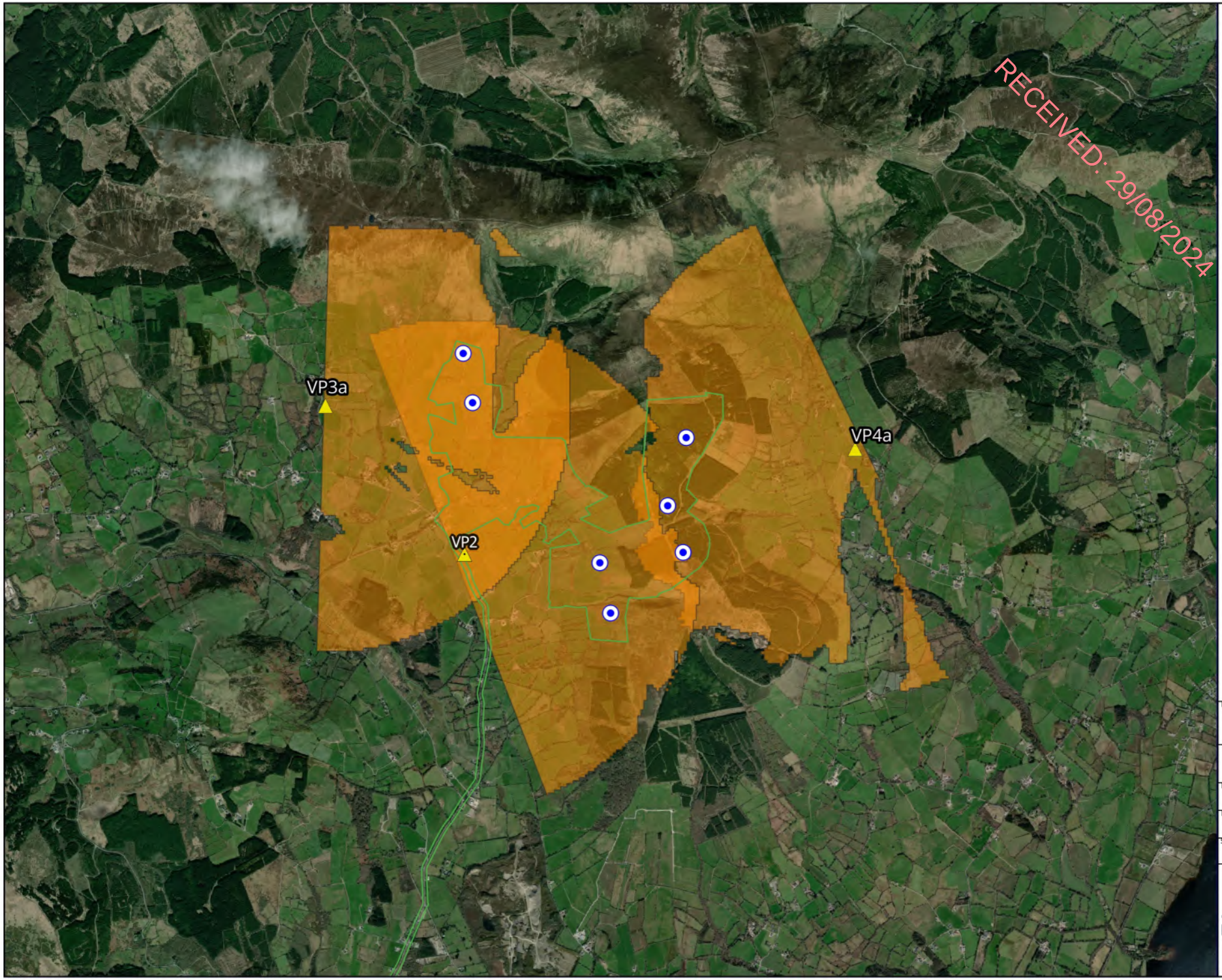

Map Legend

- EIAR Site Boundary
- Turbine Locations
- VP Locations
- viewshed coverage area

N

Drawing Title
Viewsheds
October 2021- May 2023

Project Title
Lackareagh Wind Farm
Co. Clare

Drawn By	Checked By
SA	KS
Project No.	Drawing No.
220245	Fig. 7.2a
Scale	Date
1:40,000	14/05/2024

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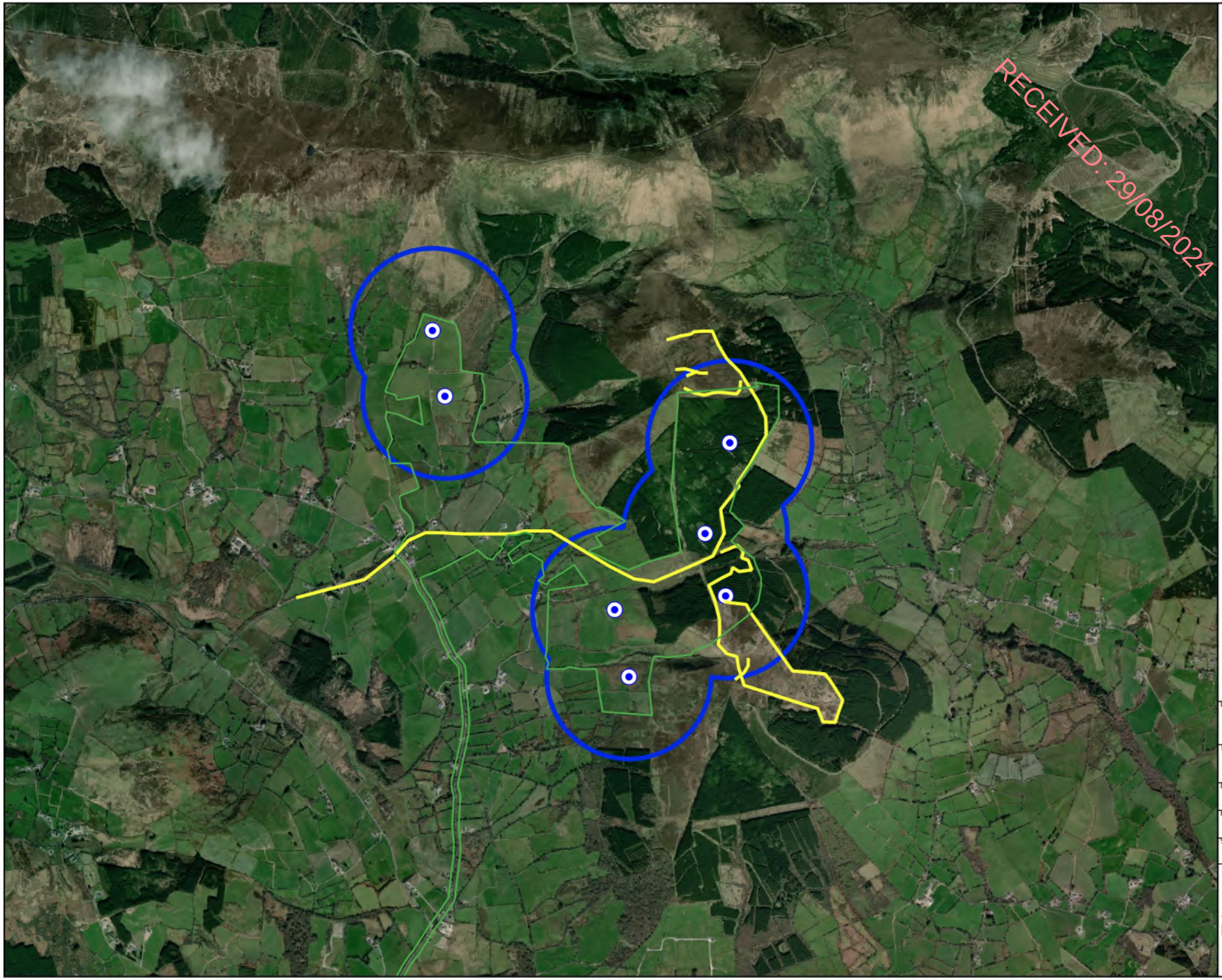
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Map Legend
EIAR Site Boundary
500m Buffer of Turbines
Turbine Locations
Transects
Microsoft product screen shots reprinted with permission from Microsoft Corporation
N
Drawing Title
Winter Walkover Transects
Project Title
Lackareagh Wind Farm
Co. Clare
Drawn By
SA
Checked By
KS
Project No.
220245
Drawing No.
Fig. 7.3
Scale
1:30,000
Date
14/05/2024
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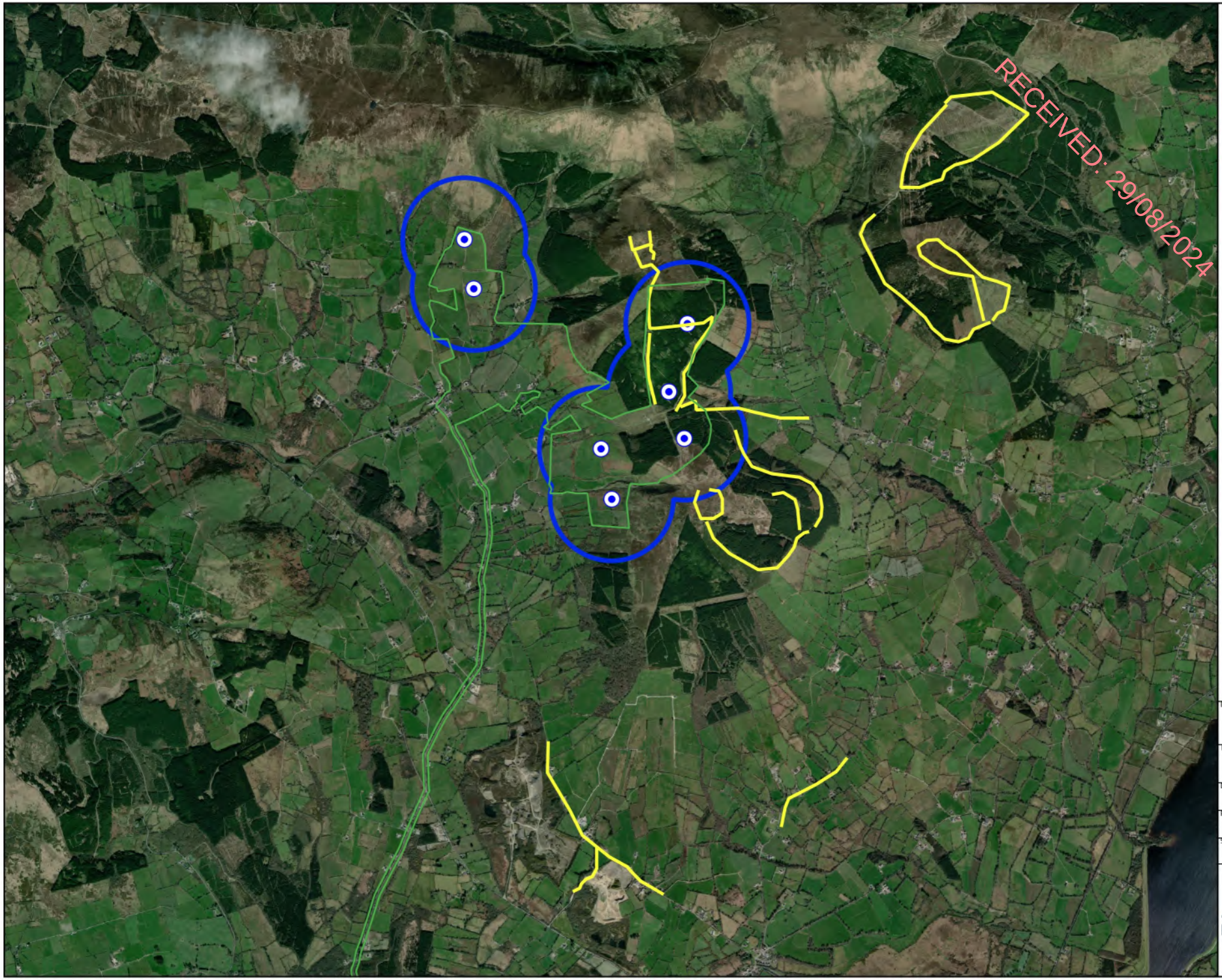

Drawing Title

Breeding Walkover Transects

Project Title

Lackareagh Wind Farm
Co. Clare

Drawn By	Checked By
SA	KS
Project No.	Drawing No.
220245	Fig. 7.4
Scale	Date
1:40,000	14/05/2024

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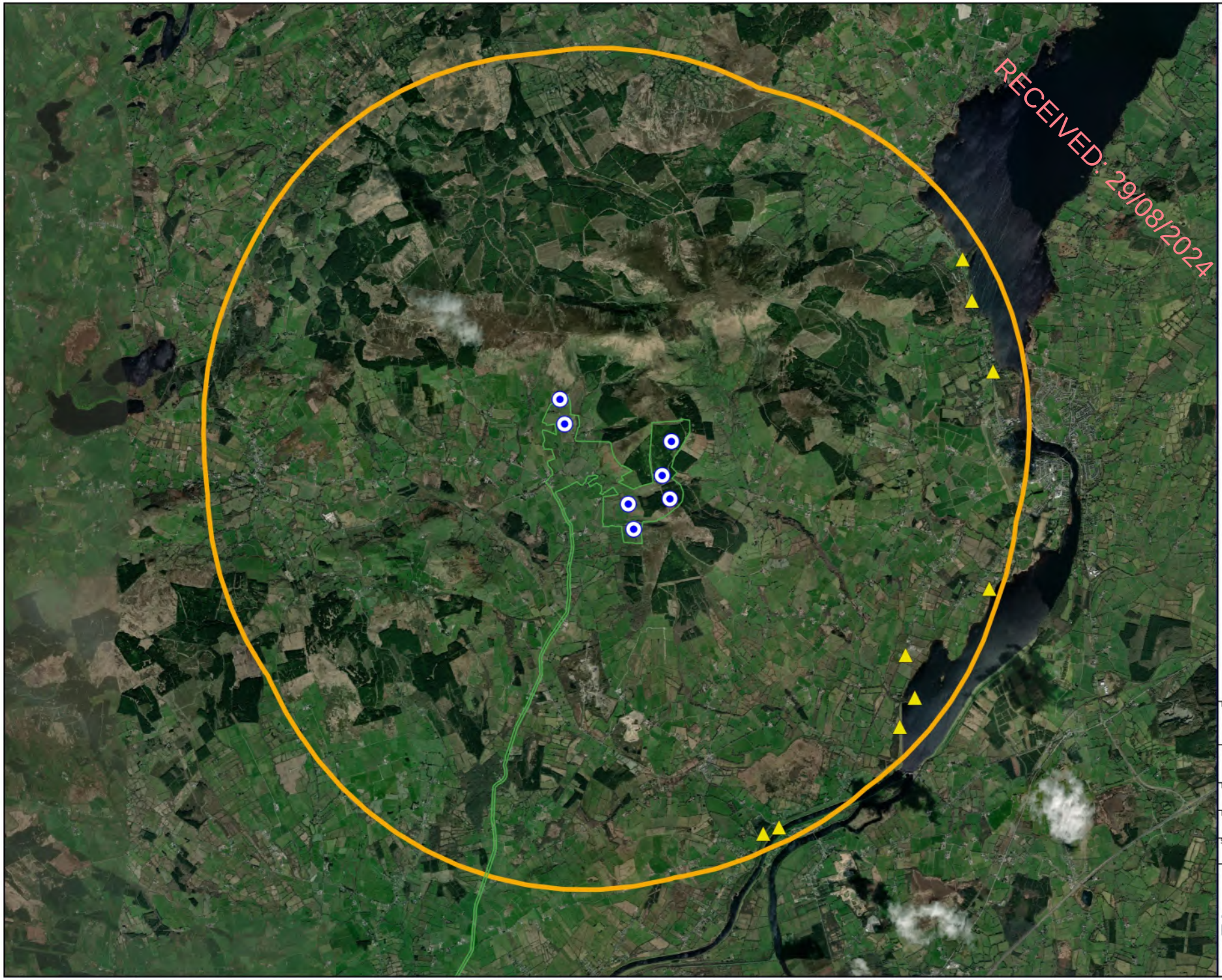
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Map Legend
EIAR Site Boundary
Survey Area
Turbine Locations
Survey Locations
Microsoft product screen shots reprinted with permission from Microsoft Corporation
N
Drawing Title
Waterbird Distribution and Abundance Survey Locations
Project Title
Lackareagh Wind Farm
Co. Clare
Drawn By
SA
Checked By
KS
Project No.
220245
Drawing No.
Fig. 7.5
Scale
1:80,000
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HHVP6
HHVP3
HHVP4
HHVP1
HHVP5
HHVP2
Map Legend
EIAR Site Boundary
2km Survey Radius
Turbine Locations
Hen Harrier VP Locations
Microsoft product screen shots reprinted with permission from Microsoft Corporation
N
Drawing Title
Hen Harrier Roost Survey Locations
Project Title
Lackareagh Wind Farm Co. Clare
Drawn By
SA
Checked By
KS
Project No.
220245
Drawing No.
Fig. 7.6
Scale
1:50,000
Date
14/05/2024
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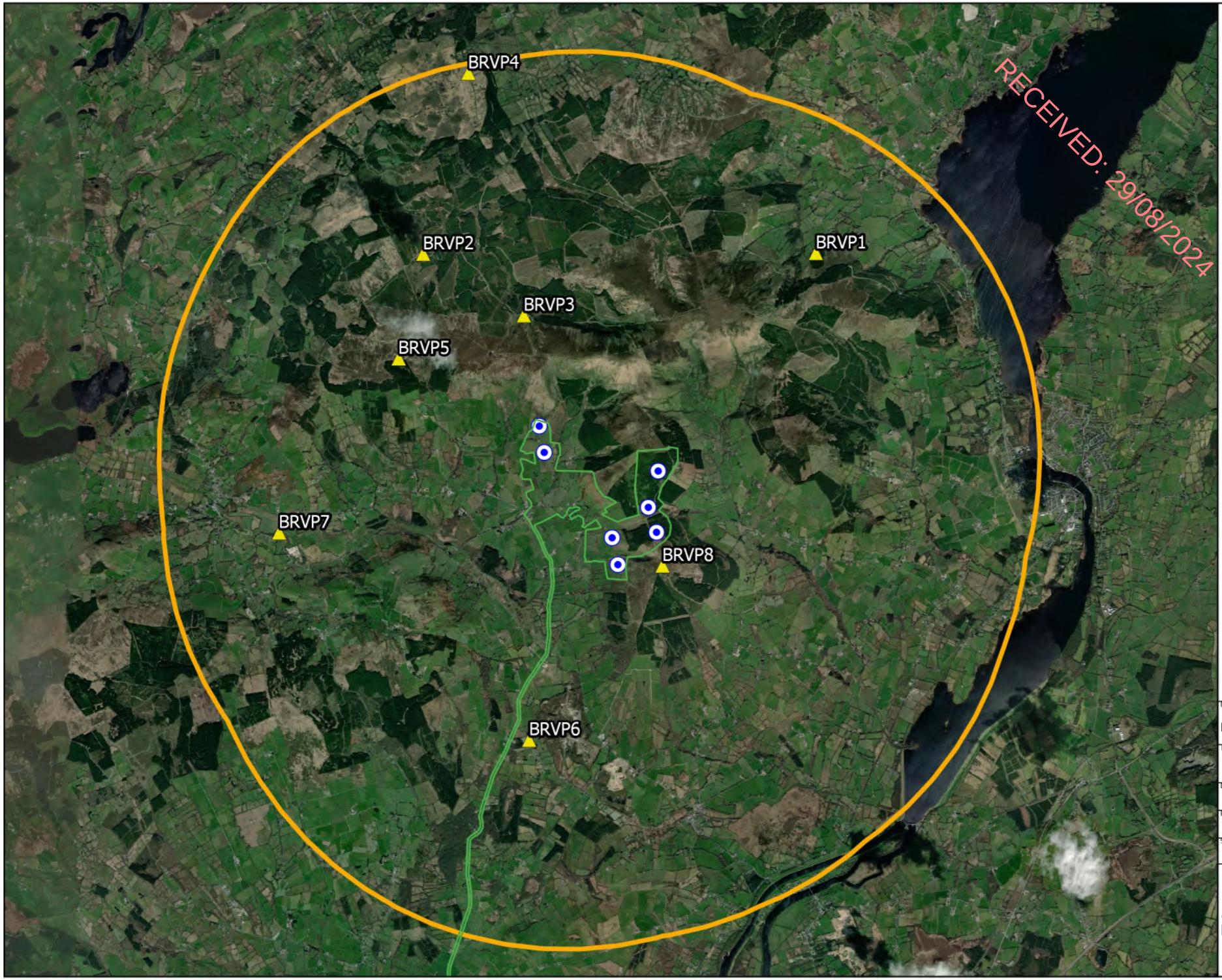
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BRVP8
BRVP6
RECEIVED: 29/08/2024
Map Legend
EIAR Site Boundary
5km Survey Radius
Turbine Locations
Breeding Raptor VP Locations
N
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Drawing Title
Breeding Raptor Survey Locations
Project Title
Lackareagh Wind Farm
Co. Clare
Drawn By
SA
Checked By
KS
Project No.
220245
Drawing No.
Fig. 7.7
Scale
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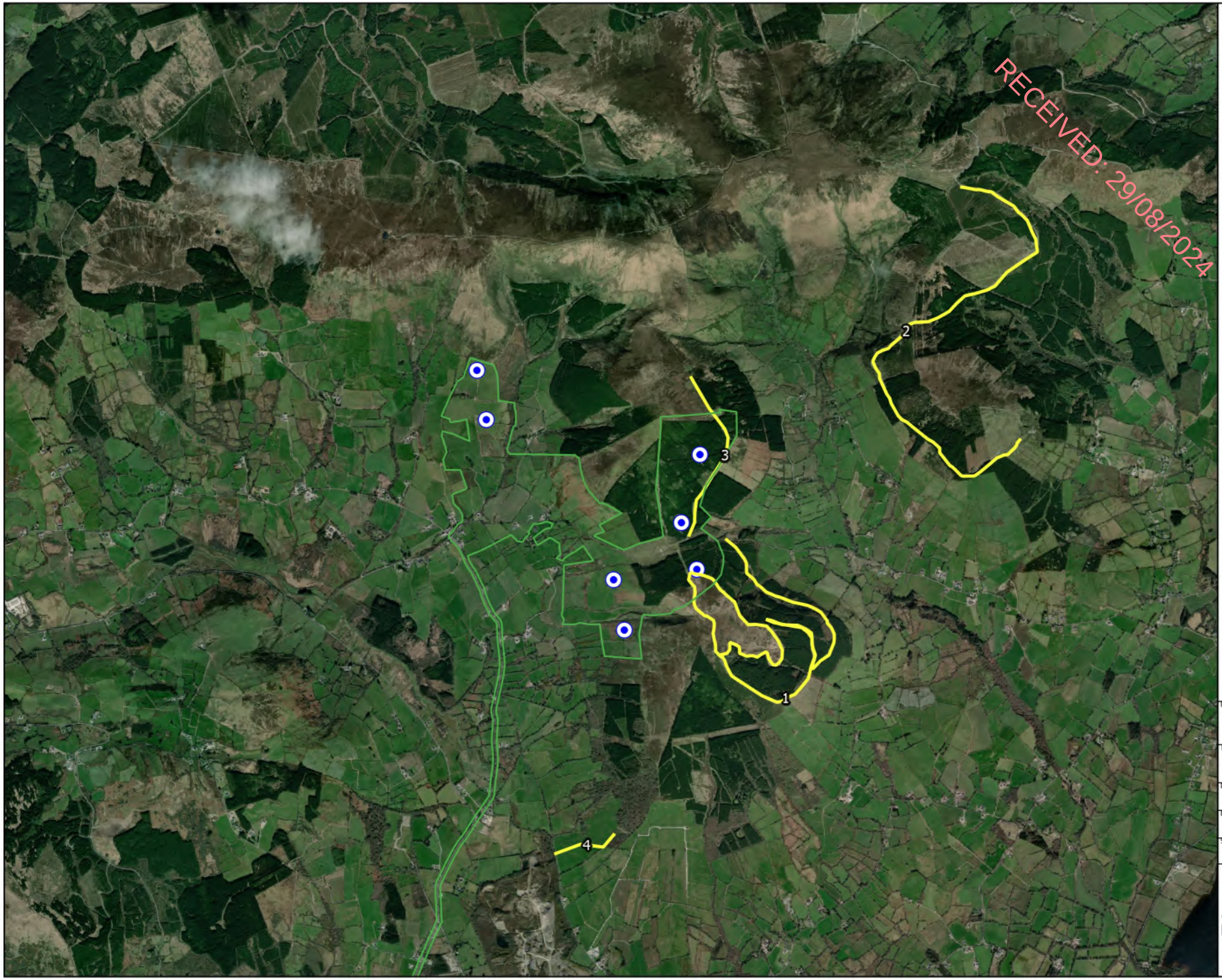

Map Legend

- EIAR Site Boundary
- Turbine Locations
- Transects

N

Drawing Title	Breeding Woodcock Survey Transects
Project Title	Lackareagh Wind Farm Co. Clare
Drawn By: SA	Checked By: KS
Project No.: 220245	Drawing No.: Fig. 7.8
Scale: 1:40,000	Date: 14/05/2024

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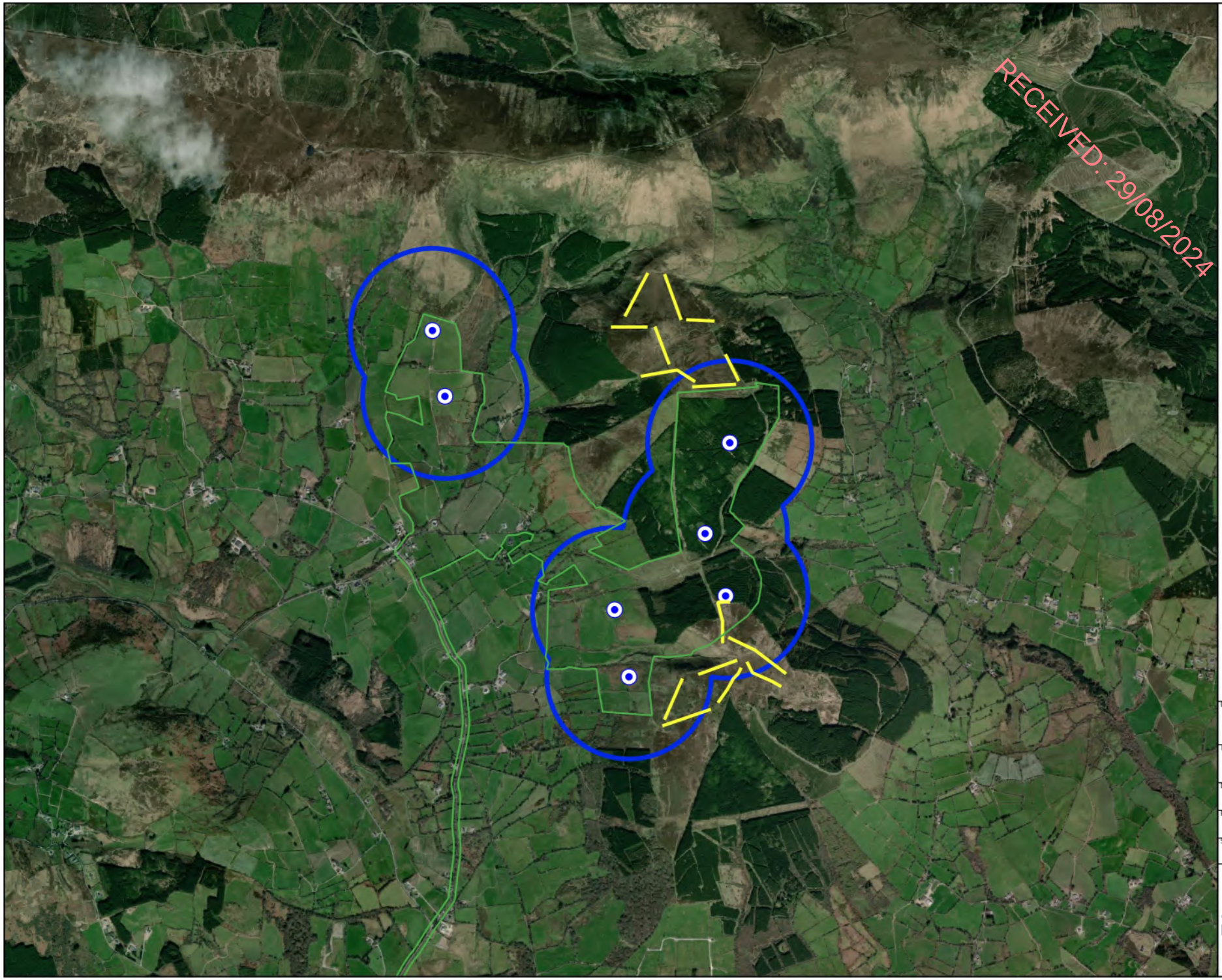
RECEIVED: 29/08/2024
Map Legend
EIAR Site Boundary
500m Buffer of Turbines
Turbine Locations
Transects
Microsoft product screen shots reprinted with permission from Microsoft Corporation
N
Drawing Title
Breeding Red Grouse Transects
Project Title
Lackareagh Wind Farm
Co. Clare
Drawn By
SA
Checked By
KS
Project No.
220245
Drawing No.
Fig. 7.9
Scale
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Map Legend

- EIAR Site Boundary
- 2km Survey Radius
- Turbine Locations
- Barn Owl VP Location

N

Drawing Title: Breeding Barn Owl Survey Locations

Project Title: Lackareagh Wind Farm Co. Clare

Drawn By	Checked By
SA	KS
Project No.	Drawing No.
220245	Fig. 7.10
Scale	Date
1:50,000	14/05/2024

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7.2.5 Receptor Evaluation and Impact Assessment

7.2.5.1 Potential Impacts Associated with Proposed Project

Wind farms present three potential risks to birds (Drewitt and Langston 2006, 2008; *Band et al.*, 2007):

- Direct habitat loss due to wind farm infrastructure.
- Disturbance/displacement (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to construction works or turbine 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 Proposed Wind Farm site has been used to predict potential impacts of the Proposed Project on birds. These impacts are also assessed cumulatively with other projects. The geographical framework and description of impacts are described below.

7.2.5.2 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2019) recommends categories of ornithological value that relate to a geographical framework (e.g. international through to local). This EIAR utilises the geographical framework described in 'Guidelines for Assessment of Ecological Impact of National Road Schemes' (NRA, 2009). The following geographic frame of reference should be used when determining the value of a bird population:

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

Locally Important (Lower Value) receptors are habitats and species that are widespread and of low ecological significance and important only in the local area. In contrast, Internationally Important sites are designated for conservation as part of the Natura 2000 Network (Special Area of Conservation or Special Protection Area) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

7.2.5.3 Description of Impacts

The sensitivity, magnitude and significance of impacts on bird populations resulting from the Proposed Project was quantified according to two assessment criteria: Percival (2003) and the Environmental Protection Agency (EPA, 2022). The two assessment criteria have been used to independently characterise impacts to inform a robust assessment of potential impacts. EPA impact assessment criteria has been used for consistency between the Biodiversity and Ornithology chapters of this EIAR, while Percival (2003) has also been followed given its specific focus on birds.

Percival (2003) criteria

The Percival (2003) methodology quantifies the sensitivity of a given species to the development type, the magnitude of the effect and the significance of the potential impact. Table 7-3 , Table 7-4 and

Table 7-5 outline the assessment criteria for each stage.

Table 7-3 Evaluation of sensitivity for birds (from Percival, 2003)

Sensitivity	Determining Factor
Very High	Species that form the cited interest of SPAs 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.
High	Species that contribute to the integrity of a 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% of the Irish population)
Medium	Species listed on Annex 1 of the EU Birds Directive. Species present in regionally important numbers (>1% county population). Other species on BirdWatch Ireland's Red List of Birds of Conservation Concern
Low	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 (from 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 (from 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

EPA (2022) Criteria

EPA criteria use the following terms to describe the quality of the effect:

- **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).

The significance of the effect is quantified as:

- **Imperceptible** - 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** - an effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- **Moderate** - an effect that alters the character of the environment that is consistent with existing and emerging baseline trends.
- **Significant** - an effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
- **Very Significant**– an effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
- **Profound** - an effect which obliterates sensitive characteristics.

The duration of effects can be:

- **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 (e.g., through remediation or restoration).

The frequency of effects (i.e., how often the effect will occur) can be:

- **Once, rarely, occasionally, frequently** or **constantly**

- **Hourly, daily, weekly, monthly** or **annually**

The probability of the effect may be:

- **Likely** – the effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
- **Unlikely** – the effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

The effects may also be described in relation to their extent and context. Extent describes the population affected by an effect, while context relates the effect to the established baseline conditions.

7.2.5.4 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the number 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 the Band Model (Band *et al.,* 2007), as recommended by NatureScot guidance. The Band Model first determines the number of birds transits through the air space swept by the rotor blades of the wind turbines. Then it calculates the collision risk for the birds. The product of the transits multiplied by the collision risk provides a collision rate. An avoidance factor is applied to this to account for birds actively avoiding turbines, providing a final "real world" annual collision rate for each species. See Appendix 7-6 for full details on the collision risk modelling method.

7.2.6 Assessment Justification

7.2.6.1 Survey Data

A comprehensive suite of bird surveys was undertaken at the Proposed Project site between September 2020 and May 2023. Results derived from a continuous 33 months of surveying at the Proposed Wind Farm and hinterland, undertaken in line with NatureScot guidance, are analysed to inform this assessment. As such, the surveys undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Project on avian receptors.

7.2.6.2 Mitigation

The Proposed Project has been designed to specifically avoid, reduce and minimise impacts on all avian receptors. Where potential impacts on KORs are predicted, mitigation has been prescribed to avoid, reduce and remove such impacts. 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. As such, the potential impacts of the Proposed Project have been considered and assessed to ensure that all impacts on KORs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures and best practices (refer to Section 7.6 for further details).

7.2.6.3 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline environment and provides an informed prediction of the likely impacts of the Proposed Project. It also prescribes mitigation as necessary and describes the predicted residual effects. Furthermore, the desk study, surveys, analysis and reporting have been undertaken in accordance with the appropriate guidelines. No significant limitations in the scope, scale or context of the assessment have been identified.

7.3 Baseline Ornithological Conditions

7.3.1 Designated Sites within the Likely ZOI 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 Project 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 documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment*". Therefore, this section provides a summary of the key findings regarding SPAs and nationally designated sites. For a detailed assessment of any potential impacts on SPAs, refer to the Appropriate Assessment and NIS associated with Chapter 6 of this EIAR.

Sites designated for nature conservation within the potential ZOI of the Proposed Project 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 this case, no potential for direct or indirect impacts for species listed as SCIs of SPAs more than 15km from the Proposed Project was identified.

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 Project 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 below.

Three SPAs were located within 15km of the Proposed Project. The SPAs are listed and summarised in Table 7-6. Apart than sites which are encompassed by these SPAs, no other nationally designated sites of ornithological significance occur within the potential ZOI.

Table 7-6 Designated sites in the Zone of Influence

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
River Shannon and River Fergus Estuaries SPA	4.9km from the Proposed Project at its nearest point – i.e., the Proposed Grid Connection Route terminus as the existing Ardnacrusha 110kV Substation.	Cormorant (*Phalacrocorax carbo)* [A017] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Scaup (*Aythya marila*) [A062] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing *(Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160]	This site has the conservation objective: "To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA" This site also has a second conservation objective: "To maintain the favourable conservation condition of the wetland habitat in the River Shannon and River Fergus Estuaries SPA as a resource for the regularly occurring migratory waterbirds that utilise it." (NPWS, Version 1.0, 2022)	**This SPA is within the Likely Zone of Impact and further assessment will be provided in the NIS.**

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
		Redshank (*Tringa totanus*) [A162] Greenshank (*Tringa nebularia*) [A164] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999]		
Lough Derg (Shannon) SPA	5.4km from the Proposed Project at its closest point – i.e., T03.	› Cormorant (*Phalacrocorax carbo*) [A017] › Tufted Duck (*Aythya fuligula*) [A061] › Goldeneye (*Bucephala clangula*) [A067] › Common Tern (*Sterna hirundo*) [A193] › Wetland and Waterbirds [A999]	This site has the conservation objective: "To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA" This site also has a second conservation objective: "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Derg SPA as a resource for the regularly occurring migratory waterbirds that utilise it." (NPWS, Version 1.0, 2012)	**This SPA is within the Likely Zone of Impact and further assessment will be provided in the NIS.**

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
Slieve Aughty Mountains SPA	11.9km from the Proposed Project at its closest point – i.e., T01.	› Hen Harrier (*Circus cyaneus*) [A082] › Merlin (*Falco columbarius*) [A098]	This site has the conservation objective: "To restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA" (NPWS. Version 1.0. 2022).	**This SPA is not within the Likely Zone of Impact and no further assessment is required.**
Slievefelim to Silvermines Mountains SPA	13.7km from the Proposed Project at its closest point – i.e., T05.	› Hen Harrier (*Circus cyaneus*) [A082]	This site has the conservation objective: "To restore the favourable conservation condition of hen harrier in Slievefelim to Silvermines Mountains SPA" (NPWS. Version 1.0. 2022).	**This SPA is not within the Likely Zone of Impact and no further assessment is required.**

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:

- The atlas of breeding birds in Britain and Ireland (Sharrock, 1976)
- The atlas of wintering birds in Britain and Ireland (Lack, 1986)
- The new atlas of breeding birds in Britain and Ireland: 1988-1991. (Gibbons et al., 1993)

The Proposed Wind Farm site lies within hectad R67, while the Proposed Grid Connection Route also extends into hectads R56 and R66. Table 7-7 and Table 7-8 present a list of species of conservation interest recorded from the relevant hecatds, with regard to breeding and wintering respectively.

Table 7-7 Breeding Bird Atlas data.

Species Name	Breeding Atlas 1968-1972			Breeding Atlas 1988-1991			Breeding Atlas 2007-2011		
	R56	R66	R67	R56	R66	R67	R56	R66	R67
Barn Owl	Conf	Conf	Prob	-	Bred	-	Poss	-	-
Black-headed Gull	Poss	Conf	Conf	Seen	Seen	Seen	-	-	-
Buzzard	-	-	-	-	-	-	-	-	Poss
Common Gull	-	-	-	-	-	Seen	-	-	-
Common Sandpiper	Prob	Conf	Conf	-	Seen	-	-	-	-
Common Tern	-	-	Conf	-	-	-	-	-	Conf
Coot	Conf	Conf	Conf	Seen	Bred	Bred	-	-	Conf
Cormorant	-	-	-	Seen	Seen	Seen	-	-	-
Corncrake	Prob	Prob	Prob	-	Seen	-	-	-	-
Curlew	Poss	-	Prob	Seen	Seen	-	Poss	Poss	-
Dipper	Conf	Conf	-	-	-	-	Prob	-	Poss
Great Crested Grebe	-	Conf	Conf	-	-	Seen	-	Poss	Conf
Grey Heron	Conf	Conf	Conf	Bred	Seen	-	-	Conf	Prob
Grey Wagtail	Conf	Conf	Conf	Bred	Bred	Bred	Prob	Prob	Conf
Greylag Goose	-	-	-	-	-	-	Prob	Poss	Prob
Hen Harrier	Poss	Poss	Poss	-	-	-	Conf	-	Prob
Herring Gull	-	-	-	Seen	-	-	-	-	-
Kestrel	Conf	Conf	Conf	Bred	Seen	Bred	Poss	Prob	Prob
Kingfisher	Conf	Conf	Conf	-	-	-	Prob	Prob	Prob
Lapwing	Conf	Conf	Prob	-	Seen	Bred	-	-	-
Little Grebe	Conf	Conf	Conf	-	-	Bred	-	-	Conf

Species Name	Breeding Atlas 1968-1972			Breeding Atlas 1988-1991			Breeding Atlas 2007-2011		
	R56	R66	R67	R56	R66	R67	R56	R66	R67
Long-eared Owl	Poss	Prob	Conf	-	-	-	-	-	-
Mallard	Conf	Conf	Conf	Bred	Bred	Bred	Conf	Conf	Conf
Meadow Pipit	Conf	Conf	Conf	Bred	Bred	Bred	Conf	Conf	Conf
Merlin	Conf	Poss	-	-	-	-	-	-	-
Moorhen	Conf	Conf	Conf	Seen	Bred	Bred	Prob	Prob	Conf
Mute Swan	Conf	Conf	Conf	Bred	Bred	Seen	-	Conf	Conf
Nightjar	Poss	-	-	-	-	-	-	-	-
Peregrine Falcon	-	-	-	-	-	-	Poss	-	Poss
Red Grouse	Conf	Conf	Conf	Seen	-	-	-	-	Prob
Red-breasted Merganser	-	Conf	Conf	-	Seen	-	-	-	-
Redshank	-	-	-	-	Bred	-	-	-	-
Snipe	Prob	Conf	Prob	Bred	Bred	-	-	Prob	-
Sparrowhawk	Conf	Conf	Conf	Seen	Bred	Bred	-	Poss	Prob
Stock Dove	Poss	Poss	-	-	Seen	-	-	-	-
Swift	Conf	Conf	Conf	Seen	Bred	Bred	Poss	Poss	-
Teal	Poss	Conf	Poss	-	-	-	-	-	-
Tufted Duck	-	Conf	Conf	Seen	Bred	Bred	-	Poss	Prob
Water Rail	-	-	-	-	-	-	-	-	Poss
Woodcock	Prob	Conf	Conf	-	-	-	-	-	-
Yellowhammer	Conf	Conf	Conf	-	-	-	-	-	-

Seen = recorded; Poss = possible breeding; Prob = probable breeding; Conf = confirmed breeding; - = not recorded; Bred = Breeding Record

Table 7-8 Wintering Bird Atlas data.

Species Name	Wintering Atlas 1981-1984			Wintering Atlas 2007-2011		
	R56	R66	R67	R56	R66	R67
Black-headed Gull	Pres	Pres	Pres	Pres	Pres	Pres
Buzzard	-	-	-	-	-	Pres
Common Gull	-	-	Pres	Pres	Pres	Pres
Common Sandpiper	-	-	-	-	Pres	-
Coot	Pres	Pres	Pres	Pres	Pres	Pres
Cormorant	Pres	Pres	Pres	Pres	Pres	Pres
Curlew	-	-	Pres	-	Pres	-
Dipper	-	-	-	Pres	Pres	Pres
Dunlin	-	-	-	-	Pres	Pres
Gadwall	-	-	-	-	Pres	-
Golden Plover	-	-	-	-	-	Pres
Goldeneye	-	Pres	Pres	-	Pres	Pres
Goosander	-	-	-	Pres	Pres	-
Great Black-backed Gull	Pres	-	Pres	-	Pres	-
Great Crested Grebe	-	Pres	Pres	-	Pres	Pres
Greater White-fronted Goose	-	-	-	-	Pres	-
Grey Heron	Pres	Pres	Pres	Pres	Pres	Pres
Grey Wagtail	Pres	Pres	Pres	Pres	Pres	Pres
Greylag Goose	-	-	-	Pres	Pres	Pres
Hen Harrier	-	-	Pres	Pres	Pres	Pres
Herring Gull	Pres	-	-	-	-	-
Kestrel	Pres	Pres	Pres	Pres	Pres	Pres
Kingfisher	Pres	Pres		Pres	Pres	Pres
Lapwing	Pres	Pres	Pres	Pres	Pres	
Lesser Black-backed Gull	-	-	-	-	Pres	Pres
Little Egret	-	-	-	-	Pres	-
Little Grebe	Pres	Pres	Pres	Pres	Pres	Pres
Long-eared Owl	-	-	Pres	-	-	-
Mallard	Pres	Pres	Pres	Pres	Pres	Pres
Meadow Pipit	Pres	Pres	Pres	Pres	Pres	Pres
Moorhen	Pres	Pres	Pres	Pres	Pres	Pres
Mute Swan	Pres	Pres	Pres	Pres	Pres	Pres
Oystercatcher	-	-	-	-	Pres	-
Peregrine Falcon	Pres	-	-	-	-	-
Pochard	Pres	Pres	-	Pres	Pres	Pres
Red Grouse	-	-	Pres	-	-	Pres

Species Name	Wintering Atlas 1981-1984			Wintering Atlas 2007-2011		
	R56	R66	R67	R56	R66	R67
Red-breasted Merganser	-	Pres	-	-	Pres	-
Redshank	Pres	Pres	-	Pres	Pres	Pres
Redwing	Pres	Pres	Pres	Pres	Pres	Pres
Ringed Plover	-	-	-	-	Pres	-
Ruff	-	-	-	-	-	Pres
Scaup	-	-	-	-	Pres	Pres
Shelduck	-	-	-	-	Pres	-
Shoveler	-	-	-	Pres	-	-
Snipe	Pres	-	Pres	Pres	Pres	Pres
Sparrowhawk	Pres	-	-	Pres	Pres	Pres
Teal	Pres	Pres	Pres	Pres	Pres	Pres
Tufted Duck	Pres	Pres	Pres	Pres	Pres	Pres
Whooper Swan	Pres	Pres	-	-	Pres	Pres
Wigeon	Pres	-	-	-	Pres	-
Woodcock	Pres	-	Pres	Pres	-	-
Yellowhammer	-	-	Pres	-	-	-

Pres = present; - = not recorded.

7.3.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland to provide 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 (McGuiness *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 Proposed Wind Farm site is located within areas of low and medium bird sensitivity to wind energy developments. The bird species with noted sensitivity to wind energy developments in the vicinity of the Proposed Wind Farm site are hen harrier and red grouse. The Proposed Wind Farm site boundary is 3.2km from the nearest area of high sensitivity. The Proposed Grid Connection Route is entirely within areas of low sensitivity.

7.3.4 National Biodiversity Data Centre Records

The National Biodiversity Data Centre (NBDC) Biodiversity Maps provide records of flora and fauna within 10km hectads across Ireland. Data is available from the map viewer on the NBDC website (https://maps.biodiversityireland.ie/Map). The Proposed Wind Farm site lies entirely within hectad R67. Table 7-9 lists the bird species that have been recorded in this 10km grid square.

Table 7-9 National Biodiversity Data Centre records

Common Name	NBDC Dataset
Barn Owl	Birds of Ireland
Belted Kingfisher	Rare Birds of Ireland
Black-headed Gull	Birds of Ireland
Buzzard	Birds of Ireland

Common Name	NBDC Dataset
Coot	Birds of Ireland
Great Crested Grebe	Birds of Ireland
Kestrel	Birds of Ireland
Kingfisher	Birds of Ireland
Lapwing	Birds of Ireland
Hen Harrier	Birds of Ireland
Osprey	Birds of Ireland
Red Grouse	Birds of Ireland
Snipe	Birds of Ireland
Swift	Birds of Ireland
Tufted Duck	Birds of Ireland

7.3.5 Irish Wetland Bird Survey Records

The Irish Wetland Bird Survey (I-WeBS), coordinated by BirdWatch Ireland, monitors wintering waterbird populations at their wetland sites across Ireland. I-WeBS site locations are available at https://birdwatchireland.ie/our-work/. Datasets for the following sites were sourced from www.birdwatchireland.ie and reviewed:

- Ballyallia Lake
- Ballycar Lough
- Carran Polje
- Castlelough
- Corofin Wetlands
- Dromore Lakes (Clare)
- Farrihy Lough
- Inagh River
- Knockaunroe/Rinnamona
- Liscannor Bay
- Lough Atorick
- Lough Girroge
- Lough Graney
- Lough O'Grady
- Mid-Clare Coast
- Poulataggle
- Pouleenacoona
- River Shannon (Lower)
- River Shannon (Lower) Aerial
- Scarriff Area
- Shannon & Fergus Estuary
- Shannon & Fergus Estuary Aerial
- South East Clare Lakes
- Tullaher Lough
- Turloughmore (Clare)

7.3.6 Rare and Protected Species Dataset

An information request was sent to NPWS requesting records from the Rare and Protected Species Database. The following records were obtained from the NPWS on the 28th of April 2024:

Hen Harrier

Presence recorded in hectads R56, R66 and R67.

7.3.7 Carrownagowan Wind Farm Assessment

During the survey period for the Proposed Wind Farm, breeding hen harrier activity was observed to the north/northwest of the Proposed Wind Farm, which was determined to not be associated with habitats within the Proposed Wind Farm or surround area. Based on the location of these observations and a review of existing EIARs, it was determined that the breeding hen harriers were associated with those discussed in the Carrownagowan Wind Farm EIAR. Other projects within 25km radius of the Proposed Wind Farm are discussed and assessed in Section 7.9 of this chapter, however there was no relevance to breeding hen harrier activity associated with the Proposed Wind Farm at these other projects.

The EIAR which was carried out for the permitted Carrownagowan Wind Farm was consulted to determine the location of hen harrier breeding territories recorded during surveys at Carrownagowan. The Proposed Wind Farm site is within the foraging range of hen harrier (2km, SNH (2016)) from the permitted Carrownagowan Wind Farm. Four breeding seasons were surveyed at Carrownagowan Wind Farm (2017 – 2020) and between two and four hen harrier breeding territories were identified each year during this period. While the location of breeding hen harrier territories were not provided, the Carrownagowan EIAR states that confirmed nests were located between 0.5km and 0.6km from the nearest Carrownagowan turbine. Therefore, the distance to the nearest confirmed nest to the proposed turbine at the Proposed Wind Farm site is likely to be approximately 1.6km. Therefore, the Proposed Wind Farm is sufficiently close that the birds from this territory could forage on the site of the Proposed Wind Farm. Notwithstanding this, the species was infrequently recorded within the Proposed Wind Farm. Please see Section 7.3.9.1 below for further details on hen harrier observations.

7.3.8 The 2022 National Survey of breeding Hen Harrier in Ireland

The 2022 national survey of breeding hen harrier in Ireland (Ruddock *et al.,* 2024) was consulted to determine the proximity of confirmed or probable hen harrier territories to the Proposed Wind Farm site, within 10km hectads. The following lists breeding records of 10km hectads which contain the Proposed Wind Farm (R67) and those within the foraging range of hen harrier i.e. 5km radius (R57, R66 and R56):

- **R67** (Proposed Wind Farm): Confirmed breeding in 2022
- **R57**: Hen harrier seen in 2022
- **R66**: No records in 2022
- **R56**: Hen harrier seen in 2022

The hectad R67 is shared by both the Proposed Wind Farm site and permitted Carrownagowan Wind farm and as outlined above, breeding was confirmed at Carrownagowan Wind Farm. The Proposed Wind Farm is located a considerable distance from the nearest SPA designed for breeding hen harrier: 11.9km from the Slieve Aughty Mountains SPA and 13.7km from Slievefelim to Silvermines Mountains SPA. Both SPAs have seen a reduction in hen harrier territories between previous surveys. Since the most recent survey in 2015, the number of territories in the Slieve Aughty Mountains SPA has reduced by nine territories. The Slievefelim to Silvermines Mountains SPA has reduced by six territories since the 2015 surveys.

7.3.9 Field Survey Results

The target species recorded within the surveyed area of the Proposed Wind Farm site during field surveys are listed in Table 7-10, along with a summary of breeding and roosting status. The following sections describe the records of each target species under the individual survey headings.

Table 7-10 Target species recorded in the surveyed area of the Proposed *Wind Farm.*

Species	Overall breeding status	Overall wintering status
Hen Harrier	**Confirmed Breeding**. There was a breeding territory identified in the wider surroundings of the Proposed Wind Farm (offsite). There were four observations of breeding activity greater than 1.8km from the site, all to the north of the site. These observations are likely associated with known breeding territories at Carrownagowan.	**No regularly used roosts identified within Proposed Wind Farm.** There was infrequent roosting observed. There were two observations of hen harrier going to roost, greater than 2km from the site.
Merlin	**Non-breeding**. There was no evidence of breeding at the site during surveys	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Peregrine	**Confirmed Breeding**. There was a breeding territory identified 4.1km from the nearest proposed turbine.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Barn Owl	**Confirmed Breeding**. Breeding was confirmed approximately 2.6km from the nearest proposed turbine in both 2021 and 2022.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Kestrel	**Confirmed Breeding**. There were two probable breeding territories and one confirmed territory identified in 2022. The confirmed territory was 1.2km from the nearest proposed turbine.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Lapwing	**Non-breeding**. There was no evidence of breeding at the site during surveys.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Red Grouse	**Probable Breeding**. There was probable breeding observed on peatlands in the north and south of the Proposed Wind Farm site.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Snipe	**Non-breeding**. There was no evidence of breeding at the site during surveys.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Buzzard	**Confirmed Breeding**. There was one probable breeding territory and two confirmed territories in 2021, one confirmed breeding territory in 2022 and one probable breeding territory in 2023.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.

Species	Overall breeding status	Overall wintering status
Long-eared Owl	**Non-breeding**. There was no evidence of breeding at the site during surveys.	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.
Sparrowhawk	**Confirmed Breeding**. There was one probable breeding territory identified in 2021, and one confirmed territory identified in 2022	**No regularly used roosts identified within Proposed Wind Farm.** There was no evidence of roosting at the site during surveys.

The target species listed below were recorded during waterbird distribution and abundance surveys, up to 5km from the Proposed Wind Farm. These species were not observed on or near the Proposed Wind Farm and therefore, there is no potential for impact from the Proposed Project. The list is ordered in accordance with conservation significance: Annex I species, SCIs of designated sites, Red listed species and raptors.

- Golden Plover
- Greenland White-fronted Goose
- Kingfisher
- Little Egret
- Whooper Swan
- Cormorant
- Tufted Duck
- Goldeneye
- Curlew
- Knot
- Pochard
- Redshank
- Scaup
- Shoveler
- Woodcock

A list of all bird species recorded during surveys is provided in Appendix 7-1. 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 breeding red grouse survey records
- Summary of breeding barn owl survey records
- Summary of winter walkover survey records
- Summary of hen harrier roost survey records
- Summary of waterbird distribution and abundance survey records
- Summary of non-target species records

7.3.9.1 Hen Harrier

Hen Harrier were observed in the breeding and winter season. Raw survey data and maps are provided in Appendix 7-4. Survey data and maps relating to breeding and roosting activity are provided in Confidential Appendix 7-5.

Vantage Point Surveys

Hen harrier was observed on 15 occasions during vantage point surveys (see Appendix 7-4, Figure 7-4-1). Hen harrier was observed on average once every 45 hours of vantage point survey. All observations were of individual birds and the majority of observations were of birds travelling or hunting. Observations were of a ringtail[7] and male birds, indicating the presence of at least two birds on site. There was one observation of a male catching prey and carrying it away in June 2022, 1.8km from the nearest proposed turbine, which could indicate breeding in the wider surroundings of the Proposed Wind Farm site. There were only two observations within 500m of the proposed turbine layout and four observations within the potential collision height.

Breeding Walkover Surveys

Hen harrier was observed on one occasion during breeding walkover surveys (one observation over 24 survey dates) (see Appendix 7-4, Figure 7-4-2). This observation was of an individual male hunting, 1.3km from the nearest proposed turbine.

Breeding Raptor Surveys

Hen harrier was observed on 11 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7-4-3). Hen harrier were observed at four of the eight survey locations to the northwest and southeast of the site, and on average on two survey dates per location. All observations were of individual birds and the majority of observations were of birds travelling or hunting. Observations were of a ringtail and male bird, indicating the presence of at least two birds. An adult male was observed displaying on two occasions 2.6km north from the nearest proposed turbine in April 2021. This observation indicates probable breeding in the area. There was one observation of a ringtail carrying prey 3.6km north from the nearest proposed turbine in July 2022. This observation confirms breeding in the area. There were only two observations of hen harrier within 500m of the proposed turbine layout. These observations were of individual birds travelling/hunting over the site.

Winter Walkover Surveys

Hen harrier was observed on one occasion during winter walkover surveys (on average, one observation in every seven surveys) (see Appendix 7-4, Figure 7-4-4). The observation was of an individual ringtail travelling within 500m of the proposed turbine layout.

Hen Harrier Roost Surveys

Hen harrier was observed on six occasions during hen harrier roost surveys (on average, one observation in every eight surveys) (see Appendix 7-4, Figure 7-4-5). All observations were of individual birds. There were three observations of birds hunting or commuting. In November 2022, there was an observation of a bird going to roost approximately 2.7km from the nearest proposed turbine. In March 2023 an individual was observed going to roost approximately 3.3km from the nearest proposed turbine. Following this observation, the bird was flushed from the roost by the surveyor and was observed flying north and presumed to have gone to roost in a different area, approximately 4.8km from the nearest proposed turbine.

Incidental Observations

Hen harrier was observed on three occasions as incidental observations. A male was observed rising from the ground in the evening, therefore this observation is unlikely to be associated with a roost

[7] *Ringtail refers to females and immature (male and female) birds.*

location (0.9km from the nearest turbine) and there were a further two observations of individuals hunting/travelling (see Appendix 7-4, Figure 7-4-6).

Breeding Summary

There were four observations that relating to breeding activity throughout the survey period. During breeding raptor surveys, an adult male was observed on two occasions displaying 2.6km from the nearest proposed turbine in April 2021, indicating probable breeding. There was one observation of a male catching prey and carrying it away in June 2022, 1.8km from the nearest proposed turbine observed during vantage point surveys. This observation confirms breeding in the wider area. There was one observation of a ringtail carrying prey 3.6km from the nearest proposed turbine in July 2022, confirming breeding in the wider area.

The locations of the above observations suggest a probable hen harrier territory in the Carrownagowan area in 2021 and a confirmed nest in the same general area in 2022. See Confidential Appendix 7-5, Figure 7-5-4 for the locations.

Roosting Summary

There were two observations of hen harrier going to roost, approximately 2.7km and 3.3km from the nearest proposed turbine. Both roosts were only observed being utilised on one occasion each, there were no further observations of roosting hen harrier on subsequent surveys in these areas. See Confidential Appendix 7-5, Figure 7-5-5 for the locations.

7.3.9.2 Merlin

Merlin were observed in the winter season only. Raw survey data and maps are provided in Appendix 7-4.

Incidental Observations

Merlin was observed on one occasion as an incidental observation. An individual was observed travelling 500m from the nearest turbine (see Appendix 7-4, Figure 7-4-7).

7.3.9.3 Peregrine

Peregrine were observed in the breeding and winter seasons. Raw survey data and maps are provided in Appendix 7-4. Survey data and maps relating to breeding activity are provided in Confidential Appendix 7-5.

Vantage Point Surveys

Peregrine were observed on nine occasions during the vantage point surveys, or on average once every 75 hours of vantage point survey (see Appendix 7-4, Figure 7-4-8). Observations were of individuals hunting or travelling. There were four observations within 500m of the proposed turbine layout and six observations were within the potential collision height.

Breeding Walkover Surveys

Peregrine was observed on two occasions during breeding walkover surveys, or on average one observation every 12 survey dates (see Appendix 7-4, Figure 7-4-9). Both observations were in June 2022 and were of individuals hunting or travelling between 0.7km and 1.3km from the nearest proposed turbine.

Breeding Raptor Surveys

Peregrine was observed on 11 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7-4-10). Peregrine were observed at two of the eight survey locations to the south and southwest of the site, and on average on four survey dates per location. The majority of observations were associated with an identified nest in a quarry, 4.1km from the nearest proposed turbine. Breeding was confirmed at this location in 2022 with adults observed carrying prey to the nest and juveniles observed in July 2022. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7-5-6. The remaining observations were of individuals hunting or travelling.

Winter Walkover Surveys

Peregrine was observed on two occasions during winter walkover surveys (on average, one observation every six surveys) (see Appendix 7-4, Figure 7-4-11). One observation was of an individual hunting within the Proposed Wind Farm. The second observation was of two birds soaring approximately 600m from the Proposed Wind Farm.

Breeding Summary

Breeding was confirmed in 2022 approximately 4.1km from the nearest proposed turbine. See Confidential Appendix 7-5, Figure 7-5-7 for location details.

7.3.9.4 Barn Owl

Barn owl were observed in the breeding season. Survey data and maps relating to breeding are provided in Confidential Appendix 7-5.

Breeding Barn Owl Surveys

Barn owl were observed on 13 occasions during the breeding barn owl surveys in 2021 and 2022 (please see Confidential Appendix 7-5, Figure 7-5-8). Surveys were located at a building 2.6km from the nearest proposed turbine. Breeding was confirmed in both 2021 and 2022 with observations of provisioning of young in 2021 and observations of juveniles in 2022.

Breeding Summary

Breeding was confirmed approximately 2.6km from the nearest proposed turbine in both 2021 and 2022. Please see Confidential Appendix 7-5, Figure 7-5-9 for location details.

7.3.9.5 Kestrel

Kestrel were observed in the breeding and winter seasons. Raw survey data and maps are provided in Appendix 7-4. Survey data and maps relating to breeding activity are provided in Confidential Appendix 7-5.

Vantage Point Surveys

Kestrel was observed on 211 occasions during vantage point surveys (see Appendix 7-4, Figure 7-4-12). Kestrel were observed on average once every 3.2 hours of vantage point survey. The majority of observations were of one or two birds travelling, perched or hunting. There were three observations of breeding behaviour in 2022. A pair were observed mobbing another bird, indicating probable breeding 1.7km from the nearest proposed turbine. A single bird was observed mobbing another bird 4.7km from the nearest proposed turbine, indicating probable breeding. Additionally, a male was observed

carrying prey approximately 1.2km from the nearest proposed turbine, which confirms breeding in this area. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7-5-10. There were 44 observations within 500m of the proposed turbine layout and there were 53 observations within the potential collision height.

Breeding Walkover Surveys

Kestrel was observed on 11 occasions during breeding walkover surveys (on average, one observation every two survey dates) (see Appendix 7-4, Figure 7-4-13). All observations were of individuals hunting. One bird was noted to be hunting close to a possible nest site on a cliff, approximately 1.1km from the nearest proposed turbine, in July 2022 but no further breeding activity was observed.

Breeding Raptor Surveys

Kestrel was observed on 30 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7-4-14). Kestrel was observed at all of the eight survey locations, and on average on two survey dates per location. All observations were of individual birds and were of birds hunting or travelling. There were no observations relating to breeding behaviour. There was one observation of kestrel within 500m of the proposed turbine layout. this observation was of an individual hunting over the site.

Winter Walkover Surveys

Kestrel was observed on three occasions during winter walkover surveys (on average, one observation per 2.6 surveys) (see Appendix 7-4, Figure 7-4-15). The observations were of individuals hunting and one observation was within 500m of the proposed turbine layout.

Incidental Observations

Kestrel was observed on 28 occasions as incidental observations (see Appendix 7-4, Figure 7-4-16). Observations were of up to two birds hunting or travelling. There were five observations within 500m of the proposed turbine layout.

Breeding Summary

In summary, there were two probable breeding territories, and one confirmed territory identified in 2022. The confirmed territory was 1.2km from the nearest proposed turbine. One of the probable territories was adjacent to the Proposed Wind Farm. The second territory was located approximately 1.5km from the nearest proposed turbine. There was no breeding behaviour observed during the 2021 breeding season. See Confidential Appendix 7-5, Figure 7-5-11 for locations of all breeding territory locations.

7.3.9.6 Lapwing

Lapwing were observed in the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Lapwing was observed on only one occasion during vantage point surveys (see Appendix 7-4, Figure 7-4-17). The observation was of 26 birds travelling before landing in an agricultural field to feed, approximately 600m from the nearest proposed turbine. The birds were observed flying within the potential collision height.

7.3.9.7 Red Grouse

Red grouse were observed in the breeding and winter season. Raw survey data and maps are provided in Appendix 7-4. Survey data and maps relating to breeding activity are provided in Confidential Appendix 7-5.

Breeding Walkover Surveys

Red grouse was observed on four occasions during breeding walkover surveys (on average, one observation every six survey dates) (see Appendix 7-4, Figure 7-4-18). Observations were of individuals calling, flying briefly or flushed by the surveyor. Additionally, there was one observation of a bird singing, approximately 700m from the nearest proposed turbine, indicating probable breeding in this area (see Confidential Appendix 7-4, Figure 7-5-12).

Breeding Red Grouse Surveys

Red grouse was observed on 13 occasions during breeding red grouse surveys (on average, 4 observations per survey) (see Appendix 7-4, Figure 7-4-19). Observations were of up to two birds calling, responding to the tape lure, flying and landing on mounds or of bird flushed by the surveyor. Ten of the observations were relating to breeding activity (responding to the tape lure). Three of the observations were within 500m of the proposed turbine layout, two of which were relating to breeding activity. There were two areas where the majority of observations were observed. Observations relating to breeding activity are presented in Confidential Appendix 7-5. Figure 7-5-13.

Winter Walkover Surveys

Red grouse was observed on three occasions during winter walkover surveys (on average, one observation per 2.6 surveys) (see Appendix 7-4, Figure 7-4-20). The observations were of up to two birds flying or flushed by the surveyor and one observation was within 500m of the proposed turbine layout.

Incidental Observations

Red grouse was observed on five occasions as incidental observations. Observations were of up to 10 birds calling or flushed by the surveyor and two observations were within 500m of the proposed turbine layout (see Appendix 7-4, Figure 7-4-21).

Breeding Summary

In summary, there were 10 observations of birds responding to tape lures during breeding red grouse surveys. This is indicative of breeding in these areas, which are located in the peatland north and south of the proposed turbine layout. See Appendix 7-5, Figure 7-5-15 for details on the breeding territory locations.

7.3.9.8 Snipe

Snipe were observed in the breeding and winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Snipe was observed on six occasions during vantage point surveys (see Appendix 7-4, Figure 7-4-22). Snipe were observed on average once every 112 hours of vantage point survey. The majority of

observations were of individuals travelling or calling. All observations were greater than 500m from the proposed turbine layout and only one observation was within the potential collision height.

Winter Walkover Surveys

Snipe was observed on six occasions during winter walkover surveys (on average, one observation per 1.3 surveys) (see Appendix 7-4, Figure 7-4-23). The observations were of up to two birds flushed by the surveyor and four observations were within 500m of the proposed turbine layout.

Waterbird Distribution and Abundance Surveys

Snipe were observed on two occasions during waterbird distribution and abundance surveys, or on average one observation per 27 survey rounds (see Appendix 7-4, Figure 7-4-24). The average number of birds per observation was 13 birds, with a peak of 23 birds. Snipe was recorded approximately 5.2km from the nearest proposed turbine with both observations occurring along the River Shannon.

Incidental Observations

Snipe was observed on nine occasions as incidental observations. Observations were of up to four birds calling or flushed by the surveyor and three observations were within 500m of the proposed turbine layout (see Appendix 7-4, Figure 7-4-25).

7.3.9.9 Buzzard

Buzzard were observed in the breeding and winter season. Raw survey data and maps are provided in Appendix 7-4. Survey data and maps relating to breeding activity are provided in Confidential Appendix 7-5.

Vantage Point Surveys

Buzzard was observed on 145 occasions during vantage point surveys (see Appendix 7-4, Figure 7-4-26). Buzzard were regularly observed (on average once every 4.6 hours) during vantage point surveys. The majority of observations were of between one and three birds travelling, perched or hunting. There were seven observations relating to breeding activity in 2021 and six in 2022. In 2021, there were six observations of birds displaying, five of which were not mapped. However, given the survey locations it is assumed these observations are all from the same area, indicating probable breeding approximately 700m from the Proposed Wind Farm. Additionally, there was one observation of a food pass, confirming breeding at this location, approximately 50m from the Proposed Wind Farm. In 2022, there were two observations of displaying or mobbing and two observations of birds carrying prey. All of these observations are presumed to be associated with one confirmed territory partially within the Proposed Wind Farm. One observation of a bird catching and carrying prey was approximately 2km from this territory, however given the habitat in this bird's flight path it is most likely travelling to the identified territory. Additionally, there were two observations of birds displaying in February 2023, indicating probable breeding in this area adjacent to the Proposed Wind Farm. Observations relating to breeding behaviour is presented in Appendix 7-5, Figure 7-5-16. There were 63 observations within 500m of the proposed turbine layout and 76 observations were within the potential collision height.

Breeding Walkover Surveys

Buzzard was observed on 12 occasions during breeding walkover surveys (on average, one observation every two survey dates) (see Appendix 7-4, Figure 7-4-27). Observations were of between one and three birds and the majority were of birds travelling, hunting or perched. There was one observation of chicks in a nest in June 2022, confirming breeding within the Proposed Wind Farm, approximately

250m from the nearest proposed turbine (see Confidential Appendix 7-5, Figure 7-5-17). This is the same breeding territory as discussed above in the vantage point survey results.

Breeding Raptor Surveys

Buzzard was observed on 21 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7-4-28). Buzzard was observed at six of the eight survey locations, and on average on two survey dates per location. All observations were of between one and three birds and the majority of observations were of birds hunting, soaring, travelling or perched. There was one observation of a food pass in 2021, confirming breeding in this location, 2.3km from the nearest proposed turbine. In 2022, a bird was observed carrying prey which confirms breeding in this location within the Proposed Wind Farm (chick were later observed in same area during breeding walkover surveys). See Confidential Appendix 7-5, Figure 7-5-18 for flights associated with breeding behaviour.

Winter Walkover Surveys

Buzzard was observed on 11 occasions during winter walkover surveys (on average, one observation per 2.6 surveys) (see Appendix 7-4, Figure 7-4-29). Most observations were of one or two birds hunting, travelling or perched. There was one observation of birds displaying in March 2022, this observation was over the confirmed territory previously discussed in this section (see Confidential Appendix 7-5, Figure 7-5-19). There were nine observations within 500m of the proposed turbine layout.

Incidental Observations

Buzzard was observed on nine occasions as incidental observations. Observations were of individuals hunting or travelling and three observations were within 500m of the proposed turbine layout (see Appendix 7-4, Figure 7-4-30). There was one observation of a buzzard carrying prey in June 2022, indicating a confirmed breeding territory (in same location as the confirmed nest discussed previously), see Confidential Appendix 7-5, Figure 7-5-20.

Breeding Summary

In summary, there was one probable breeding territory and two confirmed territories in 2021, one confirmed breeding territory in 2022 and one probable breeding territory in 2023. In 2021, the confirmed breeding territories were 0.8km and 2.7km from the nearest proposed turbine. The confirmed breeding territory in 2022 was within the Proposed Wind Farm, approximately 250m from the nearest proposed turbine. The probable breeding territory in 2021 was located adjacent to the Proposed Wind Farm to the east. The probable breeding territory in 2023 was adjacent to the Proposed Wind Farm, to the south. See Confidential Appendix 7-5, Figure 7-5-21 for locations of all breeding territory locations.

7.3.9.10 Long-eared Owl

Long-eared owl were observed in the breeding season. Raw survey data and maps are provided in Appendix 7-4.

Incidental Observations

Long-eared owl was observed on two occasions as incidental observations. Observations were of individuals travelling and both observations were within 500m of the proposed turbine layout (see Appendix 7-4, Figure 7-4-31).

7.3.9.11 Sparrowhawk

Sparrowhawk were observed in the breeding and winter season. Raw survey data and maps are provided in Appendix 7-4. Survey data and maps relating to breeding activity are provided in Confidential Appendix 7-5.

Vantage Point Surveys

Sparrowhawk was observed on 30 occasions during vantage point surveys (see Appendix 7-4, Figure 7-4-32). Sparrowhawk were observed on average once every 22.4 hours of vantage point survey. The majority of observations were of one or two birds travelling, perched or hunting. There was one observation of an individual displaying 500m from the nearest proposed turbine, indicating probable breeding in this area (see Confidential Appendix 7-5, Figure 7-5-22). Additionally, there were two observations of sparrowhawk interacting with kestrel, however these observations were during the winter and therefore unlikely to be associated with a breeding territory for either species. There were five observations within 500m of the proposed turbine layout and six observations were within the potential collision height.

Breeding Walkover Surveys

Sparrowhawk was observed on two occasions during breeding walkover surveys (on average, one observation every 12 survey dates) (see Appendix 7-4, Figure 7-4-33). Observations were of individuals hunting. There was one observation of a bird carrying prey, which confirms breeding in this location, 700m from the nearest proposed turbine (see Confidential Appendix 7-5, Figure 7-5-23).

Breeding Raptor Surveys

Sparrowhawk was observed on four occasions during breeding raptor surveys (see Appendix 7-4, Figure 7-4-34). Sparrowhawk were observed at two of the eight survey locations to the north and northeast of the site, and on average on one survey date per location. All observations were of individual birds hunting or travelling. All observations were over 500m from the proposed turbine layout. There were no observations of breeding behaviour during these surveys.

Winter Walkover Surveys

Sparrowhawk was observed on four occasions during winter walkover surveys (one observation per 2.6 surveys) (see Appendix 7-4, Figure 7-4-35). The observations were of individuals hunting, travelling or flushed and two observations were within 500m of the proposed turbine layout.

Breeding Summary

In summary, there was one probable breeding territory identified in 2021 and one confirmed territory identified in 2022. The confirmed territory was 700m from the nearest proposed turbine. The probable territory was located adjacent to the Proposed Wind Farm to the east. See Confidential Appendix 7-5, Figure 7-5-24 for locations of all breeding territory locations.

7.3.9.12 Passerines (Red Listed)

The BoCCI Red listed species grey wagtail, meadow pipit, redwing and swift were recorded during the surveys between September 2020 and May 2023 within 500m of the Proposed Wind Farm. Grey wagtail were observed on 12 occasions, with up to two birds being recorded. Meadow pipit were observed on 30 occasions, with up to 16 birds being recorded. Redwing were observed on eight occasions, with up to 20 birds being recorded. Swift were observed on one occasion, with two birds being recorded.

7.4 Receptor Evaluation

7.4.1 Determination of Population Importance

A determination of population importance for birds within the likely ZOI is provided below, following criteria described in Section 7.2.5. Estimates of national population sizes were obtained from the most recent species-specific national survey, or national surveys by Burke *et al.* (2018), Lewis *et al.* (2019a), Crowe *et al.* (2014) and Lewis *et al.* (2019b), or Ireland's Article 12 Reporting 2013-2018 (EU, 2022), depending on what literature was available. Estimates for mean county population sizes were obtained from species-specific surveys, a review of I-WeBS sites within Clare[8], or derived from national estimates, according to what literature was available.

Following NRA (2009), a population of National Importance is a regularly occurring population that exceeds 1% of the national population. Similarly, a population of County Importance is a regularly occurring population that exceeds 1% of the county population. Locally Important (Higher Value) populations are resident or regularly occurring species of conservation concern of importance at the local level, while Locally Important (Lower Value) populations are resident or regularly occurring species of some local importance.

7.4.1.1 Hen Harrier

Wintering

The estimated national wintering population of hen harrier in Ireland is 311-435 (Ruddock *et al.*, 2016; Article 12 Reporting 2013-2018) therefore 1% of the Republic of Ireland 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. The Proposed Wind Farm is located in an upland range that was identified as a regional stronghold for hen harrier (Ruddock *et al.*, 2016).

Hen harrier were observed on 13 occasions during the winter season. The majority of these observations were during hen harrier roost surveys and were of birds hunting and commuting. There were two roost sites identified 2.7km and 4.8km from the nearest proposed turbine. Both roosts were observed being used on one occasion each between November 2022 and March 2023. Observations throughout the survey period were of male and ringtail birds and no more than a single bird was observed during any one observation. This indicates a minimum of two birds present during the survey period.

Taking a precautionary approach, it is assumed that the individuals recorded during the winter season are associated with a wintering population of **County Importance**.

Breeding

Based on the latest Breeding Hen Harrier Survey (Ruddock *et al.*, 2024), the Republic of Ireland national breeding population is in the range of 85-106 pairs. Therefore, a single breeding pair in Ireland conforms to National Importance as per NRA criteria.

This species was recorded on 24 occasions during the breeding season. The majority of these observations were during vantage point and breeding raptor surveys equally and were of birds hunting and travelling. There were four observations indicating breeding activity with two observations of birds

[8] *Please note that these figures are estimates based on the best available information and should be interpreted with a degree of caution.*

displaying in 2021 and two observations of birds carrying prey in 2022, approximately 1.8km and 3.6km respectively from the proposed turbine layout.

Thus, the hen harrier observed at the Proposed Wind Farm are associated with a breeding population in the wider area that is of **National Importance**.

7.4.1.2 Merlin

As per the latest NPWS Article 12 reporting document, the estimated population of merlin is between 200 – 400 pairs based on Hardy *et al.* (2013). Therefore, a regularly occurring population of 2-4 birds is required for classification as National Importance.

Merlin 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 Proposed Wind Farm is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.4.1.3 Peregrine

As per NPWS Article 12 Reporting (2013-2018), the estimated population of peregrine is 425 pairs. Therefore, as per NRA (2009) criteria, a regularly occurring population of four pairs of peregrine is required for classification as Nationally Important. There are no published figures for the County Clare population of peregrine. Using the distribution of peregrine across Ireland from the breeding bird atlas[9] (2007-2011) the County population of peregrine is estimated to be 34 birds. Taking a precautionary approach and using the above as a guide; a regularly occurring population of just one bird is required for classification of County Importance.

Peregrine was observed within the Proposed Wind Farm on 24 occasions and observations were of up to three birds (one adult and two juveniles at nest). Confirmed breeding was observed at a quarry 4.1km from the Proposed Wind Farm. It cannot be ruled out that observations at the Proposed Wind Farm are associated with the confirmed nest site, given that peregrine falcon can hunt beyond their 2km foraging range (NatureScot, 2016) where habitats are suboptimal for provisioning.

Thus, it is considered that observations at the Proposed Wind Farm are associated with a breeding territory that is considered to be of **County Importance**.

7.4.1.4 Barn Owl

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

There are no published figures for the County Clare population of barn owl. Using the distribution of barn owl across Ireland from the breeding bird atlas[10] (2007-2011) the county population of barn owl is estimated to be a minimum of seventeen pairs. Therefore, a regularly occurring population of just one bird is required for classification of County Important.

There was one breeding territory for barn owl identified during surveys, 2.6km from the nearest proposed turbine which is within the foraging range (3km) of this species (Szep *et al.*, 2019). While

[9] *Bird Atlas data from the National Biodiversity Data Centre was used to estimate the county population. Presence/absence hectad data was used to estimate the proportion of the national population that occurs in the county. The national population was then multiplied by this percentage to give a county population estimate.*
[10] *Bird Atlas data from the National Biodiversity Data Centre was used to estimate the county population. Presence/absence hectad data was used to estimate the proportion of the national population that occurs in the county. The national population was then multiplied by this percentage to give a county population estimate.*

there were no observations at, or within 500m of, the Proposed Wind Farm, given that this is a nocturnal species, it cannot be ruled out that this species was not present on site outside of survey hours (dusk to dawn), as the Proposed Wind Farm is within the foraging range.

Taking a precautionary approach, it is assumed that the breeding pair of barn owl adjacent to the Proposed Wind Farm are a population of **County Importance** and they may use the habitats within the Proposed Wind Farm for provisioning.

7.4.1.5 Kestrel

As per NPWS Article 12 Reporting (2013-2018), 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) criteria, a regularly occurring population of 135 birds is required for classification as Nationally Important.

There are no published figures for the County Clare population of kestrel. Using the distribution of kestrel across Ireland from the breeding bird atlas[11] (2007-2011) the county population of kestrel is estimated to be 675 birds. Therefore, a regularly occurring population of six birds bird is required for classification of County Importance.

There was a maximum of three breeding territories identified within, and adjacent to, the Proposed Wind Farm (in 2022; two probable territories and one confirmed). 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 Proposed Wind Farm 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 year[12], it is likely that there would be a population of approximately six adults and three to four juvenile birds by the end of each winter season. The population recorded at the Proposed Wind Farm was therefore assigned **County Importance** on the basis of a resident/regularly occurring population assessed to be important on a county level.

7.4.1.6 Lapwing

The estimated national wintering population of lapwing in Ireland is 69,823 for the Republic of Ireland (ROI) (Burke *et al.,* 2018). To estimate the county population, a review of all County Clare I-WeBS sites was conducted, and the county population is estimated to be 1,381 individuals. Therefore, a regularly occurring population of 698 birds is required for classification as National Importance and of 13 birds for classification as County Importance.

Lapwing was observed on only one occasion in winter despite undertaking a comprehensive suite of surveys over two and a half years. There were no observations of lapwing during the breeding season at the Proposed Wind Farm. The Proposed Wind Farm is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.4.1.7 Red Grouse

As per NPWS Article 12 Reporting (2013-2018), the national breeding population estimates of red grouse in the Republic of Ireland is 1,898 pairs. Using these latest figures, 1% of the National population of red grouse is 19 pairs. Therefore, as per NRA 2009, a regularly occurring population of 19 pairs is required for classification as Nationally Important.

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[11] Bird Atlas data from the National Biodiversity Data Centre was used to estimate the county population. Presence/absence hectad data was used to estimate the proportion of the national population that occurs in the county. The national population was then multiplied by this percentage to give a county population estimate.
[12] https://app.bto.org/birdfacts/results/bob3040.htm

There are no published figures for the County Clare population of red grouse. However, the National Red Grouse Census 2006-2008 (Cummins *et al.,* 2010) published the population of red grouse in the east and south region (which includes County Clare) as 685 birds. Therefore, a regularly occurring population of six birds is required to be of Regional/County Importance.

Red grouse was observed regularly throughout several surveys throughout the survey period. There were three probable breeding territories in 2021, two in 2022 and two in 2023. This indicates a resident population of four to 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 Proposed Wind Farm until the start of the next breeding season, when birds become territorial again.

Taking a precautionary approach, it is assumed that the individuals recorded at the Proposed Wind Farm are associated with a population of **County Importance**.

7.4.1.8 Snipe

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimate 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.

There are no published figures for the County Clare population of snipe. Using the distribution of snipe across Ireland from the breeding bird atlas[13] (2007-2011) the County population of snipe is estimated to be 214 birds. Therefore, a regularly occurring population of two birds is required for the classification of County Important.

Snipe were observed on 23 occasions throughout the two and a half years of surveys and seven of these observations occurred within 500m of the proposed turbine layout. Observations were of up to two birds.

Taking a precautionary approach, it is assumed that the individuals recorded are associated with a population of **County Importance**.

7.4.1.9 Buzzard

The national population of buzzard is estimated to be 1,938 breeding pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county population is estimated to be 75 breeding pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of 19 pairs is required for classification as National Importance and of one pair for classification as County Importance. Buzzard is not an SCI of an SPA within 15km of the site, nor listed on Annex I, and is a Green Listed BoCCI species, indicating it is of lower conservation priority.

There were three breeding territories in 2021 (one probable and two confirmed) and one confirmed breeding territory in 2022 identified within, the Proposed Wind Farm and one probable territory in 2023. This indicates a maximum resident population of six adult birds during the breeding season.

Given the conservation status of buzzard, the population at the Proposed Wind Farm is of no greater than **Local Importance (higher value)**.

[13] *Bird Atlas data from the National Biodiversity Data Centre was used to estimate the county population. Presence/absence hectad data was used to estimate the proportion of the national population that occurs in the county. The national population was then multiplied by this percentage to give a county population estimate.*

7.4.1.10 Long-eared Owl

Long-eared owl is a BoCCI Green listed species in Ireland that was only observed on two occasions within the Proposed Wind Farm despite undertaking a comprehensive suite of surveys over 2.5 years. The Proposed Wind Farm is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.4.1.11 Sparrowhawk

The national population of sparrowhawk is estimated to be 11,859 birds (Lewis *et al.*, 2019a). In the absence of more detailed county-level information, the county population is estimated to be 456 birds, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Sparrowhawk is not an SCI of an SPA within 15km of the site, nor listed on Annex I, and is a Green Listed BoCCI species, indicating it is of lower conservation priority.

There was one breeding territory in 2021 (probable) and one breeding territory in 2022 (confirmed) identified within, or adjacent to, the Proposed Wind Farm. This indicates a resident population of two adult birds during the breeding season.

Given the conservation status of sparrowhawk, the population at the Proposed Wind Farm is of no greater than **Local Importance (higher value)**.

7.4.1.12 Passerines (Red Listed)

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

7.4.2 Identification of Key Ornithological Receptors

Table 7-11 outlines the rationale for including or excluding each target species recorded during field surveys as a key ornithological receptor. The conservation status, population importance evaluation following NRA (2009) and a detailed explanation for inclusion/exclusion as a key ornithological receptor is provided. The sensitivity of species included as key ornithological receptors are then evaluated in the following section.

Table 7-11 Receptor evaluation and selection criteria rational

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as key ornithological receptors	KOR
Hen Harrier	Annex I Birds Directive & Amber List & Raptor	**Wintering** County Importance	This species was occasionally recorded hunting within the site of the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.** Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying within the potential collision risk zone on one occasion more than 500m from the proposed turbine layout. Therefore, the potential for collision risk is limited. As a precautionary measure, an assessment of **collision risk has been carried out** (Section 7.5.2). As such, an assessment of direct habitat loss, disturbance/displacement and collision has been completed for wintering hen harrier (Section 7.5.2).	**Yes**
Hen Harrier	Annex I Birds Directive & Amber List & Raptor	**Breeding** National Importance	This species was occasionally recorded hunting within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as key ornithological receptors	KOR
			Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying over the Proposed Wind Farm within the potential collision risk zone. **Potential for collision risk cannot be excluded.** As such, an assessment of direct habitat loss, disturbance/displacement and collision risk has been completed for breeding hen harrier (Section 7.5.2).	
Merlin	Annex I Birds Directive & Amber List & Raptor	**All Seasons** No population of ecological significance recorded	Merlin was observed on one occasion, despite undertaking a comprehensive suite of surveys over two and a half years. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm is of significance to this species.	**No**
Peregrine	Annex I Birds Directive & Raptor	**All Seasons** County Importance	This species was occasionally recorded hunting within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.** Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying over the Proposed Wind Farm within the potential collision risk zone. **Potential for collision risk cannot be excluded.** As such, an assessment of direct habitat loss, disturbance/displacement and collision risk has been completed for peregrine (Section 7.5.2).	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as key ornithological receptors	KOR
Barn Owl	Red List & Raptor	**All Seasons** No population of ecological significance recorded	This species was not recorded within the Proposed Wind Farm; however a breeding territory was recorded within the potential foraging range from the Proposed Wind Farm and habitats within the Proposed Wind Farm provide suitable foraging habitat for barn owl. Therefore, **the potential for habitat loss cannot be excluded**. Birds were not recorded flying within the Proposed Wind Farm; however a breeding territory was recorded within the potential foraging range. Furthermore, as this is a nocturnal species, it cannot be ruled out that this species was present on site outside of survey hours. **Potential for disturbance/displacement cannot be excluded.** This species was not recorded during vantage point surveys and as a result, an assessment of collision risk is not required. As such, an assessment of direct habitat loss and disturbance/displacement has been completed for barn owl (Section 7.5.2).	**Yes**
Kestrel	Red List & Raptor	**All Seasons** County Importance	This species was recorded hunting within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.** Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying over the Proposed Wind Farm within the potential collision risk zone. **Potential for collision risk cannot be excluded.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as key ornithological receptors	KOR
			As such, an assessment of direct habitat loss, disturbance/displacement and collision risk has been completed for kestrel (Section 7.5.2).	
Lapwing	Red List	**All Seasons** No population of ecological significance recorded	This species was not recorded on site or within the Proposed Wind Farm during the winter season. There is no evidence to suggest that the Proposed Project will have a significant effect on this species. There is no potential for any significant effects.	**No**
Red Grouse	Red List	**All Seasons** County Importance	This species was occasionally recorded utilising habitats within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.** Birds were recorded flying within the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was not recorded during vantage point surveys which inform the collision risk model and was observed within the Proposed Wind Farm infrequently. As a result, an assessment of collision risk is not required. As such, an assessment of direct habitat loss and disturbance/displacement has been completed for red grouse (Section 7.5.2).	**Yes**
Snipe	Red List	**All Seasons** County Importance	This species was occasionally recorded utilising habitats within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as key ornithological receptors	KOR
			Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying over the Proposed Wind Farm within the potential collision risk zone. **Potential for collision risk cannot be excluded.** As such, an assessment of direct habitat loss, disturbance/displacement and collision risk has been completed for snipe (Section 7.5.2).	
Buzzard	Green List & Raptor	**All Seasons** Local Importance (higher value)	This species was occasionally recorded hunting within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.** Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying over the Proposed Wind Farm within the potential collision risk zone. **Potential for collision risk cannot be excluded.** As such, an assessment of direct habitat loss, disturbance/displacement and collision risk has been completed for buzzard (Section 7.5.2).	**Yes**
Long-eared Owl	Green List & Raptor	**All Seasons** Local Importance (higher value)	Long-eared owl was observed on two occasions, despite undertaking a comprehensive suite of surveys over two and a half years. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm is of significance to this species.	**No**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as key ornithological receptors	KOR
Sparrowhawk	Green List & Raptor	**All Seasons** Local Importance (higher value)	This species was occasionally recorded hunting within the Proposed Wind Farm. The potential for habitat loss cannot be excluded. **Potential for direct habitat loss cannot be excluded.** Birds were recorded flying over the Proposed Wind Farm and within 500m of the proposed turbine layout. **Potential for disturbance/displacement cannot be excluded.** This species was recorded flying over the Proposed Wind Farm within the potential collision risk zone. **Potential for collision risk cannot be excluded.** As such, an assessment of direct habitat loss, disturbance/displacement and collision risk has been completed for sparrowhawk (Section 7.5.2).	**Yes**
Passerines	BoCCI Red List	**All Seasons** Local Importance (lower value)	Grey wagtail, meadow pipit, redwing and swift were recorded during the surveys between September 2020 and May 2023 within 500m of the Proposed Wind Farm. However, as per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology and large populations. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Project will have a significant effect on these species.	**No**

7.4.3 Key Ornithological Receptor Sensitivity Determination

Criteria developed by Percival (2003) for assessing bird sensitivity within wind farm sites is presented in Table 7-3 (Section 7.2.5) above. The sensitivity of the KORs identified for the Proposed Wind Farm, as per Percival (2003), are listed below, including the rationale for their respective sensitivity classification.

High Sensitivity KORs are:

- Hen Harrier (Annex I: EU Birds Directive)

Medium Sensitivity KORs are:

- Peregrine (Annex I: EU Birds Directive)
- Barn Owl (BoCCI Red Listed)
- Kestrel (BoCCI Red Listed)
- Red Grouse (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)

Low Sensitivity KORs are:

- Buzzard (lower conservation concern)
- Sparrowhawk (lower conservation concern)

7.5 Potential Impacts

All elements of the Proposed Project have been considered in assessing impacts on key ornithological receptors. This section is structured as follows:

- Assessment of 'Do nothing' Effect.
- Assessment of impacts in relation to KORs during construction and operation.
- Assessment of impacts in relation to KORs during decommissioning.
- Assessment of impacts associated with the Proposed Grid Connection Route.
- Assessment of impacts on designated areas.

7.5.1 Do-Nothing Effect

If the Proposed Project for which this EIAR has been prepared was not to proceed, the site would continue to be managed under the various current management practices. These include small-scale agriculture, commercial forestry and one-off rural housing. It is assumed that the character of the bird community, including the key ornithological receptors identified, will remain much as it is described in the baseline ornithological conditions. If the Proposed Project were not to proceed, the majority of the site would undergo limited changes to agricultural habitats. A portion of the site (roughly 63ha using current satellite imagery/22% of the site) is commercial forestry which would undergo changes on a rotational cycle as the forestry grows to maturity and undergoes felling. The area that is currently a closed habitat (mature forestry) will change to open (as trees are felled) which will consequently affect the bird community by providing habitats to birds likely to use pre-thicket forestry for breeding such as hen harrier (Ruddock *et al.*, 2016).

7.5.2 Effects on Key Ornithological Receptors during Construction and Operation

Table 7-12 to Table 7-20 below describe potential effects on key ornithological receptors that may occur during the construction and operation of the Proposed Wind Farm. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022) criteria.

7.5.2.1 Hen Harrier (Winter)

Table 7-12 - Potential effects during the construction and operational phases of the Proposed Project on Hen Harrier in Winter

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	The Proposed Wind Farm is dominated by improved agricultural grassland and commercial forestry; this habitat is sub-optimal for wintering hen harrier. There are some small areas of peatland/scrub to the north and south of the site, however there was no record of hen harrier utilising these lands for roosting during winter. During normal commercial forestry management, some areas of forestry will become suitable for hen harrier for periods of time as the forestry is felled, replanted and begins to regrow. Typically, this forestry is suitable for hen harrier for approximately 10 years before becoming unsuitable again. Hen harrier was observed on 13 occasions during winter season surveys. Two winter roosts were identified during the 2022/23 winter seasons; one in an area of peatland 2.7km from the proposed turbine layout and one in an area of peatland 4.8km from the proposed turbine layout. These roosts were infrequently used with hen harrier observed on only one occasion at each location despite repeated survey efforts at these locations. Hen harrier were observed hunting within the Proposed Wind Farm on one occasion despite a comprehensive suite of surveys across three winter seasons. Furthermore, the land lost to the development footprint is small (i.e. 8.4ha/2.9%	The magnitude of the effect is assessed as *Low*. The cross tablature of a *High* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	of Proposed Project) relative to the total area within the Proposed Wind Farm. Given that hen harrier were observed infrequently at the Proposed Wind Farm, this limits the potential for the proposed infrastructure to result in ecologically significant habitat loss for hen harrier. Furthermore, there is an abundance of similar habitat (agricultural grassland and commercial forestry) in the wider surroundings of the Proposed Wind Farm. No significant effects of direct habitat loss are anticipated at the county, national or international level.		
Disturbance	No hen harrier roosting sites were recorded within a 2km radius of the Proposed Wind Farm. There was a very low rate of occurrence of the species onsite, as foraging or commuting hen harrier were infrequently recorded within the Proposed Wind Farm (only on one occasion during three winter seasons). Therefore, based on the survey data, there is little potential for significant disturbance effects given that hen harrier were not dependent on the habitats located in close proximity to development infrastructure for foraging or roosting. Significant effects are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *High* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely short-term Imperceptible negative effect**
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	No evidence of roosting was recorded within the Proposed Wind Farm or within 2km of the site. This absence within 2km limits the potential for significant impacts on roosting hen harrier. Foraging hen harrier have been recorded to be subject to displacement impacts within a 250-500m radius of	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *High* sensitivity species and *Negligible*	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	turbines (Pearce-Higgins *et al.*, 2009). However, foraging/commuting hen harrier were infrequently recorded within the Proposed Wind Farm and were only recorded within 500m of the proposed turbine layout on two occasions throughout three winter seasons. Significant effects are not predicted given the low numbers recorded and infrequency of these observations.	impact corresponds to a ***Very Low*** effect significance.	
Collision Risk	The species was recorded flying within the potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.002 collisions per year, or one bird every 584 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35-year life-time of the Proposed Project.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *High* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.2 Hen Harrier (Breeding)

Table 7-13 Potential effects during the construction and operational phases of the Proposed Project on Breeding Hen Harrier

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	The Proposed Wind Farm is dominated by improved agricultural grassland and commercial forestry; these habitats are sub-optimal for breeding hen harrier. However, during normal commercial forestry management, some areas of forestry will become suitable for hen harrier for periods of time as the forestry is	The magnitude of the effect is assessed as *Low*. The cross tablature of a *High* sensitivity species and *Low* impact	**Likely long-term constant slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	felled, replanted and begins to regrow. Typically, this forestry is suitable for hen harrier for approximately 10 years before becoming unsuitable again. Furthermore, there are some small areas of peatland/scrub to the north and south of the site, however there was no record of hen harrier utilising these lands for breeding or foraging. There are breeding hen harrier in the wider surroundings of the site, however evidence from surveys suggest that they are not dependent on the Proposed Wind farm for nesting or foraging. Hen harrier were observed exhibiting breeding behaviours to the north of the site, however these breeding birds are likely associated with the known breeding territories off site, at Carrownagowan. During vantage point surveys, there was one observation of a male catching prey and carrying it away in June 2022, 1.8km from the nearest proposed turbine, which could indicate breeding in the wider surroundings of the Proposed Wind Farm. During breeding raptor surveys, an adult male was observed displaying on two occasions 2.6km north from the nearest proposed turbine in April 2021. This observation indicates probable breeding in the area. There was one observation of a ringtail carrying prey 3.6km north from the nearest proposed turbine in July 2022. All observations were to the north/northwest of the site, towards the Carrownagowan area where hen harrier are known to breed, as discussed in Section 7.3.7. No breeding territories were located within or adjacent to the Proposed Wind Farm and it is likely that the hen harrier activity observed is associated with breeding pairs from Carrownagowan. There is no potential for the loss of breeding habitat, given that hen harrier are not nesting within the Proposed Wind Farm. These nests are also unlikely to be impacted by the loss of foraging habitat given the abundance of other suitable foraging habitat that occur in the wider area. Hen harrier was observed on 24 occasions during breeding season surveys, four of which were on, or within 500m of, the Proposed Wind Farm. This is a very low rate of occurrence onsite. Hen harrier were observed hunting within the	corresponds to a ***Low*** effect significance.	

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	Proposed Wind Farm, however, the land lost to the development footprint is small (i.e. 8.4ha/2.9% of Proposed Project) relative to the total area within the site. Given that hen harrier were observed infrequently at the Proposed Wind Farm (on four occasions during two breeding seasons), this limits the potential for the proposed infrastructure to result in ecologically significant habitat loss for hen harrier. Evidence from surveys suggests that hen harrier are not dependent on the site for nesting or foraging. It is likely that hen harrier utilise more favourable habitat outside of the Proposed Wind Farm such as the Slieve Bernagh Bog SAC located to the north of the site. No significant effects of direct habitat loss are anticipated at the county, national or international level		
Disturbance	No confirmed hen harrier breeding territories were recorded within 2km of the Proposed Wind Farm. Foraging and commuting hen harrier were infrequently recorded within the Proposed Wind Farm (only on four occasions during two breeding seasons). This is a very low rate of occurrence. As previously discussed, hen harrier observed at the Proposed Wind Farm are likely associated with the known hen harrier breeding territories at Carrownagowan, 2.2km from the Proposed Wind Farm. The literature identifies the potential for disturbance impacts (associated with construction works) to occur between 500m and 1000m (Ruddock and Whitfield (2007), Fernández-Bellon *et al.* (2017) and Wilson *et al.* (2016)). Such disturbance is dependent on factors including topography and lines of sight. As hen harrier were very infrequently recorded hunting in close proximity to the proposed turbine layout (with 100m), significant impacts are unlikely. Particularly given the evidence of surveys is that they are not dependent on the Proposed Project for foraging and also the abundance of optimal foraging habitats in the wider area, e.g. Slieve Bernagh Bog SAC. It is noted that this SAC is considerably closer to the Carrownagowan pair(s) than the Proposed	The magnitude of the effect is assessed as *Low*. The cross tablature of a *High* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely short-term slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	Project. It is reasonable to assume that the optimal nature of the SAC habitats and its proximity to the breeding territories are likely to make it more attractive to foraging hen harrier than the suboptimal habitats of the Proposed Project. Therefore, based on the survey data, there is little potential for significant disturbance effects given that hen harrier were not dependent on the habitats located in close proximity to development infrastructure for foraging. No significant effects of disturbance are anticipated at the county, national or international level.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Effects on breeding sites No evidence of breeding was recorded within the Proposed Wind Farm, however there were observations of breeding activity over 1.8km from the site. Four breeding seasons were surveyed at Carrownagowan Wind Farm (2017 – 2020) and between two to four hen harrier breeding territories were identified during this period. It is likely that the breeding birds observed during surveys for the Proposed Wind Farm are associated with the confirmed nests in Carrownagowan given all hen harrier breeding activity were observed to the north of the site. These flights were either in the vicinity of the known Carrownagowan breeding territory or were observed flying toward this area. The literature identifies the potential for disturbance impacts for breeding hen harrier sites (associated with construction works) to occur between 500m and 1000m (Ruddock and Whitfield (2007), Fernández-Bellon *et al.* (2017) and Wilson *et al.* (2016)). Such disturbance is dependent on factors including topography and lines of sight. Given that breeding activity was observed over	The magnitude of the effect is assessed as *Low*. The cross tablature of a *High* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	1000m from the Proposed Wind Farm, it is unlikely to impact breeding hen harrier given the separation distance of the Proposed Wind Farm to the known breeding territories to the north of the site at Carrownagowan Wind Farm (1.6km). Effects on foraging hen harrier Foraging hen harrier have been recorded to be subject to displacement impacts within a 250-500m radius of turbines (Pearce-Higgins *et al.,* 2009). However, foraging/commuting hen harrier were infrequently recorded within the Proposed Wind Farm and were only recorded within 500m of the proposed turbine layout on four occasions throughout two breeding seasons. Significant impacts on foraging hen harrier are not predicted based on the low rate of occurrence of hen harrier within the Proposed Wind Farm during the 33 months of comprehensive surveys. Furthermore, the majority of habitats on site are suboptimal for foraging hen harrier (improved agricultural grassland and commercial forestry). Within the Proposed Wind Farm, four turbines are proposed to be built on improved agricultural grassland and three in commercial forestry. There are more favourable habitats which are closer to the know nest sites at Carrownagowan (e.g. Slieve Bernagh Bog SAC) which are more likely to be utilised by foraging hen harrier. Summary Breeding hen harrier are not anticipated to experience disturbance effects given the separation distance between the Proposed Wind Farm and the breeding territories identified at Carrownagowan Wind Farm. Foraging hen harrier are also not anticipated to be affected given the low rate of occurrence at the Proposed Wind Farm and the availability of more favourable foraging habitats.		

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	No significant effects of disturbance are anticipated at the county, national or international level.		
Collision Risk	The species was recorded flying within the potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.005 collisions per year, or one bird every 200 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35- year life-time of the Proposed Project.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *High* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.3 Peregrine (All Seasons)

Table 7-14 Potential effects during the construction and operational phases of the Proposed Project on Peregrine (all seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Peregrine were recorded on 24 occasions within the Proposed Wind Farm during surveys between September 2020 and May 2023. Most observations were of birds commuting, circling or foraging within the Proposed Wind Farm. While there were occasional observations of this species foraging within the Proposed Wind Farm during the breeding season, no evidence of onsite breeding activity was recorded. A confirmed breeding territory was identified approximately 4.1km from the proposed turbine layout. It cannot be ruled out	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	that birds observed hunting within the Proposed Wind Farm were provisioning for this nest. However, given the separation distance from the territory (4km), significant impacts on this territory are not anticipated. Furthermore, extensive areas of suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area. Moreover, 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). No significant effects of direct habitat loss are anticipated at the county, national or international level.		
Disturbance	There were five observations of this species within, or partially within, 500m of the proposed turbine layout throughout the entire survey period. Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the Proposed Wind Farm, particularly given 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 accustomed to the construction activity during the construction phase. No significant effects of disturbance are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely short-term slight negative effect**
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	In total, this species was recorded on five occasions within, or partially within, 500m of the proposed turbine layout during the survey period. The availability of alternative suitable habitat in the surroundings, limit the potential for	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium*	**Likely long-term constant slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	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 accustomed to the wind farm in the landscape. No significant effects of displacement are anticipated at the county, national or international level.	sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	
Collision Risk	The species was recorded flying within potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.018 collisions per year, or one bird every 54 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35- year life-time of the Proposed Project.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.4 Barn Owl (All Seasons)

Table 7-15 Potential effects during the construction and operational phases of the Proposed Project on Barn Owl (all seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There was one breeding territory for barn owl identified during surveys, 2.6km from the nearest proposed turbine, which is within the foraging range (3km) of this species (Szep *et al.*, 2019). While there were no observations at, or within 500m of, the Proposed Wind Farm, given that this is a nocturnal species, it	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low*	**Likely long-term constant slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	cannot be ruled out that this species did not hunt on site, outside of survey hours (dusk to dawn) as the Proposed Wind Farm is within the foraging range. Direct loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the development footprint is small ((i.e. 8.4ha/2.9% of Proposed Project) relative to the total area within the site. Furthermore, substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed Wind Farm site and the wider surroundings postconstruction. No significant effects of direct habitat loss are anticipated at the county, national or international level.	impact corresponds to a ***Low*** effect significance.	
Disturbance	As mentioned previously, barn owl were not observed within the Proposed Wind Farm despite undertaking a comprehensive suite of surveys that ranged from dawn to dusk over two and a half years. Despite this, as barn owl are a nocturnal species, it cannot be ruled out that this species travelled over the Proposed Wind Farm between dusk and dawn. 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) recommends a 250m disturbance buffer around a known nest site where operations should be limited. Given that the known nest site is located 2.6km from the nearest proposed turbine, there is no potential for impacts on the nest site. Furthermore, it is not anticipated that the additional activity in the area during the construction phase will not have a significant impact on foraging habits of this nesting pair.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely short-term slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	The Proposed Wind Farm 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 barn owl population. No significant effects of disturbance are anticipated at the county, national or international level.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	There was one breeding territory for barn owl identified during surveys, 2.6km 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 the nest given the considerable separation distance involved. Furthermore, if displacement were to occur, there is an abundance of suitable foraging habitat (agricultural grassland) in the wider surroundings of the Proposed Wind Farm. No significant effects of displacement are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant slight negative effect**
Collision Risk	This species was not recorded within the Proposed Wind Farm during the extensive vantage point survey work undertaken. The potential for collision risk is therefore negligible based on the survey data. Collision related mortality is not likely to significantly impact this species, particularly given this species flies at low elevation when foraging (Barn Owl Trust, 2021).	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.5 Kestrel (All Seasons)

Table 7-16 Potential effects during the construction and operational phases of the Proposed Project on Kestrel (all seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There were three breeding territories identified in 2022 (two probable territories and one confirmed) within, or adjacent to, the Proposed Wind Farm. The confirmed territory was located 1.3km from the proposed turbine layout while the probable territories were between 0.6km and 1.5km from the proposed turbine layout. The territory locations were located in sparse treelines or commercial forestry adjacent to improved agricultural grasslands and peatlands. There will be minimal loss of suitable breeding habitat, given the extent of similar woodland habitats outside the proposed turbine infrastructure. Direct loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the development footprint is small ((i.e. 8.4ha/2.9% of Proposed Project) relative to the total area within the site. Substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed Wind Farm site and the wider surroundings postconstruction. No significant effects of direct habitat loss are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant slight negative effect**
Disturbance	The Proposed Wind Farm 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 three kestrel territories identified at the Proposed Wind Farm. Given that kestrel have brood sizes of four to five chicks, and a	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely short-term slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	survival rate of 30% in their first year[14], it is likely that there would be a population of approximately six adults and three to four juvenile birds by the end of each winter season. Therefore, only 1.7% of the county population (i.e., 9 of c.519 birds (please see Section 7.4.1.12 for further details)) could be impacted. 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 Proposed Wind Farm. No significant effects of disturbance are anticipated at the county, national or international level.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Raptor studies have generally found only low levels of turbine avoidance (Hötker *et al.*, 2006; Madders and 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 Proposed Wind Farm. No significant effects of displacement are anticipated.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

[14] https://app.bto.org/birdfacts/results/bob3040.html

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	The species was recorded flying within potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.37 collisions per year, or one bird every three years with a maximum blade length of 77.5m. Annual mortality of adult kestrel has been calculated at 35% per annum (Orta *et al.*, 2020). If 0.37 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 (c.675) by 0.16%. The predicted collision risk is negligible. No significant effects are anticipated.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.6 Red Grouse (All Seasons)

Table 7-17 Potential effects during the construction and operational phases of the Proposed Project on Red Grouse (all seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was observed within 500m of the Proposed Wind Farm on seven occasions, six of which were within the upland blanket bog in the north and south of the site. The Proposed Wind Farm is predominantly agricultural grassland and conifer plantations, these habitats are considered to be suboptimal for red grouse. Direct loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the development footprint is small ((i.e. 8.4ha/2.9% of	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	Proposed Project) relative to the total area within the site. Substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed Wind Farm and the wider surroundings postconstruction. Significant habitat loss for this species is not anticipated.		
Disturbance	The species was recorded within 500m of the proposed turbine layout on seven occasions. Additionally, breeding territories were identified within or adjacent to the Proposed Project. Disturbance during construction is unlikely to significantly discourage foraging or breeding attempts as the areas of suitable habitat are located at the wider edge or outside the Proposed Wind Farm. The occurrence of red grouse near wind energy access routes in a Scottish case study was found to be higher than in the surrounding moor (Pearce-Higgins *et al.*, 2009). Additionally, populations of red grouse were found to recover within one year after disturbance caused by construction of wind farms (Pearce-Higgins *et al.,* 2012). Significant displacement effects are not anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely short-term slight negative effect**
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Operation is unlikely to discourage foraging or breeding attempts within the Proposed Wind Farm or surrounding area. A study by Douglas *et al.* (2011) found no significant change in the relationships between grouse occurrence and either turbine or track proximity	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible*	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	and found, no evidence for re-distribution in red grouse in response to wind farm operation. Additionally, substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed Wind Farm and the wider surroundings postconstruction. Significant effects are not anticipated.	impact corresponds to a ***Very Low*** effect significance.	
Collision Risk	This species was not recorded within the Proposed Wind Farm during the extensive vantage point survey work undertaken. The potential for collision risk is negligible based on the low number of observations of red grouse within the Proposed Wind Farm (seven observations within the Proposed Wind Farm) and that there were no observations of red grouse flying at the potential collision height during the vantage point surveys.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.7 Snipe (All Seasons)

Table 7-18 Potential effects during the construction and operational phases of the Proposed Project on Snipe (all seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Snipe were observed within 500m of the proposed turbine layout on seven occasions and all observations within that radius were of individual birds. While there were no confirmed breeding territories identified during surveys, there was a regular occurrence of snipe throughout the year. The loss of habitat will be minimal as the infrastructure is confined to a narrow corridor (i.e. 8.4ha/2.9% of Proposed Project) relative to the total area within the 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.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* impact corresponds to a ***Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	No significant effects of direct habitat loss are anticipated		
Disturbance	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. No evidence of breeding territories was observed between September 2020 and May 2023. Disturbance associated with construction works could result in a measurable reduction in the breeding density of snipe onsite/around the margins of the Proposed Wind Farm. However, as there is no evidence that snipe breed within the Proposed Wind Farm, no significant effects of disturbance are anticipated. Furthermore, given the abundance of similar habitats (improved agricultural grasslands) in the wider surroundings, substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed Wind Farm and the wider surroundings during construction. No significant effects of disturbance are anticipated.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely short-term Imperceptible negative effect**
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Snipe breeding density can be reduced by 50% within 400m of turbines (Pearce-Higgins *et al.*, 2009), Disturbance displacement associated with operational turbines could result in a measurable reduction in the breeding density of snipe onsite/around the margins of the Proposed Wind Farm. However, no evidence of breeding was observed for snipe during surveys between September 2020 and May 2023, therefore breeding is unlikely to be affected within the Proposed Wind Farm. Furthermore, substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	Proposed Wind Farm and the wider surroundings post-construction. No significant effects of displacement are anticipated		
Collision Risk	The species was recorded flying within potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.001 collisions per year, or one bird every 1,105 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35-year life-time of the Proposed Project.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.2.8 Buzzard (All Seasons)

Table 7-19 Potential effects during the construction and operational phases of the Proposed Project on Buzzard (all seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded within the Proposed Wind Farm during the breeding and winter seasons. The construction of the Proposed Wind Farms will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e., 8.4ha/2.9% of Proposed Project) relative to the total area within the site. There was one confirmed breeding territories and two probable territories identified within or adjacent to the Proposed Wind Farm during the 2021	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Low* sensitivity species and *Low* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant slight negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	breeding season and two confirmed and two probable breeding territories within or adjacent the Proposed Wind Farm during the 2022 breeding season (see Confidential Appendix 7-5, Figure 7-5-21). A confirmed breeding territory was also observed during the 2021 breeding season, 2.5km from the Proposed Wind Farm. There is evidence of breeding within the Proposed Wind Farm in areas of mature woodland/treelines. These habitats are not unique to the Proposed Wind Farm and are not a rare resource in the wider area. Significant loss of breeding habitat is not anticipated. Direct loss of potential foraging habitat to the footprint of the Proposed Wind Farm will be minimal. No significant effects of direct habitat loss are anticipated at the county, national or international level.		
Disturbance	Onsite areas and to a 500m radius of the Proposed Wind Farm has hosted up to three breeding pairs of buzzard between 2021 and 2023 (see Confidential Appendix 7-5, Figure 7-5-21). As previously discussed, this species is resident at the Proposed Wind Farm. 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 Proposed Wind Farm. However, these lands (e.g., treeline, scrub, adjacent woodland and farmland) are not considered unique to the Proposed Wind Farm or rare in the wider surroundings. No significant effects of disturbance are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Medium*. The cross tablature of a *Low* sensitivity species and *Medium* impact corresponds to a ***Very Low*** effect significance.	**Likely short-term slight negative effect**
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Displacement and Barrier Effect	This species was frequently recorded within the Proposed Wind Farm during the breeding and winter seasons. As previously discussed, there was one confirmed breeding territories and two probable territories identified within or adjacent to the Proposed Wind Farm during the 2021 breeding season, one confirmed breeding territory within the Proposed Wind Farm in 2022 and one probable territory in 2023. Pearce-Higgins (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. There was a maximum of one breeding territory identified within 500m of the Proposed Wind Farm. 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). Additionally, there were 90 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 Proposed Wind Farm and there is an abundance of suitable habitat for this species greater than 500m from the proposed turbine layout within the Proposed Wind Farm and its surroundings. No significant effects of displacement are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Medium*. The cross tablature of a *Low* sensitivity species and *Medium* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**
Collision Risk	The species was recorded flying within the potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Low* sensitivity species and *Low* impact	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.3 collisions per year, or one bird every three years with a maximum blade length of 77.5m. The favourable conservation status of this species (Green-listed BoCCI) limits the potential for ecologically significant effects to result. The loss one bird every three years from the local population of a Green-listed (BoCCI) species is considered of low significance.	corresponds to a **Very Low** effect significance.	

7.5.2.9 Sparrowhawk

Table 7-20 Potential effects during the construction and operational phases of the Proposed Project on Sparrowhawk

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded on seven occasions within 500m of the proposed turbine layout during the breeding and winter seasons. The construction of the Proposed Wind Farm will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e. 8.4ha/2.9% of Proposed Project) relative to the total area within the site. Within, or partially within, the Proposed Wind Farm there was one probable breeding territory identified in 2021, and one confirmed breeding territory identified in 2022 (see Appendix 7-4, Figure 7-5-24). There is the potential for the loss of nesting habitat within the Proposed Wind Farm. However, these lands (e.g. agricultural land, commercial forestry and treelines) are not considered unique to the Proposed Wind Farm or rare in the wider surroundings. No significant effects of direct habitat loss are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Low* sensitivity species and *Low* impact corresponds to a **Very Low** effect significance.	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
Disturbance	As previously discussed, breeding sparrowhawk were recorded during the 2021 and 2022 breeding seasons. One confirmed breeding territory was recorded within 500m of the proposed turbine layout in 2022, while a probable territory was recorded 0.8km from the proposed turbine layout in 2021. Construction activity adjacent to the nest sites within the Proposed Wind Farm could 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 Proposed Wind Farm. However, these lands (e.g., farmland, adjacent woodland and treelines) are not considered unique to the Proposed Wind Farm or rare in the wider surroundings. No significant effects of disturbance are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Medium*. The cross tablature of a *Low* sensitivity species and *Medium* impact corresponds to a ***Very Low*** effect significance.	**Likely short-term Imperceptible negative effect**
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated given that no new infrastructure is proposed during this phase.	**No Effect**	**No Effect**
Displacement and Barrier Effect	As previously discussed, the Proposed Wind Farm 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). There was one territory within 500m of the proposed turbine layout 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 Proposed Wind Farm.	The magnitude of the effect is assessed as *Medium*. The cross tablature of a *Low* sensitivity species and *Medium* impact corresponds to a ***Very Low*** effect significance.	**Likely long-term constant Imperceptible negative effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2022)
	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 Proposed Wind Farm with significant areas of similar habitats available outside the Proposed Wind Farm. No significant effects of direct habitat loss are anticipated at the county, national or international level.		
Collision Risk	The species was recorded flying within the potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6) and three collision risk analysis methods were conducted: a minimum rotor diameter (149m), a median rotor diameter (150m) and a maximum rotor diameter (155m). Taking a precautionary approach the highest collision result is outlined below. The collision risk has been calculated at a rate of 0.004 collisions per year, or one bird every 270 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35- year life-time of the Proposed Project.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Low* sensitivity species and *Low* impact corresponds to a **Very Low** effect significance.	**Likely long-term constant Imperceptible negative effect**

7.5.3 Effects on Key Ornithological Receptors during Decommissioning

Potential effects on KORs that may occur during the decommissioning of the wind farm are described below. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022).

Table 7-21 Potential impacts during the decommissioning phase of the Proposed Project on KOR during decommissioning

Potential impacts during the decommissioning phase of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Disturbance	As above for the construction phase for each species in Section 7.5.2.	As above for the construction phase for each species in Section 7.5.2.	As above for the construction phase for each species in Section 7.5.2.

7.5.4 Effect Associated with the Proposed Grid Connection Route

The Proposed Grid Connection Route will commence from the proposed onsite 38kV substation and will run along existing roads to the existing 110kV Ardnacrusha substation. Required works are minor and are all located within the existing road corridor (full details in Chapter 4 of this EIAR).

For the Proposed Grid Connection Route , the existing habitats (i.e. existing roads) do not have the potential to support species of conservation interest in the area. On a precautionary basis, it is assumed that some temporary disturbance may occur during works. However, given the extent of suitable habitat in the wider area, significant disturbance effects are not predicted. The effect significance for all KORs is classed as no greater than ***Low*** (Percival, 2003) or a **likely short-term slight negative effect (**EPA, 2022).

7.5.5 Effect Associated with the Turbine Delivery Route

The proposed Turbine Delivery Route (TDR) will require temporary junction accommodation for abnormal loads, therefore required works are also minor and are located within the existing road corridor (full details in Chapter 4 of this EIAR). Upon completion of the turbine delivery phase, the route delivery temporary accommodation works location will revert back to its existing condition.

For the TDR, the existing habitats (i.e. existing roads) do not have the potential to support species of conservation interest in the area. On a precautionary basis, it is assumed that some temporary disturbance may occur during works. However, given the extent of suitable habitat in the wider area, significant disturbance effects are not predicted. The effect significance for all KORs is classed as no greater than ***Low*** (Percival, 2003) or a **likely short-term slight negative effect (**EPA, 2022).

7.5.6 Effects on Designated Areas

The Proposed Wind Farm is not located within the boundaries of any European Sites (see Section 7.3.1). An Appropriate Assessment screening was prepared to provide the information necessary to complete an Appropriate Assessment for the Proposed Project. The screening identified and assessed a potential pathway for indirect effects on the Lough Derg SPA.

Following the screening, a Naura Impact Statement was prepared which concluded that:

"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 and operation of the Proposed Project does not adversely affect the integrity of European sites. Therefore, it can be objectively concluded that the Proposed Project, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.".

As such, it can be concluded that the Proposed Project will not have an adverse impact on any European Sites designated for birds, either alone or in combination with other plans or projects. No proposed National Heritage Area or National Heritage Area within the ZOI were considered as ornithological ecological receptors in their own right due to the separation distance from the Proposed Project and the absence of connectivity.

7.6 Mitigation and Best Practice Measures

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

- Design of the Proposed Project.
- Management of the development phases.

7.6.1 Design of the Proposed Project

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

- Hardstanding areas have been designed to the smallest possible footprint practicable to accommodate the turbine range being assessed within this EIAR.
- The Proposed Grid Connection Route has been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.
- The Proposed Project avoids wildlife refuge sites (e.g. waterbodies).

7.6.2 Management of the Proposed Project Phases

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

7.6.2.1 Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared and will be in place prior to the start of the construction phase. Full details of the CEMP are available in Chapter 4 Appendix 4-3, while details pertinent to birds are summarised below. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results.

- Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by pre-construction bird surveys.
- The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context.
- 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. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use (Chapter 12).
- Silt fences will be installed as an additional water protection measure around existing watercourses.
- An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include:
    - Organise the undertaking of a pre-construction walkover bird survey to ensure that significant effects on birds will be avoided.
    - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Wind Farm.

- Oversee management of ornithological 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 as necessary.

7.6.2.2 Operational Phase

No significant operational phase impacts requiring mitigation were identified.

7.6.2.3 Decommissioning Phase

During the decommissioning phase, disturbance limitation measures will be as per the construction phase described in Section 7.6.2.1.

7.7 Monitoring

The following monitoring measures are proposed as industry best practice rather than in response to any identified impacts associated with the Proposed Project. Please see Appendix 7-7 for further details.

7.7.1 Pre-Construction and Construction Surveys

It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the Proposed Project site to identify sensitive sites (e.g. roosts). Any requirement for construction works to run into the subsequent breeding and winter seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July) and once during the winter season (October). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question.

The survey will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the development footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with most recent best practice guidance (e.g., Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.

7.7.2 Operational Phase Surveys

In line with best practice measures, a detailed Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project (refer to Appendix 7-6 for further details). The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the Proposed Wind Farm. Surveys will be scheduled to coincide with Years 1, 2,

3, 5, 10 and 15 of the life-time of the Proposed Wind Farm. Monitoring measures are broadly based on guidelines issued by SNH (2009). The following individual components are proposed:

- Monthly flight activity surveys: vantage point surveys
- Breeding bird surveys: adapted Brown and Shephard
- 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 (as per guidance outlined in NatureScot, 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.

7.7.3 Decommissioning

It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the Proposed Project to identify sensitive sites (e.g. roosts). Any requirement for decommissioning works to run into the subsequent breeding and winter seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July) and once during the winter season (October). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question.

The surveys will be undertaken by a suitably qualified ornithologist. The surveys will comprise a thorough walkover survey of the development footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with most recent best practice guidance (e.g., Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.

7.8 Residual Effects

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

- Hen Harrier (Winter)
- Hen Harrier (Breeding)
- Peregrine (All Seasons)
- Barn Owl (All Seasons)
- Kestrel (All Seasons)
- Red Grouse (All Seasons)
- Snipe (All Seasons)
- Buzzard (All Seasons)
- Sparrowhawk (All Seasons)

Following the measures described in Section 7.6, no effect significance greater than ***Low,*** as per Percival (2003) criteria, was identified for any KOR. No effect significance greater than ***Slight,*** as per EPA (2022) criteria, was identified for any KOR. Taking into consideration the effect significance levels identified and the proposed best practice and mitigation, significant residual effects on the KORs with regard to direct habitat loss, disturbance/displacement or collision mortality are not anticipated.

7.9 Cumulative Effects

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

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

This section first identifies other plans and projects in the vicinity of the Proposed Wind Farm and then assesses the potential for additive, antagonistic or synergistic impacts to occur.

7.9.1 Other Plans and Projects

Assessment material was compiled for relevant developments within the vicinity of the Proposed Wind Farm. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, planning application details and planning drawings. It served to identify past and future plans and projects, their activities and their environmental impacts. These are then considered for in-combination or cumulative effects with the Proposed Project. All plans and projects reviewed are outlined below.

7.9.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Clare County Development Plan 2023-2029
- Mid-West Regional Planning Guidelines 2010-2022
- National Biodiversity Action Plan 2023-2030

7.9.1.2 Projects Considered in the Cumulative Impact Assessment

NatureScot guidance (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)'. Please note that a 25km radius of the Proposed Wind Farm was considered a reasonable approximation of the size of a county and a 5km radius of the Proposed Wind Farm was considered a reasonable approximation for the local level.

To conduct the cumulative impact assessment, Clare County Council online planning registers, relevant EIAR (or EIS) documents, planning application details and planning drawings in the vicinity of the Proposed Wind Farm 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.

7.9.1.2.1 *Forestry and Agricultural Practices*

Some areas within the surrounding area are planted with commercial forestry. The forestry works (felling/planting) associated with the forestry in the wider surroundings of the Proposed 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.

7.9.1.2.2 Developments/Landuses

The review of the Clare County Council planning register identified relevant general development planning applications in the vicinity of the Proposed Project. Most of these relate to the provision and/or alteration of one-off rural housing and agriculture-related structures, as described in Chapter 2 of the EIAR. Owing to the scale and nature of these developments, significant cumulative impacts are not anticipated.

7.9.1.2.3 Other Wind Farm Developments

Wind farm projects within 25km of the Proposed Wind Farm are provided in Table 7-22, including details of their planning status. A total of three existing and 59 proposed/permitted turbines were identified for consideration. The environmental impacts of each permitted or existing wind farm are outlined in detail in this section.

Table 7-22 Wind energy applications within 25km of the Proposed Wind Farm

County	Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)
Clare	Fahybeg Wind Farm	Permitted	8	c.1.3km
	Carrownagowan Wind Farm	Permitted	19	c.2.2km
	Knockshanvo Wind Farm	Proposed	9	c.5.1km
	Oatfield Wind Farm	Proposed	11	c.6.1km
	Ballycar Wind Farm	Proposed	12	c.11km
	Parteen Turbine	Existing	1	c.12.3km
	Single Domestic Turbine at Portdrine	Existing	1	c.19km
Limerick	Vision Care Turbine	Existing	1	c.13.7km

Fahybeg Wind Farm

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Fahybeg Wind Farm was considered. The planning file[15] was reviewed on the An Bord Pleanála website. Fahybeg Wind Farm shared the following key ornithological receptors within the Proposed Wind Farm: buzzard, hen harrier, kestrel, peregrine, snipe and sparrowhawk. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be Very Low (as per Percival, 2003) for kestrel and buzzard. The remaining KORs were not subject to collision risk assessment as they were not recorded during vantage point surveys or were recorded for less than 200 seconds in total at the potential collision height. Displacement/barrier effect, post mitigation, was assessed to be no greater than Medium (as per Percival, 2003) for kestrel at a

[15] https://www.pleanala.ie/en-ie/case/317227

local scale only, Low (as per Percival, 2003) for hen harrier, peregrine, kestrel, snipe, buzzard, and Very Low (as per Percival, 2003) for woodcock and sparrowhawk.

The cumulative assessment for the Fahybeg Wind Farm assessed the cumulative construction and operational impacts on birds of the wind farm when wind farms within 20km were taken into consideration. It was concluded that there would be no significant cumulative displacement/barrier effects or collision risk anticipated.

Carrownagowan Wind Farm

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside the permitted Carrownagowan Wind Farm was considered. The planning file[16] was reviewed on the An Bord Pleanála website. Carrownagowan Wind Farm shared the following key ornithological receptors within the Proposed Wind Farm: hen harrier, peregrine, sparrowhawk, kestrel, buzzard and red grouse.

Hen harrier was found to have *Short-term Significant* displacement and barrier effects during the construction phase and *Slight to Moderate* effects during the operational phase and mitigation measures were included to reduce effects. All other KORs at Carrownagowan (shared with Lackareagh) were assessed to be no higher than *Low* or *Slight* effects (EPA, 2022). Mitigation measures include avoidance of recognised buffers installed at identified breeding hen harrier locations, pre-construction and construction phase bird surveys to identify hen harrier nests prior to any work being carried out and suspension of heavy construction works within 500m of hen harrier nest sites, an exclusion zone enforced throughout the construction phase around nests, habitat improvement lands for hen harrier to provide foraging and potential nesting habitats through ecological improvement of existing areas of conifer plantations and the rehabilitation of peatland habitats. The EIAR identified two areas for habitat improvement to restore blanket bogs and heath habitats in felled areas and the areas were selected based on suitability for foraging hen harrier, proximity to the nearby Slieve Bernagh SAC and open peatlands and proximity to a previously successful hen harrier nesting area. The areas comprise 106ha in total with an additional 54ha of biodiverse farmland that will remain in its ecologically valuable state for the lifetime of the wind farm. With mitigation measures in place, this EIAR states that residual effects will have no impact on key ornithological receptors at this site.

The cumulative assessment for the Carrownagowan Wind Farm assessed the cumulative barrier effect and collision risk of the wind farm when wind farms within 30km were taken into consideration. It was concluded that there would be no significant cumulative effects on avian KORs in-combination with other wind farms.

Oatfield Wind Farm

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Oatfield Wind Farm was considered. The planning file[17] was reviewed on the An Bord Pleanála website. Oatfield Wind Farm shared the following key ornithological receptors within the Proposed Wind Farm: hen harrier, peregrine, kestrel, red grouse, snipe and buzzard. Habitat loss during the construction phase was assessed to be a medium effect magnitude for hen harrier, kestrel and woodcock, a small effect magnitude for red grouse peregrine and buzzard and negligible for snipe. Disturbance/displacement during the construction phase was assessed to be a small effect magnitude for hen harrier, peregrine, kestrel red grouse and buzzard and negligible for snipe. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be not significant for all species. Displacement/barrier effect, post mitigation, was assessed to be not significant. The EIAR also includes mitigation as habitat reinstatement and creation focusing on

[16] https://www.pleanala.ie/en-ie/case/308799
[17] https://www.pleanala.ie/en-ie/case/318782

red grouse and hen harrier. The species and habitat management plan allocates a total of 173.66ha of managed habitats (grassland, heath, scrub and forestry) and 14.48km of linear habitats (hedgerows) as compensatory habitats for hen harrier.

The cumulative assessment for the Oatfield Wind Farm assessed the cumulative construction and operational impacts on birds of the wind farm when wind farms within 20km were taken into consideration. It was concluded that there would be no significant cumulative displacement/barrier effects or collision risk anticipated.

Knockshanvo Wind Farm

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Knockshanvo Wind Farm was considered. The planning file[18] was reviewed on An Bord Pleanála and no information regarding potential effects on birds was available due to this project being in the pre-planning stage. The following information is available and was considered. The indicative turbine locations for Knockshanvo Wind Farm are in an area of predominantly commercial forestry. The proposed Knockshanvo Wind Farm is located <1km from the previously discussed proposed Oatfield Wind Farm and Knockshanvo proposed turbines are located directly to the north and south of Oatfield turbines in similar conifer plantations, as such it is probable that the bird distribution and abundance of that site are similar to the proposed Knockshanvo Wind Farm. Please see the above information from the Oatfield Wind Farm planning file for further information.

Ballycar Wind Farm

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Ballycar Wind Farm was considered. The planning file[19] was reviewed on the An Bord Pleanála website. Ballycar Wind Farm shared the following key ornithological receptors within the Proposed Wind Farm site: hen harrier, peregrine, kestrel sparrowhawk and buzzard. Habitat loss was assessed and determined to be an adverse effect of slight significance for all species. Disturbance during construction was assessed to be a significant adverse effect for breeding hen harrier, kestrel, woodcock and buzzard, an imperceptible effect for sparrowhawk and a not significant effect for wintering hen harrier and peregrine. Displacement during construction was assessed to be Slight for hen harrier, kestrel and buzzard and not significant for peregrine and sparrowhawk. Collision risk was found to be imperceptible for hen harrier and sparrowhawk and slight for kestrel and buzzard. Collision risk was found to be moderate for peregrine, with the highest risk determined to be for inexperienced young birds. Mitigation measures included real time monitoring of breeding locations to determine breeding activity and to determine routes taken by adults when leaving or arriving to the site, to identify turbines with the highest risk of collision and to curtail turbine activity during peak activity of juveniles. With mitigation measures enforced, it is determined that there will be no significant residual effects to peregrine or any other key ornithological receptors.

The cumulative assessment for the Ballycar Wind Farm assessed the cumulative construction and operational impacts on birds of the wind farm when wind farms within 25km were taken into consideration. It was concluded that there would be no significant cumulative displacement/barrier effects or collision risk anticipated.

Parteen Turbine

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Parteen Turbine was considered. The planning file[20] was reviewed on the Clare

[18] https://www.pleanala.ie/en-ie/case/315797
[19] https://www.pleanala.ie/en-ie/case/318943
[20] https://www.eplanning.ie/ClareCC/AppFileRefDetails/22254/0

County Council Planning Register and the Appropriate Assessment Screening report was reviewed. No significant impacts on designated birds were anticipated in the report. Parteen Turbine development is located within predominately agricultural habitats.

Single Domestic Turbine at Portdrine

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Single Domestic Turbine at Portdrine was considered. The planning file[21] was reviewed on the Clare County Council Planning Register and no information regarding potential effects on birds was available. The Single Domestic Turbine at Portdrine is located within predominately scrub/agricultural habitats.

Vision Care Turbine

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Vision Care Turbine was considered. The planning file[22] was reviewed on the Limerick County Council Planning Register and the EIS for the Vision Care Turbine was consulted. No significant impacts on birds were identified in the EIS.

7.9.2 Assessment of Cumulative Effects

There were seven KORs identified at the Proposed Project: hen harrier, peregrine, kestrel, red grouse, snipe, buzzard, sparrowhawk. A key consideration in the assessment of the potential for cumulative impacts to result in significant effects on KORs is proximity. For the purposes of this cumulative assessment, the local scale is considered to be a 5km radius of the Proposed Wind Farm. There are only two wind farms within 5km of the Proposed Wind Farm site (Fahybeg Wind Farm and Carrownagowan Wind Farm); the remaining were within 5-25km.

Following SNH (2012) guidance, the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor: National Importance (hen harrier; breeding population); County Importance (hen harrier; winter population, peregrine, kestrel, red grouse, snipe); and Local Importance Higher Value (buzzard, sparrowhawk). The assessment of cumulative effects on KORs is provided below. In particular, cumulative habitat loss and displacement associated with operational turbines is assessed. Short-term impacts (e.g. construction disturbance) are highly unlikely to give rise to significant cumulative impacts. For this reason, it is not considered further.

7.9.2.1 Wintering Hen Harrier (County Importance)

The decline in hen harrier populations in Ireland is a result of human related pressures, in particular habitat modification and loss. The industries that most closely overlap with the distribution of hen harrier in the surrounding uplands are commercial forestry, agricultural, and wind farms[23]. As outlined in Article 12 reporting[24] the key threats/pressures acting on hen harrier relate to forestry practise (including forest planting on open ground and forestry management) and the modification of cultivation practices. These threats/pressures are described as of high importance. Impacts associated with wind farms (renewable abiotic energy use) are classified as of medium importance. The recently drafted Threat Response Plan for the Hen Harrier 2024-2028 prepared by NPWS includes a similar summary of the Article 12 threat/pressures. These threats are likely to apply locally in the survey area which is

[21] https://www.eplanning.ie/ClareCC/AppFileRefDetails/09742/0
[22] https://www.eplanning.ie/LimerickCCC/AppFileRefDetails/13746/0
[23] The majority of these wind farms are currently proposed and have yet to receive a planning permission decision.
[24] https://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envxztxxq/IE_birds_reports_20191031-130157.xml&conv=612&source=remote

located in an upland area where agricultural practices and commercial planting are the most frequent habitat use.

Foraging hen harrier was infrequently recorded within the Proposed Wind Farm. The impacts of habitat loss, disturbance, displacement and barrier effects as a result of the Proposed Project are assessed to be of low significance. No significant effects of collision risk are anticipated at the county, national or international level. In the wider surroundings of the Proposed Wind Farm, hen harrier are largely roosting and foraging in scrub and heath habitats such as those in the Slieve Bernagh Bog SAC. The Proposed Wind Farm is unlikely to contribute significantly to the negative cumulative effects as the proposed turbines are sited in habitats (improved agricultural grassland and commercial forestry) that are not favoured by hen harrier as evidenced by surveys. Therefore, hen harrier are not dependent on the habitat that would be lost onsite. If hen harrier are not dependent on these habitats then any loss of these habitats is unlikely to contribute to significant cumulative effects.

No significant cumulative impacts on this species were identified within 5km of the Proposed Wind Farm, as the two wind farms within this area (i.e., Fahybeg Wind Farm and Carrownagowan Wind Farm) did not anticipate significant effects with mitigation measures in place. There are no significant effects between these two wind farms and in combination, there are no cumulative effects with the Proposed Project. Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Proposed Wind Farm.

The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilised for hunting and/or roosting. Fahybeg Wind Farm and Carrownagowan Wind Farm are located partially within commercial forestry, peatland and open farmland and are therefore suitable for foraging and roosting hen harrier. However, the habitats at the Proposed Wind Farm site and these wind farms (commercial forestry/farmland/peatland) are not considered to be a scarce resource in the area. Additionally, commercial forestry is a non-native habitat of low ecological value. Extensive areas of suitable foraging and roosting habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area.

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. Taking into consideration that there are only two other wind farms within 5km of the Proposed Wind Farm and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.9.2.2 Breeding Hen Harrier (National Importance)

The decline in hen harrier populations in Ireland is a result of human related pressures, in particular habitat modification and loss. The industries that most closely overlap with the distribution of hen harrier in the surrounding uplands are commercial forestry, agricultural, and wind farms[25]. As outlined in Article 12 reporting[26] the key threats/pressures acting on hen harrier relate to forestry practise (including forest planting on open ground and forestry management) and the modification of cultivation practices. These threats/pressures are described as of high importance. Impacts associated with wind farms (renewable abiotic energy use) are classified as of medium importance. The recently drafted Threat Response Plan for the Hen Harrier 2024-2028 prepared by NPWS includes a similar summary of the Article 12 threat/pressures. These threats are likely to apply locally in the survey area which is

[25] The majority of these wind farms are currently proposed and have yet to receive a planning permission decision.
[26] https://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envxztxxq/IE_birds_reports_20191031-130157.xml&conv=612&source=remote

located in an upland area where agricultural practices and commercial planting are the most frequent habitat use.

There were four observations indicative of breeding activity throughout the survey period however no breeding territories were located within the Proposed Wind Farm despite comprehensive survey efforts. All breeding activity was observed greater than 1.8km to the north from the nearest proposed turbine. The nearest known nest is located approximately 1.6km to the north/northwest of the site and these birds are likely to be largely foraging in the Slieve Bernagh Bog SAC and other similar peatland habitats that will remain unaffected by the Proposed Project. It is reasonable to assume that these SAC habitats are favoured by local hen harrier given their suitability and proximity to the breeding territories. The Proposed Wind Farm is unlikely to contribute significantly to the negative cumulative effects as the proposed turbines are sited in habitats (improved agricultural grassland and commercial forestry) that are not favoured by hen harrier as evidenced by surveys. Therefore, hen harrier are not dependent on the habitat that would be lost onsite. If hen harrier are not dependent on these habitats then any loss of these habitats is unlikely to contribute to significant cumulative effects.

Foraging hen harrier were infrequently recorded within the Proposed Wind Farm. The impacts of habitat loss, disturbance, displacement and barrier effects as a result of the Proposed Project are assessed to be of low significance. No significant effects of collision risk are anticipated at the county, national or international level.

No significant cumulative impacts on this species were identified within 5km, as the two wind farms within this area (Fahybeg Wind Farm and Carrownagowan Wind Farm) did not anticipate significant effects with mitigation measures in place. There are no significant effects between these two wind farms and in combination, there are no cumulative effects with the Proposed Project. The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilized for hunting and/or nesting. The nearby permitted Fahybeg Wind Farm and permitted Carrownagowan Wind Farm are located partially within commercial forestry, peatland and open farmland and are therefore suitable for foraging and nesting hen harrier. However, the habitats at the Proposed Wind Farm site and the Fahybeg Wind Farm and Carrownagowan Wind Farm (commercial forestry/farmland/peatland) are not considered to be a scarce resource in the area. Additionally, commercial forestry is a temporarily suitable habitat for the first ten years after planting, after which it becomes unsuitable as the forestry matures. Extensive areas of suitable foraging and roosting habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area e.g. Slieve Bernagh SAC. Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Proposed Wind Farm.

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. Taking into consideration that there are only two other wind farms within 5km of the Proposed Wind Farm and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.9.2.3 Peregrine (County Importance)

Foraging peregrine was recorded within the Proposed Wind Farm, with a confirmed nest located approximately 4.1km from the Proposed Wind Farm. The impacts of habitat loss, disturbance, displacement and barrier effects as a result of the Proposed Project were assessed to be of very low significance. No significant effects of collision risk are anticipated at the county, national or international level.

The potential for developments at a county scale (25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. The habitats within

the identified wind farms within 25km of the Proposed Wind Farm comprise agricultural grassland, upland bog and commercial forestry. Some of these habitats offer some foraging potential for peregrine. However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of the Proposed Wind Farm, significant cumulative impacts are not anticipated. Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Proposed Wind Farm.

There are seven proposed/existing wind energy developments located within the maximum foraging range of peregrine (Fahybeg, Carrownagowan, Oatfield, Ballycar, Parteen Turbine and Vision Care). The maximum foraging range of peregrine is 18km (NatureScot, 2016). No significant impacts on peregrine were anticipated from any of these developments. The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilized for hunting and/or nesting. Fahybeg, Carrownagowan, Oatfield, Knockshanvo and Ballycar wind farms are located partially within commercial forestry, peatland and open farmland and are therefore suitable for foraging peregrine. The Parteen turbine is located in agricultural grassland and the Vision Care turbine in built land. The habitats at the Proposed Wind Farm site and these wind farms (commercial forestry/farmland/peatland) are not considered to be a scarce resource in the area. Additionally, commercial forestry is a non-native habitat of low ecological value. Extensive areas of suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area.

No significant cumulative impacts on this species were identified within 5km, as the two wind farms within this area (Fahybeg Wind Farm and Carrownagowan Wind Farm) did not anticipate significant effects with mitigation measures in place. There are no significant effects between these two wind farms and in combination, there are no cumulative effects with the Proposed Project. Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Proposed Wind Farm.

Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.9.2.4 Kestrel (County Importance)

Kestrel were recorded hunting within the Proposed Wind Farm and breeding territories were identified adjacent to the Proposed Wind Farm or within the wider area. The impacts of habitat loss, displacement and barrier effects as a result of the Proposed Project were assessed to be of very low effect significance. No significant effects of collision risk are anticipated at the county, national or international level.
The potential for developments at a county scale (25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Ballycar Wind Farm, the Single Domestic Turbine at Portdrine and Parteen Turbine are located within agricultural grassland habitat. Fahybeg Wind Farm, Carrownagowan Wind Farm and Oatfield Wind Farm turbines are located within commercial forestry. The single Vision Care turbine is located on built land. These habitats offer some breeding and foraging potential for kestrel. However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of the Proposed Wind Farm, significant cumulative impacts are not anticipated. Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Proposed Wind Farm.

There is one wind energy development located within the foraging range of kestrel (Fahybeg Wind Farm). The core foraging range of kestrel is 1.8km (based off a maximum home range of 10km^2 (Village, 1990)). The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilized for

hunting and/or nesting. However, these habitat types are not rare locally. Therefore, significant cumulative impacts are not predicted. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.9.2.5 Red Grouse (County Importance)

The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered.

Fahybeg, Ballycar, Oatfield and Carrownagowan wind farms are located partially within open farmland and commercial forestry, which is of limited ecological value for red grouse. Oatfield Wind Farm is located adjacent to bogland habitats, which have the potential to support red grouse populations. There are three proposed turbines in Oatfield wind farm which have the potential to cause displacement of red grouse, however any potential impacts have been offset by the proposed Oatfield enhancement measures. The separation distance between the Proposed Wind Farm and the proposed Oatfield Wind Farm is large enough so that cumulative impacts on red grouse are not anticipated.

The majority of wind farms within 25km of the Proposed Project (including the Proposed Wind Farm site) are located in commercial forestry or open farmland, which are not suitable for red grouse, significant cumulative impacts are not anticipated. 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 farms located within a 25km radius of the Proposed Wind Farm.

Red grouse was not observed during any of the vantage point surveys during the survey period and was therefore not assessed for collision risk. Cumulative collision risk is therefore not considered to be significant as the predicted impact is effectively zero.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative effects are not predicted.

7.9.2.6 Snipe (County Importance)

Snipe were recorded travelling over the Proposed Wind Farm and there were observations of birds utilising habitats within the Proposed Wind Farm. The impacts of habitat loss, disturbance, displacement and barrier effects as a result of the Proposed Project are classed as up to low significance. No significant effects of collision risk are anticipated at the county, national or international level.

The potential for developments at a county scale (25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilized for foraging and/or nesting. Fahybeg, Carrownagowan, Oatfield, Knockshanvo and Ballycar wind farms are located partially within commercial forestry, peatland and open farmland and are therefore suitable for foraging peregrine. The Parteen turbine and the single domestic turbine at Portdrine are located in agricultural grasslands and the Vision Care turbine in built land. The habitats at the Proposed Wind Farm site and these wind farms (commercial forestry/farmland/peatland) are not considered to be a scarce resource in the area. Additionally, commercial forestry is a non-native habitat of low ecological value. Extensive areas of

suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area.

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.9.2.7 Buzzard (Local Importance)

Buzzard was recorded hunting within the Proposed Wind Farm in addition to three confirmed and two probable breeding territories between 2021 and 2023. The impacts of habitat loss, disturbance, displacement and barrier effects as a result of the Proposed Project were assessed to be of very low effect significance. No significant effects of collision risk are anticipated at the county, national or international level.

The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilized for hunting and/or nesting. The disturbance associated with operational turbines will not significantly impact the breeding population of buzzard onsite. Similar displacement impacts are predicted on other wind farm sites locally. However, these habitat types are not rare locally. Therefore, significant cumulative impacts are not predicted.

No significant cumulative impacts on this species were identified within 5km, as the two wind farms within this area (Fahybeg Wind Farm and Carrownagowan Wind Farm) did not anticipate significant effects with mitigation measures in place. There are no significant effects between these two wind farms and in combination, there are no cumulative effects with the Proposed Project. Furthermore, no significant effects were reported for any of the wind farm located within a 25km radius (county scale) of the Proposed Wind Farm.

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.9.2.8 Sparrowhawk (Local Importance)

Sparrowhawk was recorded hunting within the Proposed Wind Farm in addition to one probable breeding territory within 500m of the proposed turbine layout and one confirmed breeding territory off-site. The impacts of habitat loss, disturbance, displacement and barrier effects as a result of the Proposed Project were assessed to be of very low effect significance. No significant effects of collision risk are anticipated at the county, national or international level.

The Proposed Project is sited predominantly in agricultural grasslands with a mixture of bog and other commercial forestry throughout, habitat types that are predominantly utilized for hunting and/or nesting. The disturbance associated with operational turbines will not significantly impact the breeding population of buzzard onsite. Similar displacement impacts are predicted on other wind farm sites locally. However, these habitat types are not rare locally. Therefore, significant cumulative impacts are not predicted.

No significant cumulative impacts on this species were identified within 5km, as the two wind farms within this area (Fahybeg Wind Farm and Carrownagowan Wind Farm) did not anticipate significant effects with mitigation measures in place. There are no significant effects between these two wind farms and in combination, there are no cumulative effects with the Proposed Project. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Proposed Wind Farm.

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.

Significant cumulative effects are not predicted.

7.10 Conclusion

Following consideration of the residual effects (post-mitigation), it is concluded that the Proposed Project will not result in any significant effects on any of the identified KORs. No significant effects on receptors of International, National or County Importance were identified. Provided that the Proposed Project is constructed, operated and decommissioned in accordance with the design, best practice mitigation and enhancement measures that are described within this application, significant individual or cumulative effects on the identified KORs are not anticipated.