7. ORNITHOLOGY

7.1 Introduction

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

This chapter is supported by Technical Appendices 7-1 to 7-4, which contain data from the surveys undertaken including full details of the survey times, weather conditions, and other relevant information together with the bird records themselves. Confidential Appendix 7-5 contains sensitive records of protected species breeding 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 Development. The Wind Farm Site and survey radii are provided in Figures 7.1-7.11 below.

The chapter is structured as follows:

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

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

- "Key Ornithological Receptor" (KOR) is defined as a species occurring within the zone of influence of the development upon which likely significant effects are anticipated and assessed.
- "Zones of Influence" (ZOI) for individual ornithological receptors refers to the zone within which potential effects are anticipated. ZOIs were assigned following best available guidance (SNH, 2016 and McGuinness *et al.,* 2015).
- "Wind Farm Site" refers to all infrastructure located within the EIAR redline with the exception of the grid connection route and the turbine delivery route.
- "Turbine delivery route" refers to works relating to upgrading the road network along the turbine delivery route to facilitate the transportation of the turbines. See Section 4.2.11 of Chapter 4 of this EIAR for further details.
- "Grid Connection route" refers to works relating to the installation of the grid connection. See Section 4.3 of Chapter 4 of this EIAR for further details.
- "Proposed Development" is defined as all elements of the development within the EIAR site boundary, including the turbine delivery route, the Grid Connection route and all other associated infrastructure.

7.1.1 Description of the Proposed Development

The full development description is provided in Chapter 4 of this EIAR. The Proposed Development will comprise up to 9 No. turbines with a tip height range of between 179.5 metres and 185 metres and all associated foundations and hardstanding areas, access roads and entrance(s) including upgrade of existing site roads and provision of new roads, electricity substation and wind farm control building(s), borrow pit(s), electrical cabling for grid connection, temporary construction compounds and a permanent meteorological mast. Upgrades to roads along the turbine delivery route will also be required.

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

7.1.2 Legislation, Guidance and Policy Context

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

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

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

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

https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Assessing%20the%20cumulative%20impacts%20of%20onshore%20wind%20farms%20on%20birds.pdf

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

The following Irish guidance documents were also consulted:

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

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

- European Commission (2002). Assessment of plans and projects significantly affecting Natura 2000 sites. Publications Office of the European Union, Luxembourg.
- European Commission (2020). Guidance document on wind energy developments and EU nature legislation. Publications Office of the European Union, Luxembourg.
- Planning and Development Acts 2000 – 2021 (as amended).
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Ireland.
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Statement reports. Environmental Protection Agency, Johnstown Castle Estate, Wexford.
- DoHPLG (2018). Guidelines for planning authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government, Government of Ireland, Dublin.
- CIEEM (2017). Guideline for Ecological Report Writing.
- Clare County Council (2023). Clare County Development Plan 2023-2029.

7.1.3 Statement of Authority and Competence

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

Field surveys were undertaken from April 2018 to September 2023 and were devised by Principal Ornithologist Padraig Cregg and were undertaken by Allen Mee, Athena Michaelides, Cian Cahalin, Colin Delahunt, Conor Geoghegan, Ciaran McKenna, Chris Peppiatt, Fionn O'Donoghue, Gerry Murphy, Ian Hynes, John Carey, Jonah Gaine, Joe Kelly, Jennifer Snook, Katie Grice, Louis De Vries, Marcus Hogan, Margeaux Pierrel, Mike Sylvia, Nessa Lee, Peter Capsey, Patrick Manley, Sherene Acun, Susan Doyle, Sean O'Brien, Tony Kennealy, Tom Ryan, Zuzana Erosova and Zak O'Connor of MKO.

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

7.2 Assessment Approach and Methodology

7.2.1 Desk Study

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

- Review of online web-mappers[1]: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey I-WeBS.
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.*, 1993; Balmer *et al.*, 2013).
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2020 – 2026 (Gilbert *et al.*, 2021).
- Review of the national survey for hen harrier 2022 report.
- Review of impact assessments associated with nearby developments including wind farms.

7.2.2 Consultation

7.2.2.1 Scoping and Consultation

The consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Section 2.6 of Chapter 2.

Table 7-1 provides a list of the organisations consulted with regard to ornithology during the scoping process and notes where scoping responses were received. Copies of all scoping responses are included in Appendix 2-2 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-6 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 7-1 Consultation Responses

	Consultee	Response	Issues Raised
01	An Taisce	No Response Received	-
02	BirdWatch Ireland	No Response Received	-
03	Department of Agriculture, Food and the Marine	Response received 26/01/23	No issues in relation to birds raised
04	Development Applications Unit (NPWS/NMS)	No Response Received	-
05	Irish Peatland Conservation Council	No Response Received	-
06	Irish Red Grouse Association	No Response Received	-
07	Irish Raptor Study Group	No Response Received	-
08	Irish Wildlife Trust	Response received 24/01/23	They do not have the capacity to respond to consultation

7.2.3 Identification of Target Species and Key Ornithological Receptors

This section of the report describes the criteria used for the selection of target species. The methodology for assessment followed a precautionary screening approach with regard to the identification of Key

[1] *Accessed on 11th July 2024*

Ornithological Receptors. Following a comprehensive desk study, initial site visits and consultation, a list of "target species" likely to occur in the zone of influence of the Proposed Development was derived. The observation/survey work carried out on the site was specifically designed to survey for these identified target species in accordance with NatureScot guidance (2017). The target species list (see Appendix 7-1) was drawn from:

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

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

7.2.4 Field Surveys

The survey work undertaken between April 2018 and September 2023 forms the core dataset for the assessment of effects on ornithology. These field surveys were undertaken in compliance with NatureScot guidance (SNH, 2017). The data provided in this report is robust and allows clear, precise and definitive conclusions to be made in relation to the avian receptors identified within the Wind Farm Site and its surroundings (up to 5km).

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

7.2.4.1 Initial Site Assessment

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

7.2.4.2 Survey Methodologies

As previously outlined, the survey work undertaken between April 2018 and September 2023 forms the core dataset for the assessment of effects on ornithology. The various survey types undertaken are described below.

7.2.4.2.1 *Vantage Point Surveys*

Vantage point (VP) surveys were undertaken broadly in accordance with NatureScot guidance (SNH, 2017) from April 2018 to September 2023. Surveys were conducted monthly throughout this survey period from five fixed point vantage points to allow as comprehensive as possible coverage of the 500m survey radius surrounding the proposed turbines. The vantage point locations were selected by undertaking a viewshed analysis, as described below, and confirmed by a recce visit in March 2018. Surveys were conducted from VP1 to VP5 from April 2018 to March 2023. In April 2023, VP2 was discontinued and surveys at VP6 commenced, to ensure as comprehensive as possible coverage of the updated viable area/turbine layout. Figure 7.1 shows the vantage point locations used between April 2018 and March 2023 and Figure 7.2 shows the vantage point locations used between April and September 2023.

Viewshed Analysis

Viewshed analysis was carried out to inform coverage of the Wind Farm Site from fixed vantage point locations. Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with QGIS (Version 3.22) using a notional layer suspended at 21m, which is representative of the minimum height considered for the Potential Collision Risk Area based on the selected turbine model. While the relevance of being able to view as much of the site to ground level is acknowledged, NatureScot guidance (2017) emphasizes the importance of visibility of the 'collision risk volume' when the data is to be used to estimate the risk of collision for birds with turbines.

The viewshed analysis involved testing each VP location for its visibility coverage by creating a viewshed point 1.75m in height (to represent the height of the observer) on a map using 10m contours terrain data. The relative height of forestry and its effects on visibility is also accounted for in the analysis. Using the ZTV software, a viewshed of 360 degrees was produced at 21m above ground level, to a 2km radius. The resulting viewshed image was then cropped to 180 degrees to give the viewshed from each VP location in line with NatureScot (2017). The viewshed analysis aims to establish whether the selected vantage points offer adequate coverage of the turbine layout plus a 500m radius of the outermost turbines, as per NatureScot (SNH 2017) recommendations. There are some limitations in the viewshed coverage of the site, due to the topography and the presence of mature forestry throughout the Wind Farm Site. This is discussed in further detail in Section 7.2.6.2 below. Figure 7.3 shows the viewshed analysis for surveys undertaken between April 2018 and March 2023 and Figure 7.4 shows the viewshed analysis for surveys undertaken between April and September 2023.

Data Recording and Digitisation

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

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

Table 7-2 Vantage Point Survey Effort

Survey Season	Months	Minimum Effort per VP
2018 Breeding Season (5 VPs)	Apr - Sep	36 hours/VP
2018/19 Non-Breeding Season (5 VPs)	Oct - Mar	36 hours/VP
2019 Breeding Season (5 VPs)	Apr - Sep	36 hours/VP
2019/20 Non-Breeding Season (5 VPs)	Oct - Mar	30 hours/VP[2]
2020 Breeding Season (5 VPs)	Apr - Sep	36 hours/VP
2020/21 Non-Breeding Season (5 VPs)	Oct - Mar	36 hours/VP
2021 Breeding Season (5 VPs)	Apr - Sep	36 hours/VP
2021/22 Non-Breeding Season (5 VPs)	Oct - Mar	36 hours/VP
2022 Breeding Season (5 VPs)	Apr - Sep	36 hours/VP
2022/23 Non-Breeding Season (5 VPs)	Oct - Mar	36 hours/VP
2023 Breeding Season (5 VPs)	Apr - Sep	36 hours/VP

Observed flight activity was recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the Site. Flight bands were split into 0-10m, 10-25m, 25-175m and >175m from April 2018 to September 2021 and into 0-15m, 15-25m, 25-200m and >200m from October 2021 to September 2023. Height bands were updated in 2021, in line with the industries shift

[2] *Please see Section 7.2.6.2 for further details: 6 hours per vantage point were missed during the 2019/20 non-breeding season due to Covid-19 restrictions.*

towards larger turbine models. All flight activity within the height bands 10-25m, 25-175 and >175m or 15-25m and 25-200m are considered to be within the potential collision height (PCH).

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

7.2.4.2.2 Breeding Walkover Surveys (Adapted Brown and Shepard Survey)

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

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

Walkover surveys were carried out during daylight hours during the core breeding season months of April, May, June and July (2018, 2019, 2020, 2021 and 2022), with the Wind Farm Site being visited three days per month on each occasion. The timing of visits followed the recommendations of Calladine *et al.* (2009). Following all survey visits, the field maps were analysed to determine the number and location of breeding territories. All non-breeding individuals and species encountered were also recorded.

The survey effort is presented in Appendix 7-2, Table 2. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.5 shows the areas surveyed.

7.2.4.2.3 Breeding Raptor Surveys

Breeding raptor surveys (i.e., birds of prey and owls) were undertaken within the Wind Farm Site and its immediate surroundings. The survey methodology was as outlined in Hardey *et al.* (2013). These surveys aimed to identify occupied territories and monitor their breeding success within the survey area. Raptor surveys were undertaken to an initial 5km (2018 – 2022) and subsequently 2km radius (2023) from the Wind Farm Site, in the form of short vantage point watches and walked transects. These surveys were undertaken monthly during the core breeding season period (April to July, in 2018, 2019, 2020, 2021, 2022 and 2023). Each round of surveys was undertaken over four to six days to survey the entirety of the survey area.

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

The key species of interest during these surveys was the hen harrier. While the study area encompassed a wider area, a key focus was the peatland habitats adjacent to the proposed wind farm site: namely Knockanuarha, Knockaphunta and Gortacullin bog NHA. These areas were comprehensively covered during surveys. Figure 7.6 shows the areas surveyed between 2018 and 2021 and Figure 7.7 shows the areas surveyed between 2022 and 2023.

7.2.4.2.4 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken in accordance with Gilbert *et al.* (1998). In 2018, 2019, 2020, 2021, 2022 and 2023, surveys were undertaken at the Wind Farm Site in May and June. The survey area extended 500m beyond the Wind Farm Site and focused on areas of suitable habitat. Surveys commenced one hour before sunset and continued for one hour after sunset or until it was too dark to see, as per Gilbert *et al.* (1998). Transects were slowly walked through areas of suitable woodland habitat onsite and to a 500m radius of the Wind Farm Site. All observations of woodcock (as well as the areas covered) were mapped. The survey aimed to record the presence of roding (displaying) male woodcock

and thereby establish the distribution and abundance of the species in the surveyed area. This survey method also allowed the observer to survey for owls, i.e., barn owls and long-eared owls.

Survey effort is presented in Appendix 7.2, Table 4. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.8 shows the transect routes surveyed.

7.2.4.2.5 Breeding Red Grouse Surveys

Breeding red grouse surveys were undertaken within the Wind Farm Site and a 500m radius. The survey aimed to identify breeding red grouse territories within the 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 site. 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-back and flying by the territory holder in response to the lure were recorded and mapped. The survey was conducted in March 2019, March 2020 and February 2021 and all surveys were conducted under National Parks and Wildlife Service license (licence numbers 011/2019, 018/2020 and 070/2021). Survey details are provided in Appendix 7-2, Table 5. Figure 7.9 shows the areas surveyed.

7.2.4.2.6 Winter Walkover Surveys

Winter walkover surveys were undertaken during the 2018/19, 2019/20, 2020/21 and 2021/22 winter seasons to record the presence of bird species of high conservation concern within areas of potentially suitable habitat for these species. The survey area extended 500m outside the Wind Farm Site.

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

Survey effort, including details of survey duration and weather condition, is presented in Appendix 7-2, Table 6. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7.10 shows the surveyed area.

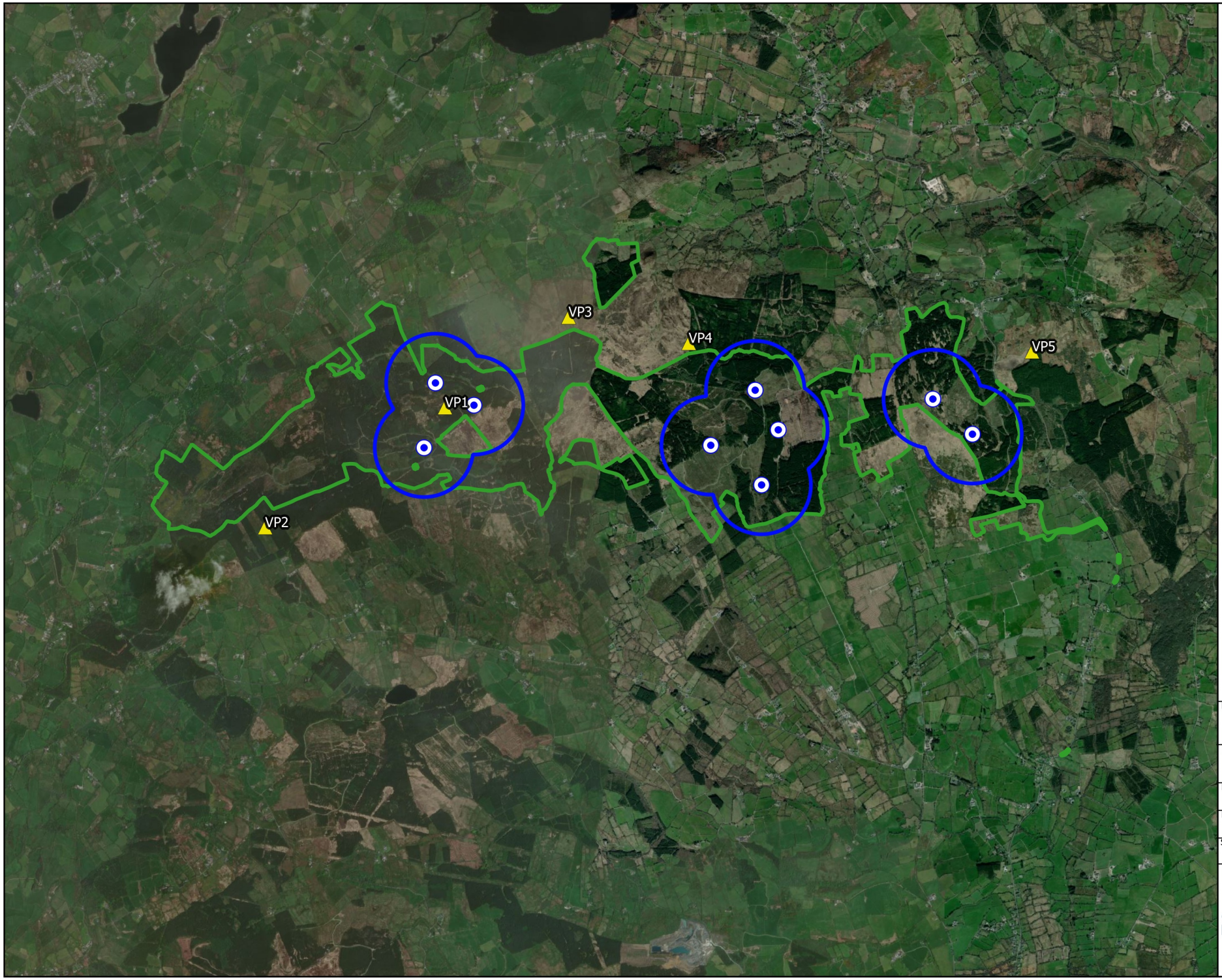
7.2.4.2.7 Hen Harrier Roost Surveys

Suitable habitat for roosting hen harrier within 2km of the Wind Farm Site were surveyed for the presence of hen harrier. Survey work was undertaken following the methodology devised by Gilbert *et al.* (1998) and the 'Hen Harrier Roost Types and Guidelines to Roost Watching' (O'Donoghue *et al.*, 2019). Surveys were carried out between October and March during the 2018/19, 2019/20, 2020/21, 2021/22 and 2022/23 non-breeding seasons. Full details of the survey effort are provided in Appendix 7-2 Table 7. Figure 7.11 shows the locations of hen harrier roost survey vantage point locations.

7.2.4.2.8 Multidisciplinary Walkover Surveys

Multidisciplinary walkover surveys of the land take areas along the proposed grid connection route and turbine delivery route were undertaken on the 6th of July 2021, 19th of August 2021 and 14th of September 2021. The surveys were undertaken in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009).

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



Map Legend

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

N

Drawing Title	Vantage Point Survey Locations April 2018 - March 2023
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: CC	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.1
Scale: 1:50,000	Date: 02/08/2024

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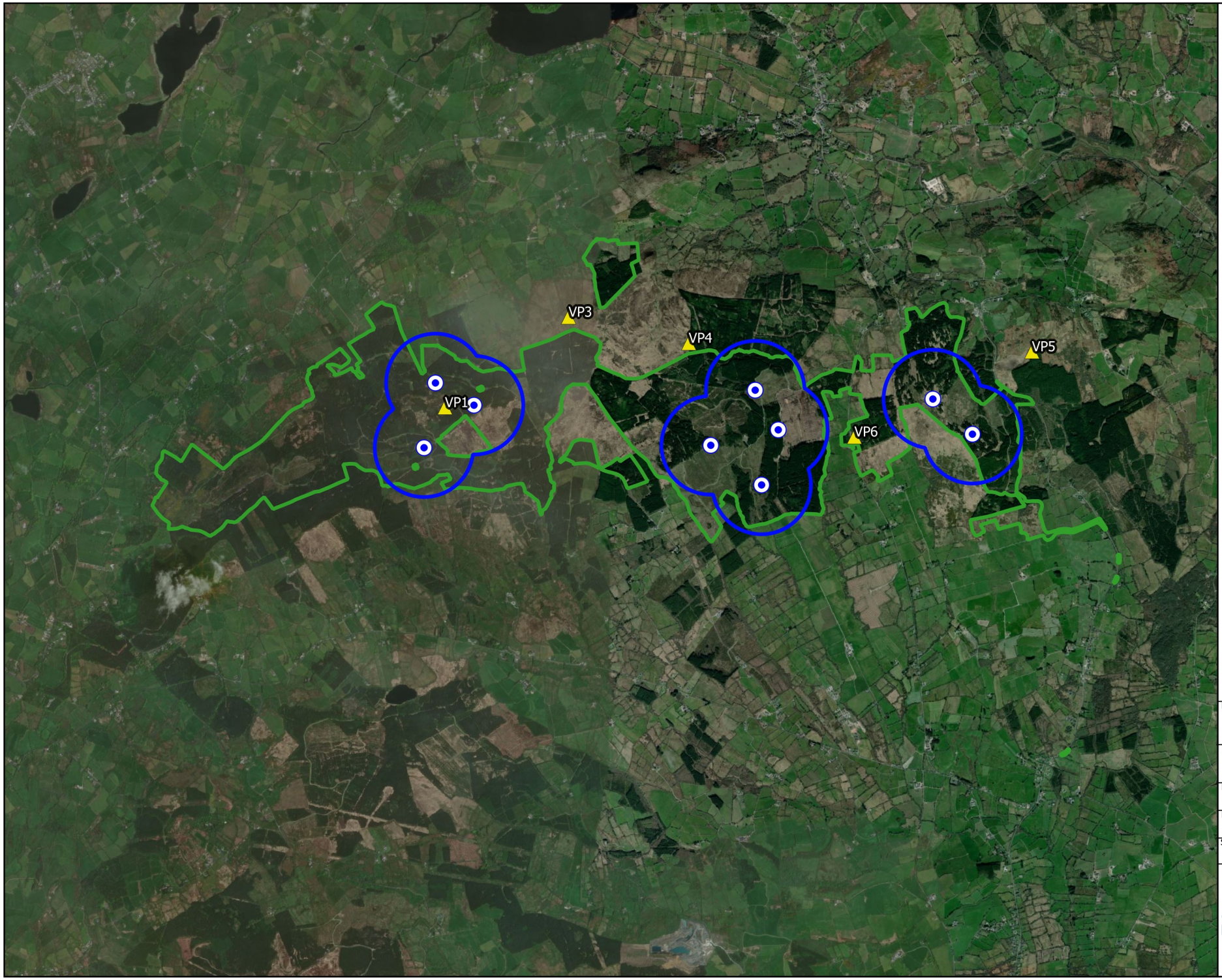

Map Legend

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

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Drawing Title
Vantage Point Survey Locations
April 2023 - September 2023

Project Title
Proposed Knockshanvo
Wind Farm Development

Drawn By	Checked By
CC	PM
Project No.	Drawing No.
180419	Fig. 7.2
Scale	Date
1:50,000	02/08/2024

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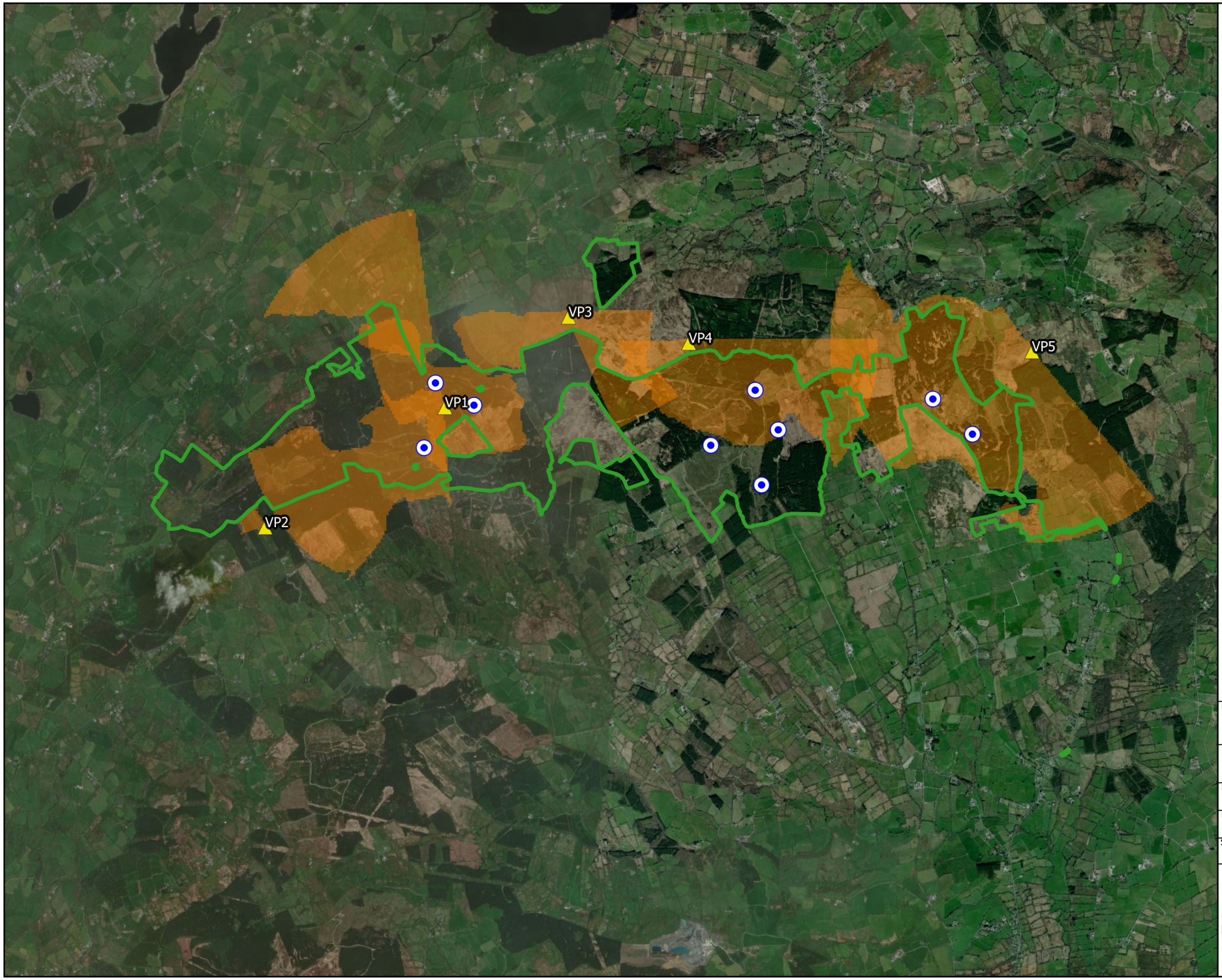

Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Vantage Point Survey Locations
- Viewshed

N

Drawing Title	Viewseheds April 2018 - March 2023
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.3
Scale: 1:50,000	Date: 02/08/2024

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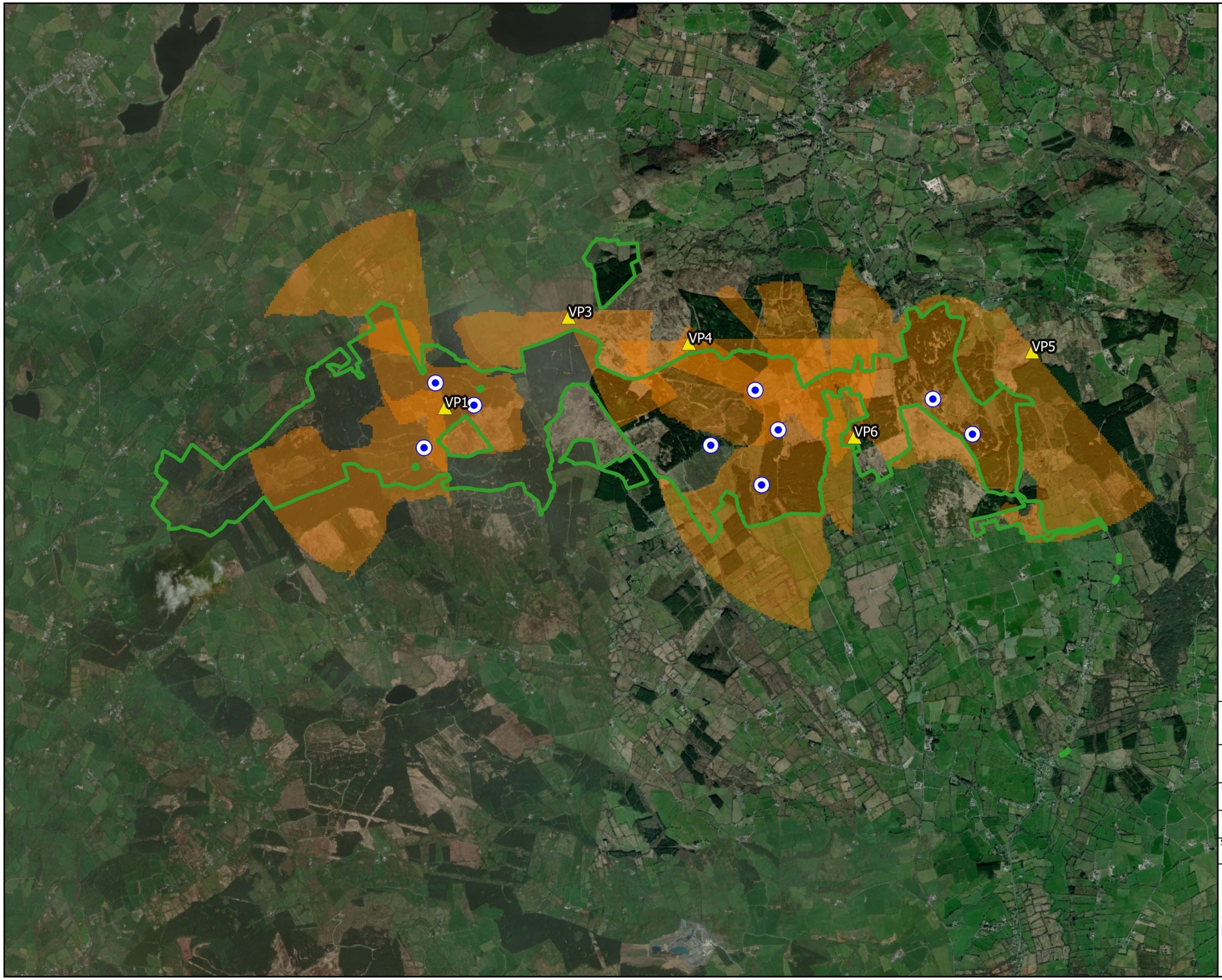

Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Vantage Point Survey Locations
- Viewshed

N

Drawing Title	Viewseheds April 2023 - September 2023
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.4
Scale: 1:50,000	Date: 02/08/2024

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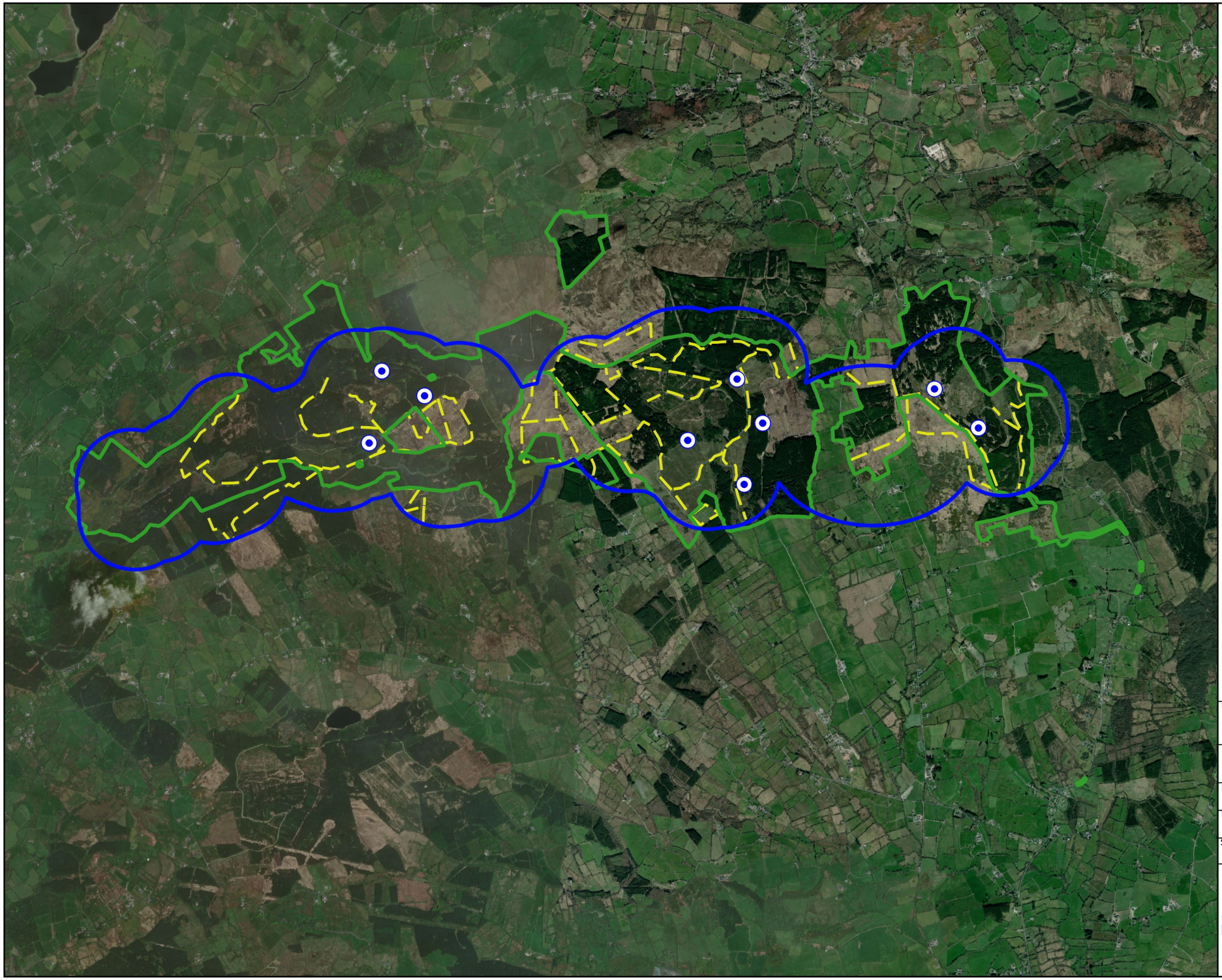

Drawing Title
Breeding Walkover Survey Locations

Project Title
Proposed Knockshanvo Wind Farm Development

Drawn By	Checked By
SA	PM
Project No.	Drawing No.
180419	Fig. 7.5
Scale	Date
1:45,000	02/08/2024

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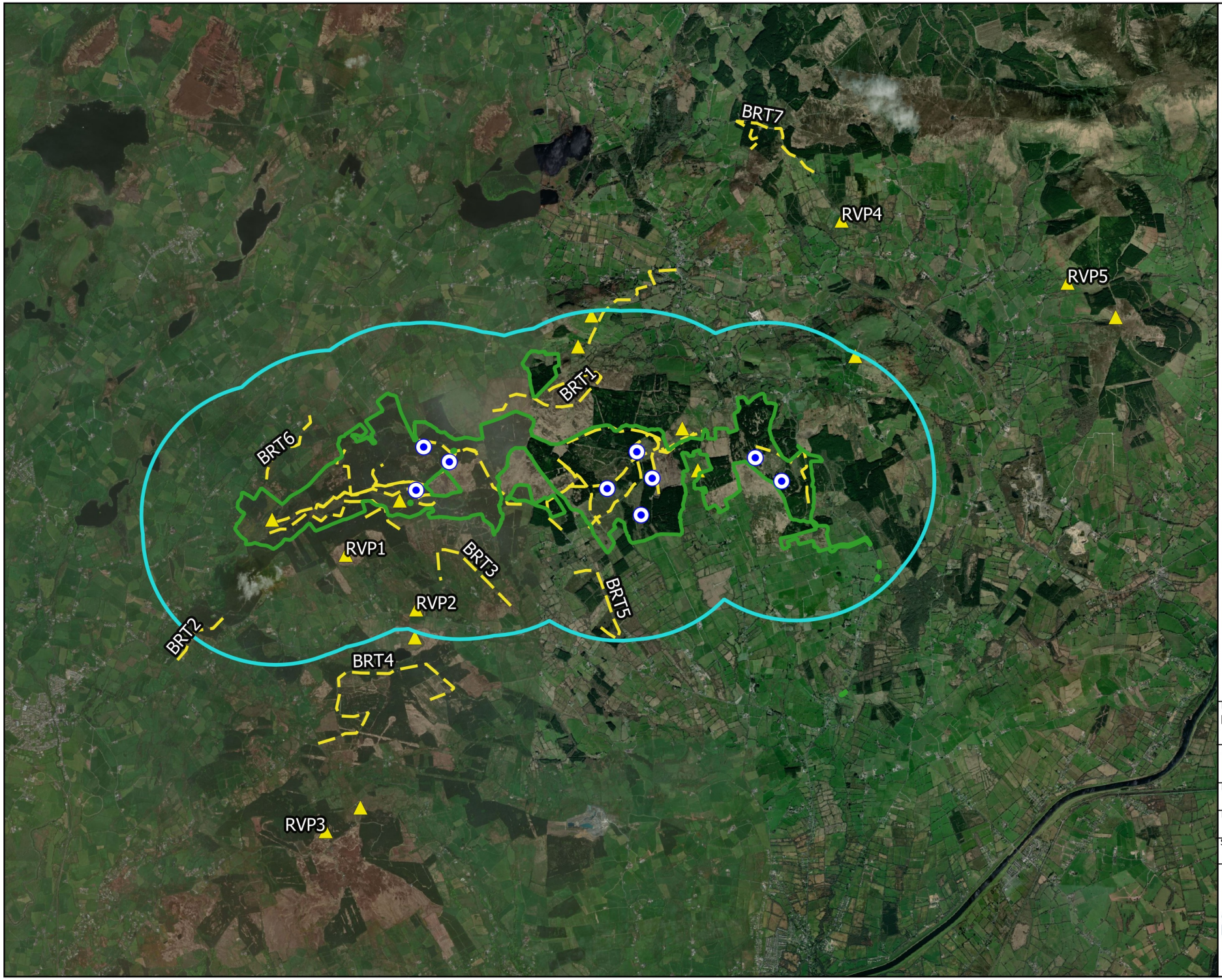

Map Legend

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

N

Drawing Title	Breeding Raptor Survey Locations 2018 - 2021
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.6
Scale: 1:75,000	Date: 02/08/2024

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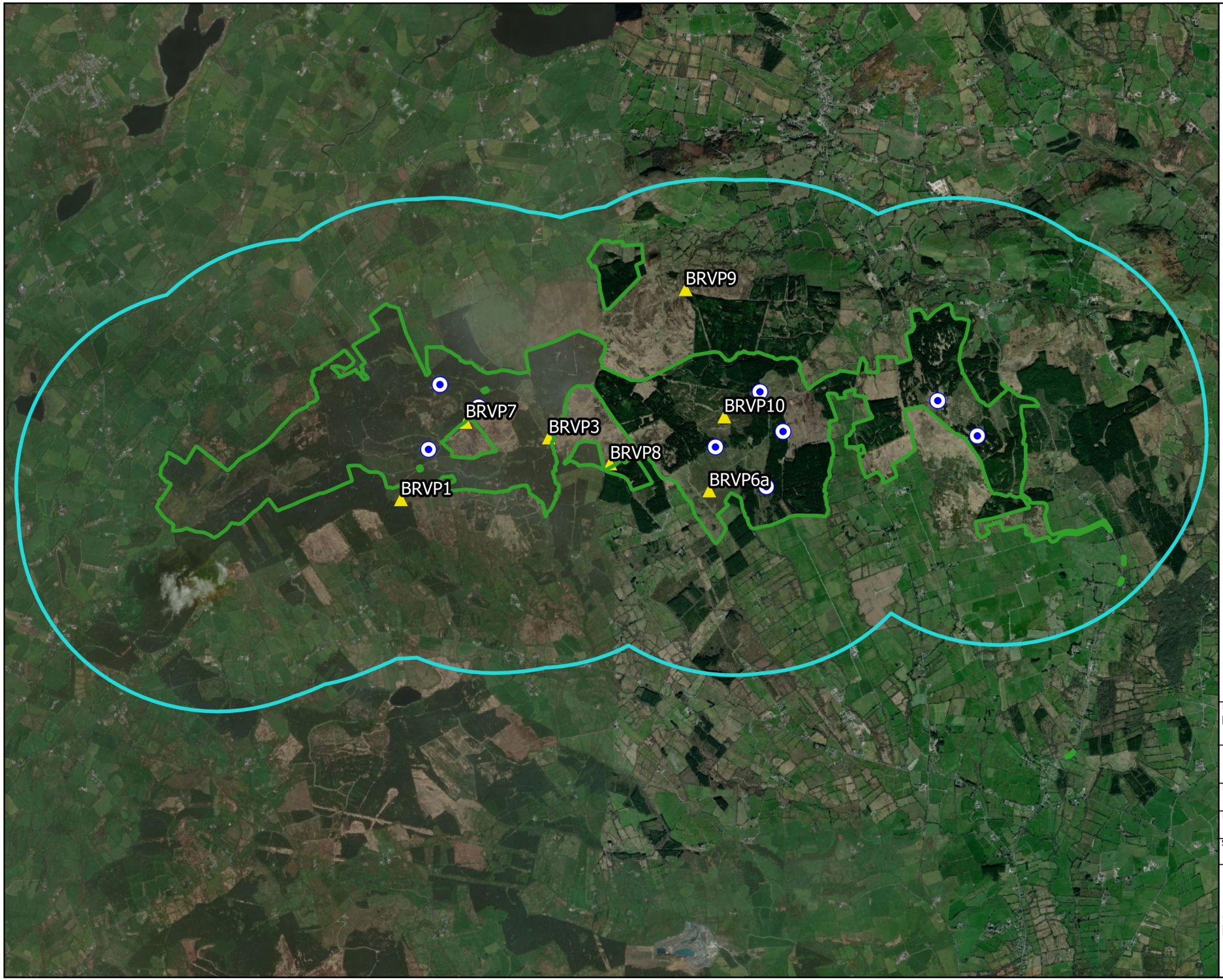

Map Legend

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

N

Drawing Title	Breeding Raptor Survey Locations 2022 - 2023
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.7
Scale: 1:50,000	Date: 02/08/2024

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Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Transects

N

Drawing Title	Breeding Woodcock Survey Locations
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.8
Scale: 1:45,000	Date: 02/08/2024

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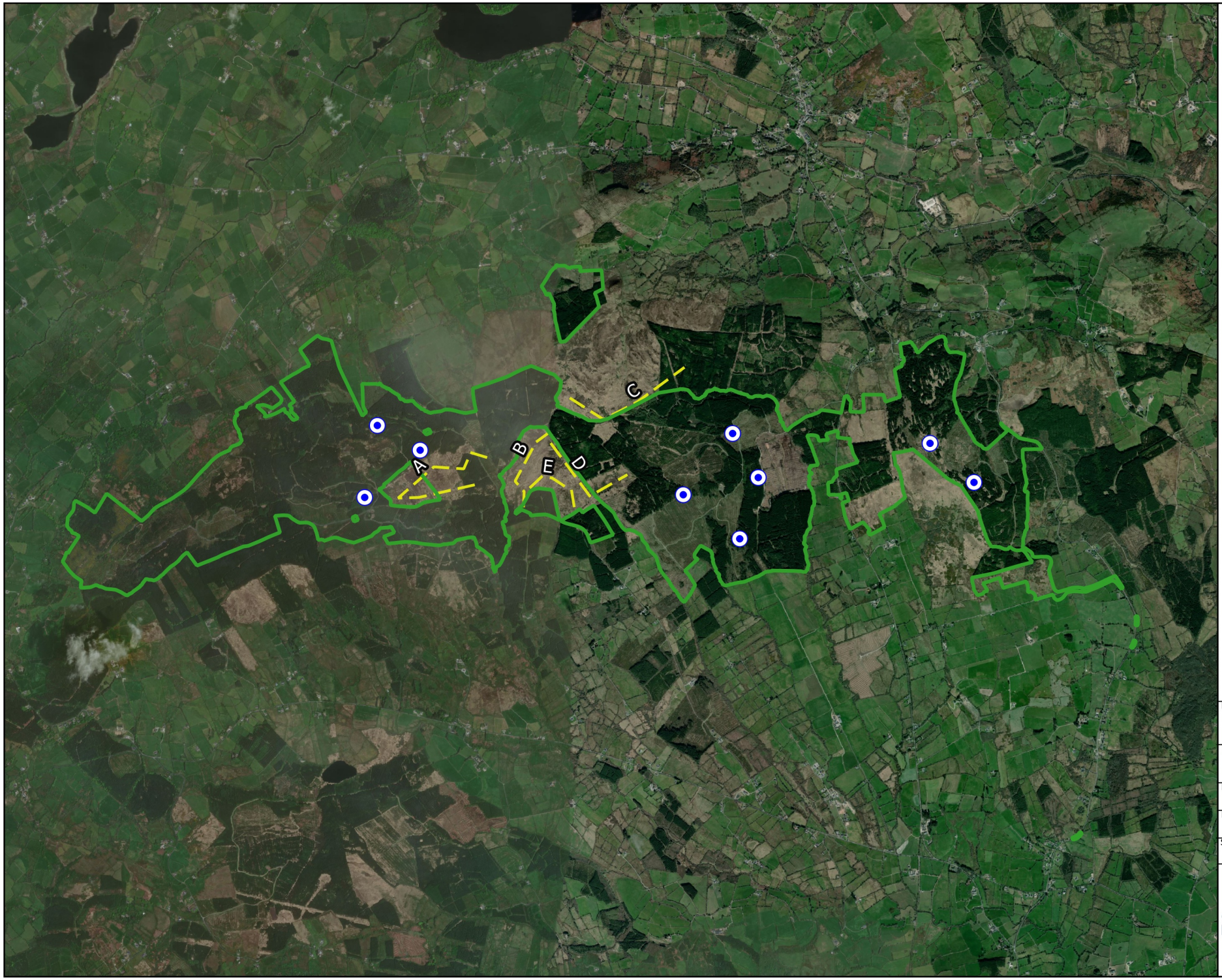

Map Legend

- Wind Farm Site
- Proposed Turbine Layout
- Transects

Drawing Title	Breeding Red Grouse Survey Locations
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.9
Scale: 1:45,000	Date: 02/08/2024

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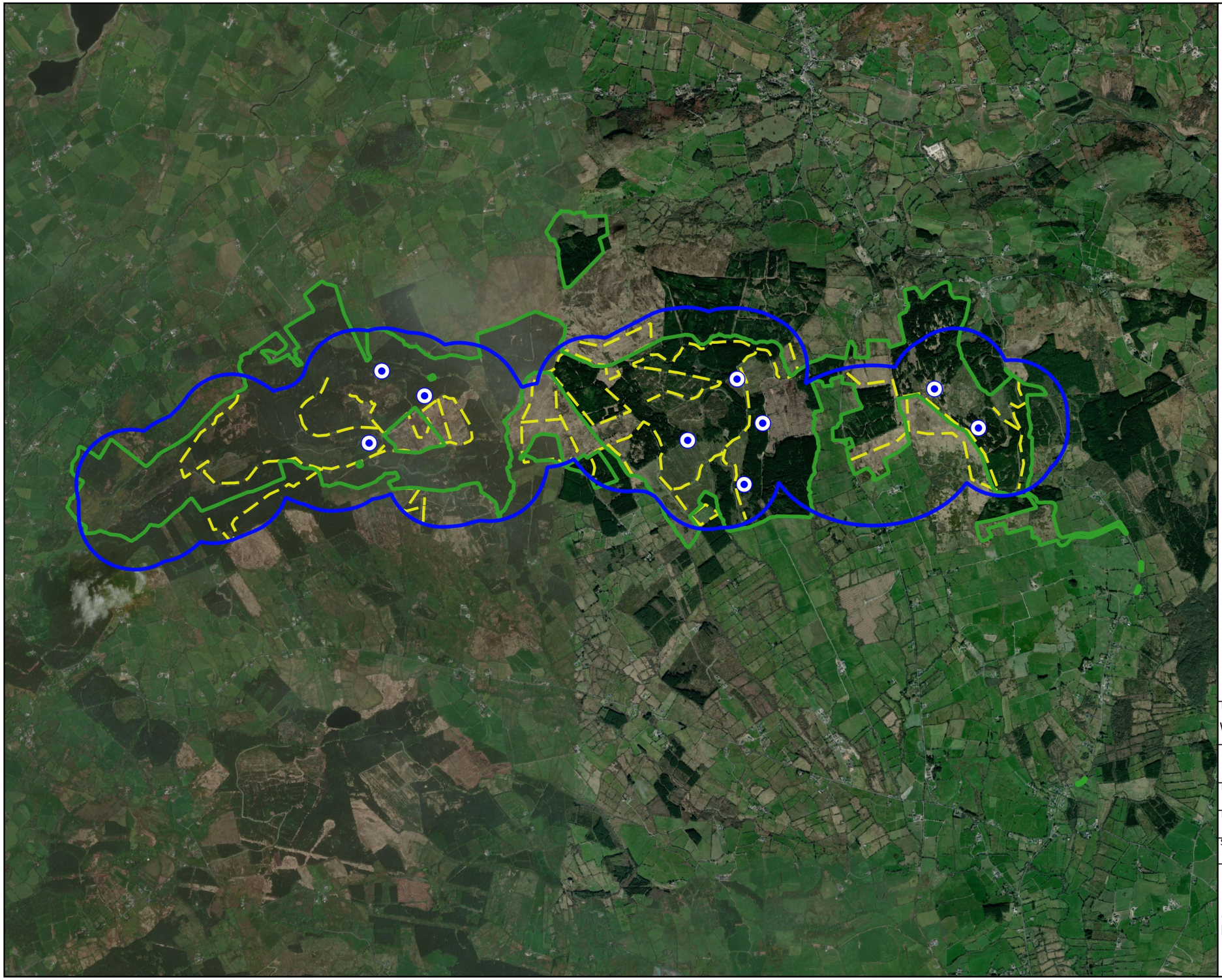
Map Legend
Wind Farm Site
Survey Area
Proposed Turbine Layout
Transects
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N
Drawing Title
Winter Walkover Survey Locations
Project Title
Proposed Knockshanvo Wind Farm Development
Drawn By
SA
Checked By
PM
Project No.
180419
Drawing No.
Fig. 7.10
Scale
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Date
02/08/2024
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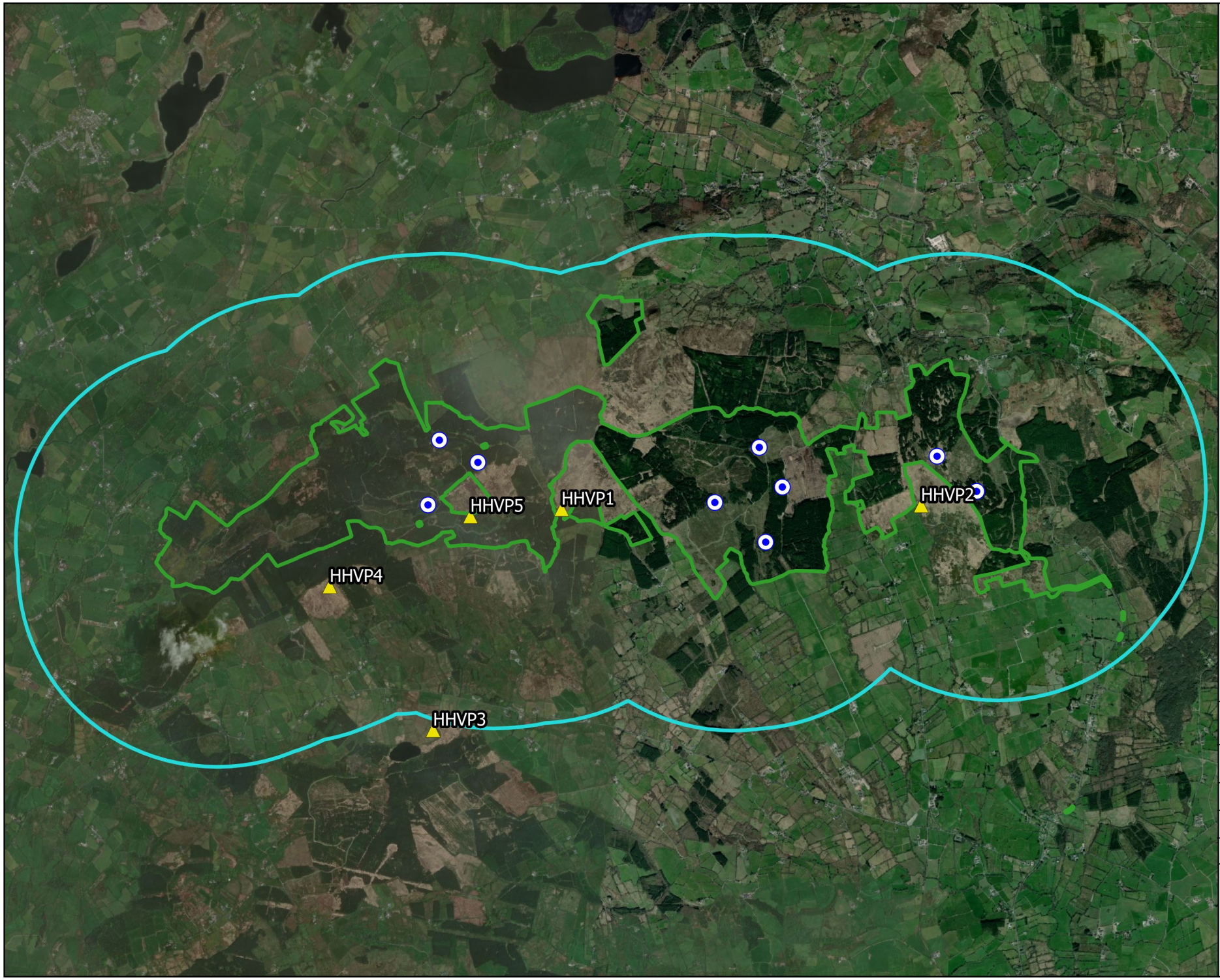

Map Legend

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

N

Drawing Title	Hen Harrier Roost Survey Locations
Project Title	Proposed Knockshanvo Wind Farm Development
Drawn By: SA	Checked By: PM
Project No.: 180419	Drawing No.: Fig. 7.11
Scale: 1:50,000	Date: 02/08/2024

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7.2.5 Ornithological Evaluation Criteria and Impact Assessment Methodology

7.2.5.1 Potential Effects Associated with the Proposed Development

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

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

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

7.2.5.2 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2019) recommends categories of ornithological or nature conservation value that relate to a geographical framework (e.g., international, through to local). This assessment utilises the geographical framework described in Guidelines for Assessment of Ecological Impact of National Road Schemes (NRA, 2009). The guidelines provide a basis for the determination of whether a site is of importance on the following scales:

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

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

7.2.5.3 Description of Impacts

The sensitivity, magnitude and significance of impacts on bird populations resulting from the Proposed Development 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.

7.2.5.3.1 *Percival (2003) Criteria*

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

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

Sensitivity	Determining Factor
Very High	› Species that form the cited interest of SPA's and other statutorily protected nature conservation areas. Cited means mentioned in the citation text for the site as a species for which the site is designated.
High	› Species that contribute to the integrity of an SPA but which are not cited as a species for which the site is designated. › Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, red necked phalarope, roseate tern and chough. › Species present in nationally important numbers (>1% Irish population)
Medium	› Species on Annex 1 of the EU Birds Directive. › Species present in regionally important numbers (>1% regional (county) population). › Other species on BirdWatch Ireland's red list of Birds of Conservation Concern
Low	› Any other species of conservation interest, including species on BirdWatch Ireland's amber list of Birds of Conservation Concern not covered above.

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

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

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

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

7.2.5.3.2 EPA Criteria (2022)

EPA impact assessment criteria are described below and detailed in Table 7-6 and Table 7-7. The following terms were utilised when quantifying duration and frequency of effects:

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

Table 7-6 Criteria for assessing impact significance based on (EPA, 2022)

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

Table 7-7 Criteria for assessing impact quality based on (EPA, 2022)

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

7.2.5.4 Collision Risk Assessment

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

Two stages are involved in the model:

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

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

7.2.6 Survey Justification

A comprehensive suite of bird surveys has been undertaken at the Wind Farm Site between April 2018 and September 2023. Results (outlined in Section 7.4 below) are derived from a continuous 5.5 years of surveying undertaken broadly in line with NatureScot (SNH, 2017) Guidance. The surveys undertaken

provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Development on avian receptors.

7.2.6.1 Mitigation

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

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

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

7.2.6.2 Limitations

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

No difficulties (for example technical deficiencies or lack of knowledge) were encountered while compiling the required information. No significant limitations in the scope, scale or context of the assessment have been identified. However, there was the following minor non-significant limitation in the survey scope, as outlined below.

Vantage Point Survey Effort

During the 2020 breeding season, vantage point surveys at VP1 and VP2 were not conducted for the required 36 hours as per SNH (2017). Due to Covid-19 restrictions 6 hours at each of these vantage point locations were not undertaken in March 2020. VP1 and VP2 were therefore only surveyed for a total of 30 hours during the 2019/20 winter season. In April 2023, VP2 was discontinued and surveys at VP6 commenced, to ensure as comprehensive as possible coverage of the updated viable area/turbine layout. Given that surveys were conducted over a 5.5 year period, which greatly exceeds the recommended survey period of two years (SNH, 2017), the missed surveys are not a significant limitation on the scope of surveys at the Wind Farm Site.

Viewshed Coverage

The selection of vantage point locations proved a challenge, given the topography and land use (commercial forestry) of the Wind Farm Site. Although there are gaps in the viewshed, as detailed in Figures 7.3 and 7.4, the coverage of the site, in general, is considered adequate (the majority of the site is visible at 21m) to inform the collision risk analysis, i.e. the Band Model (2007) presumes random movement of target species within the view shed, therefore given sufficient coverage of the site, the Band Model can account for gaps in the view shed. Furthermore, an additional VP (VP6) was added when the turbine layout was finalised, to confirm the flight activity in this location wasn't significantly different from the rest of the Wind Farm Site. The results of surveys have confirmed that there is nothing unusual about the flight activity in this area.

One vantage point location (VP1) is located within 500m of the proposed turbine layout. However given topography and the presence of mature forestry in this area, it was not possible to cover this section of the Wind Farm Site from an alternative location.

7.3 Baseline Conditions and Receptor Evaluation

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

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

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

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

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

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

European Site	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
River Shannon and River Fergus Estuary SPA (004077) Distance: 9km from the Wind Farm Site	› Cormorant › Whooper Swan › Light-bellied Brent Goose › Shelduck › Wigeon › Teal › Pintail › Shoveler › Scaup › Ringed Plover › Golden Plover › Grey Plover › Lapwing › Knot › Dunlin › Black-tailed Godwit › Bar-tailed Godwit › Curlew › Redshank › Greenshank › Black-headed Gull	Detailed conservation objectives for this site, (Version 1, September 2012[3]), were reviewed as part of the assessment and are available at www.npws.ie In summary, the conservation objective for the SPA is to maintain the favourable conservation condition of the habitats and species for which the SPA has been selected.	There will be no direct effects as the project footprint is located entirely outside the designated site. A source-pathway-receptor chain for effect on this SPA was identified due to downstream hydrological connectivity with the Proposed Development site. A potential for deterioration in water quality as a result of the Proposed Development was identified. In addition, a potential for impact on SCI species as a result of ex-situ habitat loss, disturbance and collision risk was identified. **A complete source pathway receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Development to result in likely significant effects on this European Site. Therefore, the European Site is located within the Likely zone of influence and is considered further in this assessment.**
Lough Derg (Shannon) SPA (004058) Distance: 10.8km from the Wind Farm Site	› Cormorant › Tufted Duck › Goldeneye › Common Tern	First Order Site-specific Conservation Objectives are available for this site which are: *To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA*	There will be no direct effects as the project footprint is located entirely outside the designated site. The SPA is located upgradient of the Proposed Development site. There is no downstream hydrological connectivity from the Proposed Development site to the SPA. Therefore, there is no source-pathway-receptor chain for impact via hydrological pathways.

[3] *https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004077.pdf*

European Site	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
		And *To maintain or restore the favourable conservation condition of the wetland habitat at Lough Derg (Shannon) SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.* NPWS (2022) Conservation objectives for Lough Derg (Shannon) SPA [004058]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.	During ornithological surveys undertaken at the Proposed Development site over five and a half years, no records of tufted duck, golden eye or common tern were observed. Cormorant were observed on only four occasions during vantage point surveys between April 2018 and September 2023. All observations were of individuals commuting. Given that cormorant were only observed commuting through the site on four occasions, despite undertaking a comprehensive suite of surveys over five and a half years, it is concluded that the Proposed Development site is of no ecological importance to this species given how infrequently the species was observed. Therefore, there is no potential for significant effect to any of the SCI species listed. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Impact and is not considered further in this assessment.**
Slieve Aughty Mountains SPA (004168) Distance: 11km from the Wind Farm Site	› Hen Harrier › Merlin	Detailed conservation objectives for this site, (Version 1, December 2022[4]) were reviewed as part of the assessment and are available at www.npws.ie In summary, the conservation objective for the SPA is to restore or maintain the favourable conservation condition of the species for which the SPA has been selected.	There will be no direct effects as the project footprint is located entirely outside the designated site. The Proposed Development site is outside of the core foraging range and maximum foraging range for breeding Hen Harrier (2km, 10km respectively; SNH 2016). Therefore, there is no potential for significant effect via habitat loss, disturbance, displacement or collision risk on the breeding populations associated with this SPA. While Hen Harrier were recorded within the Proposed Development site during breeding and wintering seasons, these birds are associated with a confirmed nest present within the Proposed Development site. This population is remote and separate from the population associated with the SPA. The Proposed Development site is located outside of the core foraging range for Merlin (5km, SNH 2016). Merlin were only observed on one occasion during five

[4] *https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004168.pdf*

European Site	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (https://www.npws.ie, 21/02/2018)	Conservation Objectives	Zone of Influence Determination & Identification of Pathways for Effect
			and a half years of ornithological surveys, therefore it has been concluded that the Proposed Development site is not of ecological importance to this species. Therefore, there is no potential for significant effect on the SCI populations associated with the SPA. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely zone of influence and is not considered further in this assessment.**
Slievefelim to Silvermines Mountains SPA (004165) Distance: 14.5km from the Wind Farm Site	› Hen Harrier	Detailed conservation objectives for this site, (Version 1, September 2022[5]) were reviewed as part of the assessment and are available at www.npws.ie In summary, the conservation objective for the SPA is to restore the favourable conservation condition of the species for which the SPA has been selected.	There will be no direct effects as the project footprint is located entirely outside the designated site. The Proposed Development site is outside of the core foraging range and maximum foraging range for breeding Hen Harrier (2km, 10km respectively; SNH 2016). Therefore, there is no potential for effect via habitat loss, disturbance, displacement or collision risk on the breeding populations associated with this SPA. While Hen Harrier were recorded within the Proposed Development site during breeding and wintering seasons, these birds are associated with a confirmed nest present within the Proposed Development site. Therefore, there is no potential for significant effect on the SCI populations associated with the SPA. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Impact and is not considered further in this assessment.**

[5] *https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004165.pdf*

7.3.2 Breeding and Wintering Bird Atlas Records

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

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

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

The Wind Farm Site lies within hectads[6] R56 and R57. Table 7-9 presents a list of species of conservation interest recorded from the relevant hectads:

Table 7-9 Breeding Bird Atlas Data (Hectads R56 & R57)

Species Name	Breeding Atlas 68-72		Breeding Atlas 88-91		Breeding Atlas 07-11		Conservation Status
	R56	R57	R56	R57	R56	R57	
Arctic Tern	-	-	-	Breed	-	-	BD
Barn Owl	Conf	Prob	-	-	Poss	-	RL
Black-headed Gull	Poss	Conf	Seen	Breed	-	-	SCI
Common Tern	-	Poss	-	Breed	-	-	BD
Cormorant	-	-	Seen	Seen	-	-	SCI
Corncrake	Prob	Conf	-	Breed	-	-	BD; RL
Curlew	Poss	Conf	Seen	Seen	-	-	RL
Goldeneye	-	-	-	Seen	-	-	RL
Grey Wagtail	Conf	Conf	Breed	Breed	Prob	Conf	RL
Hen Harrier	Poss	Poss	-	-	Conf	-	BD
Kestrel	Conf	Conf	Breed	Breed	Poss	Poss	RL
Kingfisher	Conf	Conf	-	Seen	Prob	Poss	BD
Lapwing	Conf	Prob	-	Seen	-	-	RL
Long-eared Owl	Poss	Prob	-	-	-	-	Raptor
Meadow Pipit	Conf	Conf	Breed	Breed	Conf	Prob	RL
Merlin	Conf	-	-	-	-	-	BD
Nightjar	Poss	-	-	-	-	-	BD; RL
Peregrine	-	-	-	-	Poss	-	BD
Pochard	-	Conf	-	-	-	-	RL
Red Grouse	Conf	Conf	Seen	-	-	-	RL
Snipe	Prob	Conf	Breed	Breed	-	Poss	RL
Sparrowhawk	Conf	Conf	Seen	Seen	-	Poss	Raptor
Stock Dove	Poss	Poss	-	-	-	-	RL
Swift	Conf	Conf	Seen	Breed	Poss	-	RL
Woodcock	Prob	Conf	-	-	-	-	RL
Yellowhammer	Conf	Conf	-	-	-	-	RL

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

[6] *A hectad is a term used in describing a geographical location and is of an area 10km by 10km square.*

Table 7-10 shows those species recorded in the relevant hectads (R56 and R57) in the wintering birds' atlases that are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list.

Table 7-10 Wintering Bird Atlas Data (Hectads R56 & R57)

Species Name	Winter Atlas 81-84		Winter Atlas 07-11		Conservation Status
	R56	R57	R56	R57	
Black-headed Gull	Pres	Pres	Pres	Pres	SCI
Cormorant	Pres	Pres	Pres	Pres	SCI
Curlew	-	Pres	-	Pres	RL
Grey Wagtail	Pres	Pres	Pres	Pres	RL
Hen Harrier	-	Pres	Pres	Pres	BD
Kestrel	Pres	Pres	Pres	-	RL
Kingfisher	Pres	Pres	Pres	Pres	BD
Lapwing	Pres	Pres	Pres	Pres	RL
Long-eared Owl	-	Pres	-	-	Raptor
Meadow Pipit	Pres	Pres	Pres	Pres	RL
Peregrine	Pres	-	-	-	BD
Pochard	Pres	Pres	Pres	-	RL
Red Grouse	-	Pres	-	Pres	RL
Redshank	Pres	-	Pres	-	RL
Redwing	Pres	Pres	Pres	Pres	RL
Shoveler	-	Pres	Pres	Pres	RL
Snipe	Pres	Pres	Pres	Pres	RL
Sparrowhawk	Pres	Pres	Pres	Pres	Raptor
Whooper Swan	Pres	Pres	-	Pres	BD
Woodcock	Pres	-	Pres	Pres	RL
Yellowhammer	-	Pres	-	-	RL

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

7.3.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland and provides a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (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 majority of the western and eastern sections of the Wind Farm Site are located within a low bird sensitivity zone (overlapping with 4 no. turbines). The remainder of the Wind Farm Site is not located within an area identified as sensitive to birds (i.e., there is no data available).

7.3.4 Irish Wetland Bird Survey (I-WeBS) Records

The Wind Farm Site is not covered by an I-WeBS site and the nearest site is located approximately 2.8km north of the Wind Farm Site at Doon Lough. Data from I-WeBS sites in County Clare have been used to estimate county populations of wintering waterbirds identified as KORs. Relevant data from I-WeBS sites as required for species specific county populations is outlined in Section 7.5.1 below for each relevant species. Datasets for the following sites were downloaded from www.birdwatchireland.ie and reviewed:

Clare I-WeBS Sites

- Ballyallia Lake
- Ballycar Lough
- Carran Polje
- Castlelough
- Corofin Wetlands
- Dromore Lakes (Clare)
- Farrihy Lough
- Inagh River
- Knockaunroe/Rinnamona
- Liscannor Bay (Liscannor – Rinaoughter)
- Lough Atorick
- Lough Girroge
- Lough Graney
- Lough O'Grady
- Mid-Clare Coast (Mal Bay – Doonbeg Bay)
- 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)

7.3.5 2022 National Survey of Breeding Hen Harrier

The National Hen Harrier Survey 2022 found there to be approximately 34 breeding individuals in County Clare[7] (as per Figure 5 of that report). The Wind Farm Site lies within two hectads (R56 covering the south of the Wind Farm Site and R57 covering the north of the Wind Farm Site). The results of the national hen harrier survey for these hectads are outlined below:

- R56 Hen harrier seen but no breeding evidence observed.
- R57 Hen harrier seen but no breeding evidence observed.

[7] *IWM 147 (2024) Hen Harrier National Survey 2022*

7.4 Field Survey Results

A comprehensive list of all bird species recorded during surveys is provided in Table 2 of Appendix 7-1. The target species listed below were recorded during the core ornithological surveys (April 2018 to September 2023). The list is ordered in accordance with conservation significance: Annex I species, SCIs of designated sites, Red listed species and raptors.

- Golden Plover (Annex I)
- Hen Harrier (Annex I)
- Merlin (Annex I)
- Peregrine (Annex I)
- Red Kite (Annex I)
- Goshawk (Annex I)
- Osprey (Annex I)
- Black-headed Gull (SCI of the River Shannon and River Fergus Estuaries SPA)
- Cormorant (SCI of the River Shannon and River Fergus Estuaries SPA and the Lough Derg (Shannon) SPA)
- Curlew (BoCCI Red Listed)
- Kestrel (BoCCI Red Listed)
- Red Grouse (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)
- Woodcock (BoCCI Red Listed)
- Buzzard (Raptor)
- Sparrowhawk (Raptor)
- BoCCI Red listed passerine species (Grey Wagtail, Meadow Pipit, Redwing, Swift)

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

- Summary of vantage point survey records
- Summary of breeding walkover survey records
- Summary of breeding raptor survey records
- Summary of breeding woodcock survey records
- Summary of breeding red grouse survey records
- Summary of winter walkover survey records
- Summary of hen harrier roost survey records
- Summary of non-target species records

7.4.1 Golden Plover

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

Vantage Point Surveys

Golden plover were observed on only one occasion during the vantage point surveys between April 2018 and September 2023 (See Appendix 7-4, Figure 7.4.1). In October 2021, an individual bird was observed commuting, approximately 1.2km south of the Wind Farm Site.

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

7.4.2 Hen Harrier

Raw Survey data for hen harrier is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3. Please note a summary is provided of the key observations in the last paragraph of this section.

Vantage Point Surveys

Hen harrier were observed on 101 occasions during vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.2). Fifty-seven of these observations were during the core breeding season (April to August). There were 25 observations within, or partially within, 500m of the proposed turbine layout. The majority of observations were in bog habitat to the north of the Wind Farm Site, within 500m of the site boundary. There were 62 observations within the potential collision height.

There was no breeding behaviour observed during these surveys during the 2018, 2020, 2021 or 2022 breeding seasons. There were four observations of a male displaying, all on the same date, in March 2019. Additionally, in 2019, two food passes were observed as well as two observations of agitated harriers, confirming breeding at this location. During the 2023 breeding season, there were five observations of hen harrier displaying, and one observation of a male carrying prey. These observations confirm breeding in this area. Please see Confidential Appendix 7-5, Figure 7.5.1 for flights relating to breeding behaviour. The remaining observations during the breeding season were of birds hunting or commuting.

Observations during the non-breeding season (September to March) were mostly of birds commuting or hunting. On the 15th of December 2020, a minimum of four birds were observed going to roost, consisting of three males and one ringtail (female/immature bird). There were no further observations of roosting during the vantage point surveys. Please see Confidential Appendix 7-5, Figure 7.5.2 for flights relating to roosting behaviour.

Breeding Walkover Surveys

There were 30 observations of hen harrier during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.3). There were no hen harrier observations during the 2018 breeding walkover surveys. During the 2019 breeding walkover surveys, there were four observations of birds displaying, one observation of a male carrying food to the nest and one observation of two chicks at the nest, with the female bird alarm calling nearby. Hen harrier were confirmed nesting adjacent to the Wind Farm Site in 2019, and fledged two chicks. The observations of birds displaying were over forestry within the Wind Farm Site, however given the separation distance from the nest location and that there were no further observations in this area. It is presumed that this was the male from the confirmed nest.

In 2020, there were three observations of hen harrier displaying in May, on two dates. There were no further observations of hen harrier during subsequent breeding walkover surveys. There were two display flights within the Wind Farm Site, and one approximately 500m north of the Wind Farm Site, and 1.3km northeast of the other two observations. These observations indicate probable breeding in the area, given the separation distance between the two observations, it is possible that these could relate to two separate males holding territories. There were no further observations of hen harrier during the 2020 breeding walkover surveys.

In 2021, there was only one observation of a commuting hen harrier. There was no breeding behaviour observed in 2021 during the breeding walkover surveys. In 2022, there were four observations, all of which were of individual males hunting or commuting. There was no breeding behaviour observed in 2022 during the breeding walkover surveys. In 2023, there was one observation of an agitated female hen harrier and an observation of a recently fledged chick in July. This confirmed nest was located within the Wind Farm Site. Please see Confidential Appendix 7-5, Figures 7.5.3 for flights relating to breeding activity.

The remaining observations of hen harrier during the breeding walkover surveys were of birds hunting or commuting. The majority of observations were of individuals and were on, or within 500m of, the Wind Farm Site.

Breeding Raptor Surveys

There were 58 observations of hen harrier during the breeding raptor surveys (see Appendix 7-4, Figure 7.4.4). There was only one observation during the 2018 breeding season. A male was observed commuting over blanket bog, north of the Wind Farm Site. There were 21 observations during the 2019

breeding season, the majority of which were relating to breeding behaviour associated with a confirmed nest location adjacent to the Wind Farm Site. The remaining observations involved birds commuting or hunting. Observations relating to this nest included displaying, provisioning and food passes. Additionally, there were two observations of displaying hen harrier, approximately 1km and 2.5km south of the Wind Farm Site. Both of these locations are considered to be probable breeding territories, however there were no further observations at these locations to confirm the presence of a nest.

In 2020, there were five observations of hen harrier during the breeding raptor surveys. Only one of which related to breeding activity, a male was observed displaying in May, within the Wind Farm Site. This observation indicates probable breeding at this location, however, there were no further observations relating to breeding activity during the breeding raptor surveys to confirm a nest at this location.

In 2021, there was only one observation of hen harrier during the breeding raptor surveys, a male was observed hunting in June. There were no observations relating to breeding activity in 2021. In 2022, there were five observations, the majority of which were of birds hunting or commuting. There was one observation of a bird displaying, indicating probable breeding at this location. However, there were no further observations relating to breeding activity at this location.

In 2023, there were 25 observations of hen harrier during the breeding raptor surveys, the majority of which were of birds commuting or hunting. There were six observations relating to a confirmed nest location. These observations included agitated adults, food passes, begging young and the presence of two fledged chicks. See Confidential Appendix 7-5, Figures 7.5.4 for flights relating to breeding activity.

Winter Walkover Surveys

There were only three observations of hen harrier during the winter walkover surveys (see Appendix 7-4, Figure 7.4.5). All observations were of individuals hunting and were on, or within 500m of, the Wind Farm Site.

Hen Harrier Roost Surveys

Hen harrier were observed on 23 occasions during the hen harrier roost surveys, 10 of which were within, or partially within, the Wind Farm Site (see Appendix 7-4, Figure 7.4.6). The majority of observations were of birds commuting or hunting. There were six observations relating to roosting hen harrier: two in winter 2018/19, three in winter 2019/20 and one in winter 2021/22. Most of these roost sites were only recorded being utilised on one occasion each. All roosts were used infrequently and by low numbers of birds. There was one roost within the Wind Farm Site and one adjacent to the Wind Farm Site, both within the same bog. The remaining two roost sites were located approximately 550m and 1.8km south of the Wind Farm Site. The roost observed in March 2019 was not mapped and its location is therefore unknown. See Confidential Appendix 7-5, Figures 7.5.5 for flights relating to roosting.

Incidental Observations

There was six incidental observations of hen harrier during survey between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.7). Most observations were of birds commuting. There was one observation of a food pass close to the confirmed nest location in 2019, and one observation of a recently fledged chick near the confirmed nest location in 2023. See Confidential Appendix 7-5, Figures 7.5.6 for flights relating to breeding activity.

Breeding Summary

In summary, breeding was only confirmed on two occasions: once in 2019 and 2023 respectively. Please note that breeding was confirmed through the evidence of surveys. To confirm breeding one or more of the following behaviours must be recorded (as per Hardey *et al.,* 2013 and Ruddock *et al.,* 2016), e.g. food passes, adult carrying prey, agitated behaviour etc. Where evidence of possible breeding was recorded e.g. display flights, repeat visits were undertaken to confirm if breeding occurred. Please see below summary of the highest breeding status confirmed each year.

- 2018: There was no breeding activity observed during the 2018 breeding season.
- 2019: There was a confirmed nest located adjacent to the Wind Farm Site in 2019. Additionally, there were two probable breeding territories approximately 1km and 2.5km south of the Wind Farm Site in 2019.
- 2020: There was one probable breeding territories within the Wind Farm Site and one probable breeding territory approximately 500m north of the Wind Farm Site in 2020. However, despite early breeding season observations of display flights, there were no further observations to confirm breeding in this year. It is therefore unlikely that there was a successful breeding attempt in 2020.
- 2021: There was no breeding activity observed during the 2021 breeding season.
- 2022: There was a probable breeding territory partially within the Wind Farm Site in 2022. However, despite early breeding season observations of display flights, there were no further observations to confirm breeding. It is therefore unlikely that there was a successful breeding attempt in 2022.
- 2023: There was a confirmed nest located within the Wind Farm Site in 2023.

Please see Confidential Appendix 7-5, Figure 7.5.7 for locations of all breeding territory.

Winter Roost Summary

In Summary, there were seven observations relating to roosting hen harrier: two in winter 2018/19, four in winter 2019/20 and one in winter 2021/22. There were four roost sites identified. There was one roost within the Wind Farm Site and one adjacent to the Wind Farm Site, both within the same bog. The remaining two roost were located approximately 550m and 1.8km south of the Wind Farm Site.

Please see Confidential Appendix 7-5, Figure 7.5.8 for all roost locations.

7.4.3 Merlin

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

Incidental Observations

Merlin were observed on one occasion as an incidental observation during a hen harrier roost survey (see Appendix 7-4, Figure 7.4.8). A male was observed perched in bog habitat adjacent to the Wind Farm Site in February 2019.

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

7.4.4 Peregrine

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

Vantage Point Surveys

Peregrine were observed on only three occasions during the vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.9). There were two observations of an individual commuting and one of an individual hunting. There were two observations within, or partially within, 500m of the proposed turbine layout. All observations were within the potential collision height.

Breeding Raptor Surveys

Peregrine were observed on two occasions during the breeding raptor surveys (see Appendix 7-4, Figure 7.4.10). There was one observation of two fledgelings with an adult in a quarry, approximately 2.1km

from the Wind Farm Site. This observation confirms breeding at this location (see Confidential Appendix 7-5 Figures 7.5.9 for the observation location) Additionally, there was one observation of an individual hunting approximately 2km north of the Wind Farm Site in 2023.

Incidental Observations

Peregrine was recorded as an incidental observation on only one occasion. This observation was of an individual commuting during a hen harrier roost survey. This observation was not mapped.

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

7.4.5 Red Kite

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

Vantage Point Surveys

Red kite was observed on only one occasion during vantage point surveys (see Appendix 7-4, Figure 7.4.11). In October 2019, an adult was observed commuting over the Wind Farm Site.

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

7.4.6 Goshawk

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

Vantage Point Surveys

Goshawk was recorded on only one occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.12). This observation was of an individual being mobbed by a female sparrowhawk in January 2020 and was approximately 150m east of the Wind Farm Site.

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

7.4.7 Osprey

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

Breeding Raptor Surveys

Osprey was observed on only one occasion during the breeding raptor surveys (see Appendix 7-4, Figure 7.4.13). This observation was of an individual commuting within the Wind Farm Site in April 2023.

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

7.4.8 Black-headed Gull

Raw Survey data for black-headed gull is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Black-headed gull were observed on three occasions during vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.14). Observations ranged from an individual to four birds and were of birds commuting. There was one observation within 500m of the proposed turbine layout and two observations within the potential collision height. All observations were in the breeding season (May to July).

Breeding Walkover Surveys

Black-headed gull were only observed on one occasion during the breeding walkover surveys. An individual was observed circling over a silage field before landing to feed. This observation was adjacent to the Wind Farm Site. See Appendix 7-4, Figure 7.4.15.

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

7.4.9 Cormorant

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

Vantage Point Surveys

Cormorant were observed on four occasions during vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.16). All observations were of individuals commuting and were within the potential collision height. All observations were at, or within 500m of, the Wind Farm Site. There were three observations during the breeding season and one during the non-breeding season.

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

7.4.10 Curlew

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

Incidental Observations

Curlew was recorded on only one occasion as an incidental observation. An individual was observed calling during a breeding raptor survey. This observation was not mapped, however given the survey location this observation was likely adjacent to the Wind Farm Site.

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

7.4.11 Kestrel

Raw Survey data for kestrel is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3. Please note a summary is provided of the key observations in the last paragraph of this section.

Vantage Point Surveys

Kestrel were recorded on 288 occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.17). However, these observations likely relate to a small number of individuals observed on multiple occasions. One hundred and forty-nine of these observations occurred during the core breeding season months between April and August, while there were 139 observations of kestrel during non-breeding

season months (September – March). Six observations occurred during the 2018 breeding season and no breeding activity was observed. Twenty-two observations occurred during the 2019 breeding season and no breeding activity was observed. In 2020, there were 49 observations during the breeding season. While no breeding activity was observed in 2020, there was one observation of a juvenile in July, suggesting successful breeding in the area surrounding the Wind Farm Site. In 2021, there were 26 observations during the breeding season. While no breeding activity was observed in 2021, there were two observations of a juvenile in July, suggesting successful breeding in the area surrounding the Wind Farm Site. In 2022, there were 22 observations during the breeding season. There was one observation of a kestrel mobbing a buzzard in May and in July, a female was observed carrying prey in the same area. These observations confirm breeding at this location. Additionally, there were two observations of juvenile kestrel later in the breeding season, one to the north and one to the west of the Wind Farm Site. It is unknown if these are the same birds from the confirmed nest location or birds from additional nests in the area. In 2023, there were 23 observations during the breeding season. While no breeding activity was observed in 2023, there were three observations of a juvenile in July, suggesting successful breeding in the area surrounding the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.10 for flights relating to breeding behaviour. The majority of non-breeding season observations were of birds commuting or hunting.

One hundred and twenty-five observations occurred within, or partially within 500m of, the proposed turbine layout. Two hundred and fifteen of the observed flights occurred within, or partially within, the potential collision height.

Breeding Walkover Surveys

Kestrel were observed on 29 occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.4.18). Most observations were of individuals hunting, commuting or perched. There were no observations of breeding behaviour during the 2018, 2019, 2021 and 2022 breeding seasons.

In 2020, there was one observation of a kestrel showing agitated behaviour towards the surveyor, indicating probable breeding within the Wind Farm Site. In 2023, There was one nest confirmed within the Wind Farm Site and one approximately 800m from the Wind Farm Site. These nests were confirmed by provisioning adults, and the presence of recently fledged chicks. See Confidential Appendix 7-5, Figure 7.5.11 for flights relating to breeding behaviour.

Breeding Raptor Surveys

Kestrel were recorded on 106 occasions during breeding raptor surveys, up to 5km from the Wind Farm Site (see Appendix 7-4, Figure 7.4.19). The majority of observations were of birds hunting or commuting. There were no observations of breeding behaviour during the 2018 and 2020 breeding seasons. However, in 2020, there was one observation of a juvenile bird in June, approximately 3.8km from the Wind Farm Site, indicating successful breeding in the wider area.

In 2019, there was one observation of a kestrel mobbing a hen harrier, indicating probable breeding at this location. However, this observation was not mapped so the location of this territory is not known. There were no further observations of breeding behaviour in 2019. In 2021, There was one observation of a bird carrying prey to a nest site, confirming breeding at this location, approximately 600m from the Wind Farm Site. In 2022, there was one observation of a food pass between two adult kestrel, indicating probable breeding at this location, within the Wind Farm Site. In 2023, there were four observations of kestrel mobbing other raptors and one observation of a bird carrying prey. These observations related to one confirmed breeding territory, approximately 850m from the Wind Farm Site, and one probable breeding territory, approximately 300m from the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.12 for flights relating to breeding behaviour.

Winter Walkover Surveys

Kestrel were recorded on 27 occasions during winter walkover surveys (see Appendix 7-4, Figure 7.4.20). Most observations were of birds commuting or hunting. All observations were on, or within 500m of, the

Wind Farm Site. In October 2019, there was one observation of two juvenile kestrel alarm calling at the surveyor, confirming successful breeding in the wider area during the 2019 breeding season.

Incidental Observations

There were 45 incidental observations of kestrel during surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.21). The majority of observations were of birds hunting or commuting. In August 2019, a female was observed carrying prey to a nest site, confirming breeding. However, this observation was not mapped so the location of the nest is unknown. There were 32 observations on, or within 500m of, the Wind Farm Site.

Breeding Summary

In summary, breeding was only confirmed within the wind farm site in 2021 and 2023. Please see the below summary of the highest breeding statuses confirmed each year:

- 2018: There was no evidence of breeding in 2018.
- 2019: There were observations of a female carrying prey and juvenile kestrel which were not associated with any identified nest site. This confirms successful breeding in the wider area of the Wind Farm Site.
- 2020: There was one probable breeding territory identified within the Wind Farm Site in 2020. Additionally, there were observations of juvenile kestrel which were not associated with any particular nest site. This confirms successful breeding either from the identified territory or elsewhere in the wider area of the Wind Farm Site.
- 2021: There were two confirmed breeding territories within the Wind Farm Site and approximately 600m from the Wind Farm Site in 2021. Additionally, there were observations of juvenile kestrel which were not associated with any particular nest site. This confirms successful breeding either from the identified territory or elsewhere in the wider area of the Wind Farm Site.
- 2022: There was one probable breeding territory identified within the Wind Farm Site in 2022.
- 2023: There were three confirmed breeding territories, two partially within the Wind Farm Site and one approximately 800m from the Wind Farm Site. Additionally, there were observations of juvenile kestrel which were not associated with any particular nest site. This confirms successful breeding either from the identified territory or elsewhere in the wider area of the Wind Farm Site.

Please see Confidential Appendix 7-5, Figure 7.5.13 for locations of all breeding territory.

7.4.12 Red Grouse

Raw Survey data for red grouse is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3. Please note a summary is provided of the key observations in the last paragraph of this section.

Vantage Point Surveys

Red grouse were observed on 28 occasions during the vantage point surveys (see Appendix 7-4, Figure 7.4.22). Most observations were of birds calling or flying and were within the upland bog habitat immediately north of the Wind Farm Site. There were three observations of birds singing in 2022 and two in 2023. The upland bog to the north of the Wind Farm Site hosts breeding red grouse territories. See Confidential Appendix 7-5, Figure 7.5.14 for flights relating to breeding behaviour. There were no flights within the potential collision height.

Breeding Walkover Surveys

Red grouse were observed on only one occasion during the breeding walkover surveys. Two birds were flushed by the observer in 2019, within the Wind Farm Site. See Appendix 7-4, Figure 7.4.23.

Breeding Red Grouse Surveys

Red grouse were observed twelve occasions during the dedicated red grouse surveys (see Appendix 7-4, Figure 7.4.24). There were six observations in both the 2019 and 2020 breeding season. In both years, red grouse were observed reacting to the lure in the bog habitats to the north of the Wind Farm Site and the two bogs which are enclosed by the Wind Farm Site. These three bog habitats host breeding red grouse territories. See Confidential Appendix 7-5, Figure 7.5.15 for observations relating to breeding behaviour.

Winter Walkover Surveys

Red grouse were observed on only three occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.25). In 2019, three red grouse were observed in flight. The remaining two observations were of individuals flushed by the surveyor in 2019 and 2022. All observations occurred within the upland bog habitat immediately north of the Wind Farm Site.

Incidental Observations

Red grouse were observed on 20 occasions as incidental observations between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.26). Most observations were of between one and two birds flushed by the surveyor or heard calling. There was one observation of a pair alarm calling at the surveyor in July 2021, in the upland bog habitat immediately north of the Wind Farm Site.

Breeding Summary

In Summary, red grouse were identified breeding n the bog habitats to the north of the Wind Farm Site and the two bogs which are enclosed by the Wind Farm Site. Evidence of breeding was recorded in 2019, 2020, 2022 and 2023. Please see Confidential Appendix 7-5, Figure 7.5.16 for locations of all breeding territory.

7.4.13 Snipe

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

Vantage Point Surveys

Snipe were observed on 30 occasions during vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.27). There was only one observation during the core breeding season (April – August) and 29 observations during the non-breeding season. Observations were of between one and 20 birds, with the majority of observations being of birds commuting, calling or being flushed. There were no observations of breeding behaviour. There were eleven observations within, or partially within, 500m of the proposed turbine layout and 19 observations of birds within the potential collision height.

Breeding Walkover Surveys

Snipe were only observed on two occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.4.28). Both observations were of individuals flushed by the surveyor in April 2019. There was one observation within the Wind Farm Site, and one immediately adjacent to the Wind Farm Site. There was no breeding activity observed during these surveys.

Winter Walkover Surveys

Snipe were recorded on thirteen occasions during winter walkover surveys (see Appendix 7-4, Figure 7.4.29). All observations were of birds being flushed by the surveyor. Observations ranged from an individual to a flock of seven birds. There were three observations of birds within, or partially within, 500m of the proposed turbine layout.

Incidental Observations

There were 30 incidental observations of snipe during surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.30). Observations ranged from an individual to six birds travelling, displaying or being flushed by the observer. There was one observation of a bird displaying during a breeding raptor survey, however this observation was not mapped and therefore the location of this breeding territory is unknown.

7.4.14 Woodcock

Raw Survey data for woodcock is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3. Please note a summary is provided of the key observations in the last paragraph of this section.

Vantage Point Surveys

Woodcock were observed on twelve occasions during vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.31). The majority of observations were of individuals commuting. There were four observations of woodcock roding, one in 2019, one in 2021 and two in 2023. The location of the 2019 observation was not mapped. There was one probable breeding territory within the Wind Farm Site in 2021 and two probable breeding territories within the Wind Farm Site in 2023. See Confidential Appendix 7-5, Figure 7.5.17 for flights relating to breeding behaviour.

Of the observations that were mapped, there were only three observations within 500m of the proposed turbine layout. There were six observations within the potential collision height.

Breeding Walkover Surveys

Woodcock were observed on three occasions during the breeding walkover surveys at the Wind Farm Site (see Appendix 7-4, Figure 7.4.32). All observations were of one or two birds flushed by the surveyor. There was one observation in 2019, 2021 and 2022. All observations were within the Wind Farm Site.

Breeding Woodcock Surveys

Woodcock were observed on 66 occasions during the breeding woodcock surveys at the Wind Farm Site (see Confidential Appendix 7-5, Figure 7.5.18). In 2019, there were 10 observations of woodcock calling and roding at dusk, indicating probable breeding at these locations. There were three breeding areas identified in 2019. In 2020, there were 11 observations of woodcock calling and roding at dusk, indicating probable breeding at these locations. There were four breeding areas identified in 2020. In 2021, there were 25 observations of woodcock calling and roding at dusk, indicating probable breeding at these locations. There were six breeding areas identified in 2021. In 2022, there were 14 observations of woodcock calling and roding at dusk, indicating probable breeding at these locations. There were two breeding areas identified in 2022. In 2023, there were 6 observations of woodcock calling and roding at dusk, indicating probable breeding at these locations. There were two breeding areas identified in 2023. Due to the nature of woodcock breeding habits and display, estimating the number of pairs in each breeding area is difficult. For the purposes of this EIAR, it is assumed that there is a minimum of one breeding pair within each breeding area identified.

Winter Walkover Surveys

Woodcock were recorded on only two occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.33). These observations were of one or two birds being flushed by the surveyor. Only one of these observations was mapped, and it was located within the Wind Farm Site. Both observations were during the 2018/19 winter season.

Incidental Observations

There were nine incidental observations of woodcock during surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.34). Most observations were of between one and two birds commuting or being flushed by the surveyor. There was one observation of a woodcock roding within the Wind Farm Site in 2022. There were seven observations on, or within 500m of, the Wind Farm Site.

Breeding Summary

In summary, woodcock territories were located during all breeding seasons at the Wind Farm Site. The majority of breeding woodcock transects each year had observations of displaying birds. Given the distribution of territories across the years, it is reasonable to assume that woodcock are breeding throughout the forestry and woodland habitats within the Wind Farm Site. Given the nature of woodcock breeding and display habits, it is difficult to estimate the number of breeding woodcock at the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.19 for the locations of the breeding areas.

7.4.15 Buzzard

Raw Survey data for buzzard is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3. Please note that a summary of the key observations is provided in the last paragraph of this section.

Vantage Point Surveys

Buzzard were observed on 120 occasions during vantage point surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.35). However, these observations likely relate to a small number of individuals observed on multiple occasions. Sixty-seven of these observations occurred during the core breeding season months between April and August, while there were 53 observations of buzzard during non-breeding season months (September – March). The majority of observations were of one or two birds commuting, hunting or soaring.

There were four observations during the 2018 breeding season, none of which were of breeding activity. In 2019, there were five observations during the breeding season, none of which were of breeding activity. In 2020, there were 16 observations during the breeding season, none of which were of breeding activity. However, in March 2020, there were two observations of buzzards displaying, both of which were on the same day. Indicating probable breeding at this location, within the Wind Farm Site. In 2021, there were eight observations during the breeding season. There was one observation of a pair of buzzard displaying, indicating probable breeding within the Wind Farm Site. In 2022, there were 10 observations during the breeding season, none of which were of breeding activity. In 2023, there were 24 observations during the breeding season. There were 10 observations relating to a confirmed nest location within the Wind Farm Site. This nest fledged one chick. See Confidential Appendix 7-5, Figure 7.5.20 for flights relating to breeding behaviour. The remaining observations during the breeding season related to between one and four birds commuting, hunting or soaring.

Sixty-one observations occurred within, or partially within, 500m of the proposed turbines. Seventy-seven of the flights occurred within, or partially within, the potential collision height.

Breeding Walkover Surveys

Buzzard were observed on 35 occasions during breeding walkover surveys (see Appendix 7.4, Figure 7.4.36). There was one observation in 2018, of a bird commuting. No breeding activity was recorded. In 2019, there were 13 observations of buzzard, five of which related to breeding behaviour. All observations were of territorial calls or displays and one observation of an adult with a fledgeling. These observations indicate one probable breeding territory, approximately 650m from the Wind Farm Site and one confirmed breeding territory within the Wind Farm Site. In 2020, there were five observations relating to breeding activity, including displaying and birds seen entering a nest. This confirms breeding within the Wind Farm Site. In 2021, there were three observations, none of which were of breeding activity. In 2022, there were three observations, none of which were of breeding activity. In 2023, there were nine observations, three of which related to breeding activity. All observations related to a confirmed nest location within the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.21 for flights relating to breeding behaviour.

All other observations during the breeding walkover surveys related to between one and four birds commuting, soaring or hunting. There were 33 observations on, or within 500m of, the Wind Farm Site.

Breeding Raptor Surveys

Buzzard were observed on 54 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7.4.37). In 2018, there was one observation of an individual displaying approximately 5km from the Wind Farm Site, indicating a probable breeding territory. In 2019, there was one observation of an individual displaying and one observation of territorial calls. These observations indicate probable breeding at these locations, one within the Wind Farm Site and one approximately 750m from the Wind Farm Site. There were no observations of breeding activity in 2020. In 2021, there was one observation of a pair displaying, and two observations of a bird carrying prey to a nest. These observations confirm breeding at two locations, approximately 1km and 5km from the Wind Farm Site. There were no observations of breeding activity in 2022. In 2023, there were three observations of birds displaying and one observation of a bird incubating on a nest. These observations confirm breeding within the Wind Farm Site and indicate a probable breeding territory approximately 450m from the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.22 for flights relating to breeding behaviour.

All other observations during the breeding raptor surveys related to between one and two birds commuting, soaring or hunting. There were 26 observations on, or within 500m of, the Wind Farm Site.

Winter Walkover Surveys

Buzzard were observed on seven occasions during winter walkover surveys (see Appendix 7-4, Figure 7.4.38). All observations were of individuals hunting, soaring, perched or commuting. Of the three observations that were mapped, all were on, or within 500m of, the Wind Farm Site.

Incidental Observations

There were four incidental observations of buzzard during surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.39). Observations were of one or two birds soaring or commuting. All observations were on, or within 500m of, the Wind Farm Site.

Breeding Summary

In summary, within the Wind Farm Site there was a confirmed nest location in 2019, 2020 and 2023. Please see the below summary of the highest breeding statuses confirmed each year:

- 2018: There was one probable breeding territory in 2018, approximately 5km from the Wind Farm Site
- 2019: There was a confirmed nest within the Wind Farm Site in 2019. Additionally, there were two probable breeding territories in wider area, approximately 650m and 750m from the Wind Farm Site

- 2020: There was a confirmed nest within the Wind Farm Site in 2020.
- 2021: There was a probable breeding territory within the Wind Farm Site in 2021. Additionally, there were two confirmed breeding territories in the wider area, approximately 1km and 5km from the Wind Farm Site.
- 2022: There was no breeding activity observed during the 2022 breeding season.
- 2023: There was a confirmed nest within the Wind Farm Site in 2023. Additionally, there was one probable breeding territory approximately 500m from the Wind Farm Site

Please see Confidential Appendix 7-5, Figure 7.5.23 for locations of all breeding territories.

7.4.16 Sparrowhawk

Raw Survey data for sparrowhawk is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3. Please note a summary is provided of the key observations in the last paragraph of this section.

Vantage Point Surveys

Sparrowhawk were recorded on 54 occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.40). However, these observations likely relate to a small number of individuals observed on multiple occasions. Twenty-nine of these observations occurred during the core breeding season months between April and August, while there were 25 observations of sparrowhawk during non-breeding season months (September – March).

There were seven observations during 2018, four during 2019, five during 2020 and seven during the 2022 breeding seasons, none of which were of breeding activity. During the 2023 breeding season, there were eight observations, two of which were of birds carrying prey to a nest site and one of a pair chasing each other. These observations confirm breeding within the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.24 for flights relating to breeding behaviour.

The remaining observations were of one or two birds commuting, soaring or hunting. There were 26 observations within, or partially within, 500m of the proposed turbine layout. There were 39 observations at the potential collision height.

Breeding Walkover Surveys

Sparrowhawk were recorded on 21 occasions during breeding walkover surveys (see Appendix 7-4, Figure 7.4.41). There were three observations during the 2018 breeding season, eight observations during the 2019 breeding season, two observations during the 2020 breeding season, four observations during the 2022 breeding season and four observations during the 2023 breeding season.

Most observations were of birds hunting or commuting. There were six observations relating to breeding behaviour, five in 2019 and one in 2020. In 2019, there were two observations of birds displaying and three of birds carrying prey to a nest. These observations relate to one confirmed nest location within the Wind Farm Site and one probable breeding territory approximately 450m from the Wind Farm Site. The 2020 observation of a bird carrying prey to a nest was not mapped, therefore the location of this confirmed breeding territory is not known. See Confidential Appendix 7-5, Figure 7.5.25 for flights relating to breeding behaviour.

Breeding Raptor Surveys

Sparrowhawk were recorded on 28 occasions during breeding raptor surveys (see Appendix 7-4, Figure 7.4.42). There were three observations during the 2018 breeding season, nine observations during the 2019 breeding season, five observations during the 2020 breeding season, five observations during the 2022 breeding season and six observations during the 2023 breeding season.

Most observations were of birds hunting or commuting. There were 18 observations on, or within 500m of, the Wind Farm Site. There were five observations relating to breeding behaviour, three in 2019 and two in 2023. In 2019, there was one observation of a bird carrying prey to a nest, one observation of a bird mobbing a hooded crow and another observation of an adult with at least one fledgling. These observations confirm two nest sites, one within the Wind Farm Site and one approximately 1.2km from the Wind Farm Site. In 2023, There was one observation of a bird carrying prey to a nest and one observation of a bird mobbing a hen harrier. These observations relate to one confirmed and one probable breeding territory for sparrowhawk, both of which were within the Wind Farm Site. See Confidential Appendix 7-5, Figure 7.5.26 for flights relating to breeding behaviour.

Winter Walkover Surveys

Sparrowhawk were observed on seven occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.43). All observations were of individuals hunting or commuting. There were five observations in the 2018/19 winter season and one in each of the 2020/21 and 2021/22 winter seasons. All observations were within, or partially within, 500m of the Wind Farm Site.

Incidental Observations

There were 12 incidental observations of sparrowhawk during surveys between April 2018 and September 2023 (see Appendix 7-4, Figure 7.4.44). All observations were of individuals hunting or commuting. Of the observations that were mapped, only three were located withing, or partially within, 500m of the Wind Farm Site.

Breeding Summary

In summary, there was one confirmed nest location in 2019, and two confirmed nest locations and one probable breeding territories in 2023 identified within the Wind Farm Site. In the surrounding lands, there was one confirmed and one probable breeding territory identified in 2019, approximately 1.2km and 500m from the Wind Farm Site respectively. All breeding territories are presented in Confidential Appendix 7-5, Figure 7.5.27.

7.4.17 Passerines (Red Listed)

The BoCCI Red listed species grey wagtail, meadow pipit, redwing and swift were recorded during the surveys between April 2018 and September 2023. Grey wagtail were observed on 48 occasions, with up to five birds being recorded. Meadow pipit were observed on 347 occasions, with up to 30 birds being recorded. Redwing were observed on 19 occasions, with up to 30 birds being recorded. Swift were observed on 19 occasions, with up to two birds being recorded.

7.5 Receptor Evaluation

7.5.1 Determination of Population Importance

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

7.5.1.1 Golden Plover

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

7.5.1.2 Hen Harrier

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. The estimated national wintering population of hen harrier in Ireland is 311-435 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 site is located in an upland range that was identified as a regional stronghold for hen harrier (Ruddock *et al.*, 2016).

This species was recorded regularly during the breeding season, with a confirmed nest located in 2018, 2019 and 2023 and probable breeding at the Wind Farm Site in 2020 and 2022. Additionally, Hen harrier were observed regularly throughout all winter seasons surveyed. There were hen harrier roosts identified during surveys at the Wind Farm Site. In 2020, a roost was identified with a minimum of four birds going to roost.

The Wind Farm Site is of **National Importance** to this species throughout the year, given that the species were regularly observed at the Wind Farm Site.

7.5.1.3 Merlin

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

7.5.1.4 Peregrine

As per NPWS Article 12 Reporting (2013-2018), the estimated population of peregrine is 425 pairs. Therefore, as per NRA 2009, a regularly occurring population of four pairs of peregrine is required for classification as Nationally Important. There are no published figures for the County Clare population of peregrine, however an estimate can be derived from the national population. Assuming an even distribution of peregrine across the 26 counties of the Republic of Ireland, the population of peregrine in the county is estimated to be 32 birds (national population divided by 26 counties). Taking a precautionary approach and using the above as a guide; a regularly occurring population of a single bird is required for classification of County Importance.

Peregrine was observed on only six occasions, three of which were within 500m of the Wind Farm Site. There was a nest location identified 2.1km from the Wind Farm Site. Taking a precautionary approach,

it is assumed that peregrine observed at the Wind Farm Site are associated with this nest site and were therefore assigned **County Importance**.

7.5.1.5 Red Kite

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

7.5.1.6 Goshawk

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

7.5.1.7 Osprey

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

7.5.1.8 Black-headed Gull

Black-headed gull is an SCI species of the River Shannon and River Fergus Estuaries SPA that was only observed on four occasions, despite undertaking a comprehensive suite of surveys over five and a half years. The Wind Farm Site is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.5.1.9 Cormorant

Cormorant is an SCI species of the River Shannon and River Fergus Estuaries SPA that was only observed on four occasions, despite undertaking a comprehensive suite of surveys over five and a half years. The Wind Farm Site is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.5.1.10 Curlew

Curlew is a BoCCI Red Listed species in Ireland. It was observed on only one occasion as an incidental observation, despite undertaking a comprehensive suite of surveys over five and a half years. The Wind Farm Site is of **No Ecological Importance** to this species, given how infrequently the species was observed.

7.5.1.11 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), 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. To estimate this population, it is assumed that kestrel are evenly distributed across the 26 counties of the Republic of Ireland[8]. The county population of kestrel can then be estimated to be 519 birds (national population divided by 26

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

counties). Therefore, a regularly occurring population of five birds is required for classification of County Importance.

There was a maximum of two confirmed breeding territories per year (2018–2023) identified within, or immediately adjacent to, the Wind Farm Site. This indicates a resident population of four adult birds during the breeding season. This population would be bolstered by fledglings at the end of the breeding season, which will remain present at the Wind Farm Site until the start of the next breeding season, when birds become territorial again. Given that kestrel have brood sizes of four to five chicks, and a survival rate of 30% in their first year[9], it is likely that there would be a population of approximately four adults and three juvenile birds by the end of each winter season. The population recorded at the Wind Farm Site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

7.5.1.12 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.

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.

There is a resident population of red grouse at the Wind Farm Site, and birds were observed regularly during surveys. During the dedicated breeding red grouse surveys, up to six male red grouse were observed, indicating a breeding population of at least six pairs at the Wind Farm Site. Therefore, the population at the Wind Farm Site was assigned **County Importance**.

7.5.1.13 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. Assuming an even distribution of snipe[10] across the 26 counties of the Republic of Ireland, the county population of snipe is estimated to be 164 pairs (national population divided by 26 counties). Therefore, a regularly occurring population of just one pair is required for the classification of County Important.

Given that snipe were regularly observed at the Wind Farm Site and that a breeding territory was identified in 2020, the population recorded was assigned **County Importance**.

7.5.1.14 Woodcock

Woodcock is BoCCI Red Listed during the breeding season in Ireland. There are no national estimates of the breeding population of woodcock in Ireland. There were up to six breeding areas identified at, or within 500m of, the Wind Farm Site between 2018 and 2023. Taking a precautionary approach (given the species unfavourable conservation status) the population recorded at the Wind Farm Site was assigned **County Importance**.

[9] *https://app.bto.org/birdfacts/results/bob3040.htm*
[10] *While acknowledging the unfavourable conservation status of this species with an identified population decline, this remains a species with a widespread distribution in Ireland (BoCCI, 2020-2026).*

7.5.1.15 Buzzard

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

7.5.1.16 Sparrowhawk

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

7.5.1.17 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)**.

7.5.2 Identification of Key Ornithological Receptors

Table 7-11 Avifaunal Receptor Evaluation and Selection Criteria Rational

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List (Breeding & Wintering Populations) & Irish Wildlife Act	All Seasons No population of ecological importance recorded	This species was recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Hen Harrier	Annex I, EU Birds Directive; BoCCI Amber List (Breeding Populations) & Irish Wildlife Act	All Seasons National Importance	Hen harrier were confirmed breeding and roosting within the Wind Farm Site. Additionally, hen harrier were observed hunting within the Wind Farm Site regularly throughout the year. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** There was a resident hen harrier breeding population within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Merlin	Annex I, EU Birds Directive; BoCCI Amber List (Breeding Populations) & Irish Wildlife Act	All Seasons No population of ecological importance recorded	This species was only recorded on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.3 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Peregrine	Annex I, EU Birds Directive & Irish Wildlife Act	All Seasons County Importance	Peregrine were recorded infrequently and in low numbers. There is very limited evidence to suggest that the Wind Farm Site is of significance to this species. Notwithstanding the above, taking a highly precautionary approach given that a breeding territory was identified 2.1km from the	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			Wind Farm Site, an assessment of potential impact has been undertaken for this species.	
Red Kite	Annex I, EU Birds Directive; BoCCI Red List (Breeding Populations) & Irish Wildlife Act	<u>All Seasons</u> No population of ecological importance recorded	This species was only recorded on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.5 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Goshawk	Annex I, EU Birds Directive; BoCCI Amber List (Breeding Populations) & Irish Wildlife Act	<u>All Seasons</u> No population of ecological importance recorded	This species was only recorded on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.6 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Osprey	Annex I, EU Birds Directive & Irish Wildlife Act	<u>All Seasons</u> No population of ecological importance recorded	This species was only recorded on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.7 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Black-headed Gull	SCI of the River Shannon and River Fergus Estuaries SPA; BoCCI Amber List (Breeding & Wintering Populations) & Irish Wildlife Act	<u>All Seasons</u> No population of ecological importance recorded	This species was recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.8 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Cormorant	SCI of the River Shannon and River Fergus Estuaries SPA	<u>All Seasons</u>	This species was recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.9 for further detailed discussion.	**No**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
	and the Lough Derg (Shannon) SPA; BoCCI Amber List (Breeding & Wintering Populations) & Irish Wildlife Act	No population of ecological importance recorded	**No pathways for significant effects were identified.**	
Curlew	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act	**All Seasons** No population of ecological importance recorded	This species was only recorded on one occasion. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.10 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Kestrel	BoCCI Red Listed (Breeding Populations) & Irish Wildlife Act	**All Seasons** County Importance	There were up to two kestrel territories identified within the Wind Farm Site. Additionally, kestrel were observed hunting within the wind farm site regularly all year round. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** There was a resident population kestrel within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Red Grouse	BoCCI Red Listed (Breeding Populations) & Irish Wildlife Act	**All Seasons** County Importance	There were up to six breeding territories identified on, or within 500m of, the Wind Farm Site. **An assessment of direct habitat loss is required.** The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** No flights were recorded within PCH. On the basis of available survey data an assessment of collision risk is not required.	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Snipe	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act	<u>All Seasons</u> County Importance	Snipe are resident at the Wind Farm Site. **An assessment of direct habitat loss is required.** The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Woodcock	BoCCI Red Listed (Breeding Populations)	<u>Breeding</u> County Importance	Woodcock are breeding throughout the Wind Farm Site. **An assessment of direct habitat loss is required.** The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** No flights were recorded within PCH. On the basis of available survey data an assessment of collision risk is not required.	**Yes**
Buzzard	BoCCI Green List & Irish Wildlife Act	<u>All Seasons</u> Local Importance (Higher Value)	Buzzard are resident at the wind farm site and utilize it for breeding and hunting. The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Sparrowhawk	BoCCI Green List & Irish Wildlife Act	<u>All Seasons</u>	Sparrowhawk are resident at the wind farm site and utilize it for breeding and hunting. The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.**	**Yes**

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
		Local Importance (Higher Value)	The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	
Passerines (Red Listed)	BoCCI Red List & Irish Wildlife Act	**All Seasons** Local Importance (Lower Value)	As per NatureScot guidance, it is generally considered that passerine species are not significantly impacted by wind farms primarily due to their large populations.	**No**

7.5.3 Key Ornithological Receptor Sensitivity Determination

Criteria developed by Percival (2003) is presented in Table 7-3 (Section 7.2.5.3.1) for assessing bird sensitivity within the Proposed Development. The sensitivity of each KOR is outlined below:

High Sensitivity KORs include:

- Hen Harrier (ecologically sensitive species)

Medium Sensitivity KORs include:

- Peregrine (Annex I; EU Birds Directive)
- Kestrel (BoCCI Red Listed)
- Red Grouse (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)
- Woodcock (BoCCI Red Listed)

The remaining KORs identified in the Proposed Development were classified as Low Sensitivity:

- Buzzard
- Sparrowhawk

7.6 Potential Effects

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

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

All elements of the Proposed Development have been considered in assessing effects on ecological receptors, including: 9 No. turbines with a tip height range of between 179.5 metres and 185 metres and all associated foundations and hardstanding areas, access roads and entrance(s) including upgrade of existing site roads and provision of new roads, electricity substation and wind farm control building(s), borrow pit(s), electrical cabling for grid connection, temporary construction compounds and a permanent meteorological mast. Upgrades to roads along the turbine delivery route will also be required. A detailed description of the Proposed Development is included in Chapter 4 of this EIAR.

7.6.1 Do-Nothing Effect

If the Proposed Development was not developed, the site will continue to function as it does at present, with no changes made to the current land-use of commercial forestry. In the specific case of forestry within the Wind Farm Site, its value and suitability for local avian receptors will vary with the management of the forestry. Forestry plantations in their initial years prior to canopy closure have the potential to support certain species (e.g., hen harrier), and as the forestry matures it is utilised by other species that favour (closed canopy) woodland conditions. Therefore, as forestry matures/ is felled there is potential for ongoing loss/creation of supporting habitat. If the Proposed Development were not to proceed, the opportunity to capture an even greater part of County Clare's valuable renewable energy resource would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment and to diversify the local economy would also be lost.

7.6.2 Effects on Key Ornithological Receptors during Construction and Operation

7.6.2.1 Hen Harrier (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	There was breeding and roosting sites identified within, and adjacent to, the Wind Farm Site during surveys between April 2018 and September 2023. The Wind Farm Site is predominantly a large conifer plantation, with areas of upland blanket bog around its margins. The area surrounding the Wind Farm Site is predominately bog and wet grassland habitats. This mosaic of habitats includes suitable breeding, roosting and foraging habitat. Nesting Habitat Between 2018 and 2023 a single pair of hen harrier was confirmed breeding on two occasions at the wind farm site or around its margins. There was also territorial occupancy in 2020 and 2022, however breeding was not confirmed. Please see Section 7.4.2 for further details and Confidential Appendix 7-5, Figure 7.5.7 for location details. As the development footprint does not overlap with the confirmed breeding locations no significant physical loss of nesting habitat is predicted. Roosting Habitat Irregularly used roost sites were identified within the upland bog habitats to the north and encircled by the Wind Farm Site. Additionally, there was one roost located within forestry habitat within the Wind Farm Site and one roost located adjacent to the Wind Farm Site, to the south, in wet grassland.	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	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	As the development footprint has been specific designed to avoid the confirmed roosting locations no significant physical loss of roosting habitat is predicted. Foraging Habitat Hen harrier were recorded regularly commuting over the Wind Farm Site and occasionally hunting within the Wind Farm Site. The majority of foraging flights were within the open habitats to the north of, or encircled by, the Wind Farm Site. Only a small percentage of flights observed were within the mature forestry that comprises the majority of the Wind Farm Site. The amount of open habitat (e.g., peatland/wet grassland) that will be lost to the development footprint will be insignificant, relative to the availability of this habitat in the wider surroundings. Hen harrier also foraged in young or pre-thicket forestry however the loss of this habitat to the development footprint is not predicted to be significant given the overall land lost to the development footprint is small (i.e. 18.5ha/2% of Wind Farm Site) relative to the total area within the Wind Farm Site. In summary, no significant effects are predicted to breeding, roosting or foraging hen harrier.		
Disturbance	As previously discussed, confirmed hen harrier breeding and roosting sites were recorded within, and adjacent to, the Wind Farm Site. Foraging or commuting hen harrier were frequently recorded within, and adjacent to, the Wind Farm Site. 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. There is the potential for disturbance of nesting hen harrier at the most recently active (2023) nest location, as it is located within 750m of the proposed turbine	The magnitude of the effect is assessed as *Medium* for the 2023 nest location and foraging hen harrier. The cross tablature of a *High* sensitivity species and *Medium* Impact corresponds to a **High** effect significance	Short-term **Significant** Negative Effect for the 2023 nest location and foraging hen harrier.

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	layout. Without mitigation, hen harrier are unlikely to nest at this 2023 nest location. Similarly, there is the potential for disturbance impacts on roosting hen harrier adjacent to the proposed infrastructure. In particular, a 2019/20 roost is located in forestry which is due to be felled as part of the project. Please see Confidential Appendix 7-5, Figure 7.5.8 for location details. This roost location has not been active in subsequent winter seasons and by the time construction works commence this forestry will no longer be suitable for roosting hen harrier. The other roost sites are located in an area of open peatland separated from the proposed infrastructure by obscuring mature forestry. Owing to the maturing of forestry, the separation distance and the obscuring mature forestry which will be present during the construction phase, no significant disturbance impacts are predicted on any of the identified roost sites. Without mitigation, there is the potential for significant but short-term disturbance of foraging hen harrier during the construction phase. In summary, before mitigation significant disturbance effects are predicted for nesting and foraging hen harrier. Please see Section 7.7 for a detailed mitigation strategy.		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**
Displacement & Barrier Effect	As previously discussed, confirmed hen harrier breeding, roosting sites and foraging were recorded within, and adjacent to, the Wind Farm Site. Impacts on these activities were considered for the operational phase. Most recently active nest:	The magnitude of the effect is assessed as *Medium* for foraging hen harrier The cross tablature of a *High* sensitivity species and *Medium* Impact corresponds to a **High** effect significance	Long-term **Significant** Negative Effect for foraging hen harrier

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	The 2023 nest is located in open pre-thicket forestry onsite, by design the canopy in this location will have closed[11] by the operational phase and the forestry will no longer be suitable for nesting. This will be confirmed during pre-commencement surveys (Please see Section 7.9 for details). No significant impacts are therefore predicted at this location. Key (nesting and roosting) habitat: As outlined in Section 7.4.2, the resident pair of hen harrier frequently moved nesting locations in alternate years. Of these, the most suitable and frequently used habitat (by design) is greater than 750m from the nearest turbine. Ruddock and Whitfield (2007) noted disturbance displacement to a distance of 500m-750m for hen harrier breeding and resting locations. This most favoured habitat was an area of peatland where breeding was attempted or confirmed in 2019 and 2022. Similarly, the same peatland habitat was regularly used for roosting. Due to the separation distance of 750m from this peatland habitat to the nearest turbines no significant impacts are predicted for potentially breeding or roosting birds in this key habitat. Loss of foraging habitat: Foraging hen harrier within the proposed wind farm site have the potential to be displaced from suitable foraging habitat to a distance of 250m from turbines (Pearce-Higgins *et al.*, 2009)[12]. To determine the likely significance of this displacement effect a two-step process was undertaken. Firstly, the amount of habitat loss was calculated, this was then (secondly) considered relative to the availability of foraging habitat locally to quantify the magnitude of the effect. Please see Appendix 6-5 for a detailed discussion of the calculation rationale.		

[11] *Coillte forestry compartments containing the 2023 nest is predicted to close at this location by 2028 (if not before). The forestry will be ten years old by then, which is typically the age when the forestry canopy closes making it unsuitable for the ground nesting hen harrier.*
[12] *Pearce-Higgins et al., (2009) noted significant avoidance of turbines to 250m.*

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	Step 1: To calculate the amount of foraging habitat that would be lost through avoidance it was assumed that there would be one hundred percent avoidance to within 250m of turbines by foraging hen harrier. The sum of the predicted loss of suitable[13] foraging habitat (for all nine turbines) is predicted to total 58.57 ha. Step 2: To calculate the amount of available habitat locally, an assessment was undertaken of all suitable habitat within the core foraging range (2km) of the confirmed 2023 nest. Hen harrier spend the majority of their time foraging within 2km (Irwin *et al.,* 2012) of their nest. There is 780ha of open habitat within 2km of the nest location and a further 130ha of pre-thicket forestry/woodland habitat, i.e., 910 ha in total. Given that there is 910ha of available foraging habitat for hen harrier within their core foraging range, the loss of 58.57ha represents, approximately, a 6.5% reduction in the amount of available foraging habitat for this pair. The magnitude of this effect is likely to give rise to significant effects for foraging hen harrier without intervention. In summary No significant effects are predicted for nesting or roosting hen harrier. Owing to the importance of the onsite population and magnitude of the effect (a 6.5% loss of habitat) significant displacement effects on foraging hen harrier are predicted without intervention. Accordingly, a comprehensive compensation and enhancement strategy is proposed, please see Section 7.8 for details.		
Collision	The species was recorded flying with the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6.	The magnitude of the effect is assessed as *Low.*	Long-term **Slight** Negative Effect

[13] *Suitable habitat was defined as all open habitats likely to contain passerines (e.g., wet grassland and peatland) and forestry in its pre-thicket phase. Under normal forestry management, forestry is available for foraging hen harrier approximately 20% of the lifetime.*

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	The collision risk has been calculated at a rate of 0.078 collisions per year. Annual mortality of adult hen harrier has been calculated at 22.2% per annum (Ruddock *et al.*, 2016). If 0.078 collisions were to occur per year, it would mean that the losses at the Wind Farm Site would increase the annual mortality of the County Clare population[14] (i.e., 34 birds (please see 7.3.5 and 7.5.1.2 for further details)) by 1.03%. The predicted collision risk is therefore negligible in the context of the national population.	The cross tablature of a *High* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	

[14] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a wide ranging species that utilises upland blanket bog and young forestry habitats, which are widespread across County Clare, it is, therefore, reasonable to conclude that there is an exchange of individuals in suitable habitat within the county.*

7.6.2.2 Peregrine (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Peregrine were recorded on only six occasions during surveys between April 2018 and September 2023. There were only two observations of birds within the Wind Farm Site, both of which were of individuals commuting. Given that the Wind Farm Site is predominantly a large conifer plantation, this offers limited suitability for peregrine. This species is unlikely to be dependent on the onsite habitats, given the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (e.g., bog/ heath/ grassland/ coniferous plantation). Significant effects are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance	Long-term **Imperceptible** Negative Effect
Disturbance	There was a nest location identified 2.1km from the Wind Farm Site. There was no evidence of breeding activity recorded within the Wind Farm Site. There were three observations of this species within 500m of the proposed infrastructure throughout the entire survey period. Disturbance during construction is unlikely to discourage flight activity in the vicinity of the Wind Farm Site, particularly given peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock *et al.,* 2007). Significant disturbance effects are not anticipated.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance	Long-term **Imperceptible** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**
Displacement & Barrier Effect	There was no evidence of breeding recorded within 2km of the Wind Farm Site. In total, this species was recorded on two occasions within 500m of the proposed turbine layout between April 2018 and September 2023. The availability of alternative suitable habitat in the surroundings, limit the potential for significant displacement effects. Furthermore, peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock *et al.*, 2007). It is, therefore, reasonable to conclude that following a period of habituation, the population will become	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance	Long-term **Imperceptible** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	accustomed to the wind farm in the landscape. Significant displacement effects are not predicted.		
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at 0.001 collisions per year. No significant effects are predicted given no collision are predicted to occur during the lifetime of the wind farm.	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	Long-term **Imperceptible** Negative Effect

7.6.2.3 Kestrel (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	There was a peak count of three confirmed territories for kestrel identified during surveys between April 2018 and September 2023. During the 2020 breeding season, there was a probable breeding territory located approximately 600m from the nearest proposed turbine. In 2021, two confirmed breeding territories were identified, approximately 1km and 1.2km from the nearest proposed turbine. In 2022, there was a probable territory identified approximately 500m from the nearest proposed turbine. In 2023, there were three confirmed nest locations, approximately 350m, 1.5km and 1.7km from the nearest proposed turbine. There will be minimal loss of suitable breeding habitat, given the extent of suitable woodland habitat greater than 500m from the proposed turbine layout. Direct loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the development footprint is small (i.e., 18.5ha/2% of Wind Farm Site) relative to the total area within the Wind Farm Site. Substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Wind Farm Site and the wider surroundings post-construction. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	The Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local kestrel population. As previously discussed, there were up to three kestrel territory identified per year at the Wind Farm Site and its surroundings. However, of these, there was a maximum of one (one in 2020, one in 2022 and one in 2023) confirmed breeding territories within, or partially within, 500m of the proposed infrastructure. Given that kestrel have brood sizes of four	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	to five chicks, and a survival rate of 30% in their first year[15], it is likely that there would be a population of approximately two adults and two juvenile birds by the end of the winter season. Therefore, 0.8% of the county population (i.e., 4 of c.519 birds (please see Section 7.5.1.11 for further details)) could be impacted. The remaining identified territories are greater than 500m from the proposed infrastructure and are unlikely to be significantly affected by construction disturbance. Significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. Onsite habitats are not considered unique to the Wind Farm Site. Significant disturbance effects are not predicted at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**
Displacement & Barrier Effect	Raptor studies have generally found only low levels of turbine avoidance (Hötker *et al.,* 2006; Madders & Whitfield, 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins *et al.*, 2009). Onsite habitats are predominately mature forestry plantations, which are considered to be suboptimal for foraging kestrel. Moreover, significant effects are not anticipated, given that extensive areas of more suitable foraging habitat exist and will remain in the wider area (e.g., bog and grassland habitats). Onsite habitats are not considered unique to the Wind Farm Site. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6.	The magnitude of the effect is assessed as *Low*.	Long-term **Slight** Negative Effect

[15] *https://app.bto.org/birdfacts/results/bob3040.htm*

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	The collision risk has been calculated at a rate of 1.86 collisions per year. Annual mortality of adult kestrel has been calculated at 31% per annum (Village, 1990). If 1.86 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[16] (i.e. c.519 birds (please see Section 7.5.1.11 for further details)) by 1.16%. The predicted collision risk is therefore low in the context of the county population.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	

[16] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a widespread species (as per the Bird Atlas 2009-11) that utilises a widespread habitat type (agricultural grassland), it is, therefore, reasonable to conclude that there is an exchange of individuals in suitable habitat within the county.*

7.6.2.4 Red Grouse (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was observed within the Wind Farm Site on only three occasions, two of which were within the upland blanket bog habitat within the Wind Farm Site, near T3. The Wind Farm Site is predominantly a large conifer plantation, this habitat is considered to be suboptimal for red grouse. Therefore, significant habitat loss for this species is not anticipated.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Long-term **Imperceptible** Negative Effect
Disturbance	The species was recorded within 500m of the proposed infrastructure. Additionally, breeding territories were identified within 500m of the proposed infrastructure. Disturbance during construction is unlikely to significantly discourage foraging or breeding attempts as the areas of suitable habitat are located outside the Wind Farm Site. 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.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**
Displacement & Barrier Effect	Operation is unlikely to discourage foraging or breeding attempts within the Wind Farm Site or surrounding area.	The magnitude of the effect is assessed as *Low*.	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
	A study by Douglas *et al.* (2011) found no significant change in the relationships between grouse occurrence and either turbine or track proximity and found, no evidence for re-distribution in red grouse in response to wind farm operation. Significant effects are not anticipated.	The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Low** effect significance.	
Collision	This species was not recorded flying at potential collision height during the extensive vantage point survey undertaken at the Wind Farm Site. Collision related mortality is not likely to significantly impact red grouse.	**No Effect**	**No Effect**

7.6.2.5 Snipe (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Snipe were regularly recorded during surveys, however no breeding territories were recorded at the Wind Farm Site. The Wind Farm Site is predominantly a large conifer plantation, which is suboptimal for snipe and offers limited breeding opportunities. The loss of breeding habitat will be minimal as the infrastructure is confined to a narrow corridor (i.e., 18.5ha/2% of Wind Farm Site), particularly given that the proposed infrastructure is mostly limited to the forestry habitats. The areas of suitable nesting and foraging habitat within the site 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 *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Long-term **Imperceptible** Negative Effect
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. There were no breeding territories identified within 400m of the proposed infrastructure, therefore significant avoidance by breeding snipe is not anticipated. Furthermore, the majority of snipe activity was limited to the open habitats adjacent the Wind Farm Site and smaller numbers within the Wind Farm Site. While some disturbance may occur in the upland blanket bog close to T1 and T3, significant impacts are not anticipated given the abundance of similar habitat in the wider surroundings. Significant disturbance during the construction phase are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Displacement & Barrier Effect	Snipe breeding density can be reduced by 50% within 400m of turbines (Pearce-Higgins *et al.*, 2009). Given that no breeding territories were identified within 400m of the proposed turbine layout, significant displacement of breeding snipe are not anticipated. There is the potential for snipe to be displaced from the upland blanket bog, which is within 400m of T1 and T3. However, significant impacts are not anticipated given the abundance of similar habitat in the wider surroundings. Significant displacement is not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.6. The model used for the analysis assumes that waterbird species, including snipe, are active for 25% of dark hours, in addition to daylight hours. It is acknowledged that the predicted number of transits, and hence the predicted rate of collision for snipe may be underestimated, as flight activity for this species is predominantly crepuscular in nature while the VP surveys are largely diurnal (Table 1.4, SNH (2017)). The collision risk has been calculated at a rate of 0.117 collisions per year. Annual mortality of snipe has been calculated at 37.5% per annum (Spence, 1987). If 0.117 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[17] (i.e. c.328 birds (please see Section 7.5.1.13 for further details)) by 0.09%. The predicted collision risk is therefore negligible in the context of the county population.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Long-term **Imperceptible** Negative Effect

[17] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a widespread species (as per the Bird Atlas 2009-11) that utilises a widespread habitat type (agricultural grassland and bog habitats), it is, therefore, reasonable to conclude that there is an exchange of individuals in suitable habitat within the county*

7.6.2.6 Woodcock (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was regularly recorded during all breeding seasons surveyed at the Wind Farm Site. Numerous roding male woodcock were recorded. It is considered that woodcock are breeding throughout the Wind Farm Site, given the frequency and number of birds recorded roding during surveys. The Wind Farm Site is predominantly a large conifer plantation, young forestry is ideal habitat for breeding woodcock (Morgan & Shorten, 1974). The construction of the Wind Farm Site will result in a measurable reduction in the breeding habitat within the Wind Farm Site. However, potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Wind Farm Site nor rare locally. Furthermore, the loss of breeding habitat will be localised to the vicinity of the proposed infrastructure, which is confined to a narrow corridor (i.e., 18.5ha/2% of Wind Farm Site). Considering the above, no significant habitat loss is predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	As previously discussed, this species is breeding throughout the Wind Farm Site. Woodcock are resident at the Wind Farm Site, however in lower numbers during the non-breeding season. The construction of the Wind Farm Site will result in a measurable reduction in the breeding habitat onsite/around the margins of the Wind Farm Site. However, potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Wind Farm Site nor rare locally. Significant disturbance impacts are not anticipated.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Medium* sensitivity species and *Medium* Impact corresponds to a **Low** effect significance.	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Displacement & Barrier Effect	As previously discussed, this species is breeding throughout the Wind Farm Site. Woodcock are resident at the Wind Farm Site, however in lower numbers during the non-breeding season. The Wind Farm Site will result in a measurable reduction in the number of breeding woodcock onsite/around the margins of the Wind Farm Site[18]. However, potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Wind Farm Site nor rare locally. The area within the Wind Farm Site, which is within 500m of a proposed turbine, represents only 46% of the total Wind Farm Site area. Additionally, there is an abundance of suitable breeding habitat for woodcock outside the Wind Farm Site that is also greater than 500m from the proposed turbine layout. There is 1,902ha of continuous forestry/woodland extending throughout the Wind Farm Site and into the surrounding area. However, a significant proportion of the predicted habitat loss will be offset by replanted forestry (as required by felling licences to facilitate construction works). Significant displacement impacts are not anticipated, given the abundance of suitable breeding habitat that will remain within the Wind Farm Site and in the wider surroundings post-construction.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Medium* sensitivity species and *Medium* Impact corresponds to a **Low** effect significance.	Long-term **Moderate** Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.6. The model used for the analysis assumes that waterbird species, including woodcock, are active for 25% of dark hours, in addition to daylight hours. The collision risk has been calculated at 0.003 collisions per year. The predicted collision risk is therefore negligible in the context of the county population.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Long-term **Imperceptible** Negative Effect

[18] *A study by Dorka et al. (2014) found that there was a reduction of breeding woodcock densities from 10 males/100ha to 1.2 males/100ha at 15 wind farms in Germany. These declines were attributed to the barrier effect of turbines and the effects of turbine noise on displaying woodcock. LAG VSW (2014) outline a displacement distance of 500m around operational turbines for breeding woodcock.*

7.6.2.7 Buzzard (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. The construction of the Wind Farm Site will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e., 18.5ha/2% of Wind Farm Site) relative to the total area within the Wind Farm Site. Breeding territories were identified within the Wind Farm Site in 2019, 2020, 2021 and 2023. There is potential for the felling of forestry within the Wind Farm Site to result in the loss of nesting habitat. However, given the size of the development footprint, significant impacts are not anticipated. There will be significant areas of suitable breeding habitat remaining on-site and in the wider area post-construction. Significant effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	The Wind Farm Site and its immediate surroundings has hosted up to three breeding pairs of buzzard between 2018 and 2023. In addition, this species was regularly recorded within the Wind Farm Site during the breeding and wintering season. The disturbance associated with construction works will result in a measurable reduction in the breeding density of buzzard onsite and a reduction in the amount of available foraging habitat around the margins of the Wind Farm Site. However, these lands (e.g., commercial forestry, upland blanket bog and farmland) are not considered unique to the Wind Farm Site or rare in the wider surroundings. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Displacement & Barrier Effect	This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. As previously discussed, there were up to three breeding territories within the Wind Farm Site and its immediate surroundings. Pearce-Higgins *et al.* (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. There was only one breeding territory identified partially within 500m of the proposed turbine layout in the 2019, 2020, 2021 and 2023 breeding seasons. Extensive areas of suitable foraging and breeding habitat exist and will remain in the wider area post-construction (i.e., outside 500m from the proposed turbine layout). Additionally, there were 127 observations of buzzard within 500m of the proposed turbine layout. There will be a measurable reduction in the frequency of commuting and foraging buzzard within 500m of the proposed turbine layout. However, onsite habitats are not considered unique to the Wind Farm Site and there is an abundance of suitable habitat for this species greater than 500m from the proposed turbine layout within the Wind Farm Site and its surroundings. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Long-term **Slight** Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.6. The collision risk has been calculated at a rate of 0.81 collisions per year. The favourable conservation status of this species (Green-listed BoCCI) limits the potential for ecologically significant effects to result. The loss of 0.81 birds per year from the local population of a Green-listed (BoCCI) species is considered of low significance.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance.	Long-term **Slight** Negative Effect

7.6.2.8 Sparrowhawk (All Seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. The construction of the Wind Farms Site will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e., 18.5ha/2% of the Wind Farm Site) relative to the total area within the Wind Farm Site. Within, or partially within, the wind farm site there was one confirmed breeding territory identified in 2019 and, two confirmed and one probable breeding territory identified in 2023. There were no territories identified within the Wind Farm Site during the other breeding seasons surveyed. There is potential for the loss of nesting habitat within the Wind Farm Site. However, these lands (e.g., commercial forestry) are not considered unique to the Wind Farm Site or rare in the wider surroundings. Significant population level effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	Breeding sparrowhawk were recorded during the 2019 and 2023 breeding seasons. Construction activity adjacent to the nest sites within the Wind Farm Site could potentially cause disturbance of breeding and foraging sparrowhawk. The disturbance associated with construction works will result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Wind Farm Site. However, these lands (e.g., commercial forestry) are not considered unique to the Wind Farm Site or rare in the wider surroundings. Significant population level disturbance effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Short-term **Slight** Negative Effect
Operational Phase			

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Direct effects are not anticipated as no additional infrastructure is proposed.	**No Effect**	**No Effect**
Displacement & Barrier Effect	As previously discussed, the Wind Farm Site hosts breeding and foraging sparrowhawk. Displacement from turbines is not reported for sparrowhawk, however, it is assumed for the purposes of the assessment that sparrowhawk show avoidance to a distance of 500m from turbines as with other raptors (Pearce-Higgins *et al.*, 2009). There was one territory within 500m of the proposed turbine layout in 2019 and three in 2023. The disturbance associated with operational turbines will result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Wind Farm Site. Notwithstanding this, extensive areas of suitable foraging habitat exist and will remain in the wider area (i.e., outside 500m from the proposed turbine layout). Moreover, onsite habitats are not considered unique to the Wind Farm Site with significant areas of similar habitats available within the Wind Farm Site, but greater than 500m from the proposed turbine layout, and within the wider surroundings. Significant population level displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Long-term **Slight** Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.6. The collision risk has been calculated at a rate of 0.097 collisions per year, or one collision every ten years. The loss of 0.097 birds from the local population of a Green-listed (BoCCI) species is considered insignificant.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Low* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Long-term **Imperceptible** Negative Effect

7.6.3 Effects on Key Ornithological Receptors during Decommissioning

7.6.3.1 All Species

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

7.6.4 Effects on Designated Areas

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

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

7.6.5 Effect Associated with the Grid Connection

The proposed grid connection cable route will commence from the proposed onsite substation and will run to the existing 110kV Ardnacrusha substation. Required works are minor and are all located within public local road networks, existing Coillte forest access tracks, existing private forestry access tracks and private agricultural lands (full details in Chapter 4 of this EIAR).

For the grid connection, 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).

7.6.6 Effect Associated with the Turbine Delivery Route

The proposed turbine delivery route 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 turbine delivery 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).

7.7 Mitigation and Best Practice Measures

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

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

7.7.1 Mitigation by Design

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

- The proposed turbine layout has been designed to avoid sensitive areas of open habitat for hen harrier. A 750m disturbance buffer has been applied to the upland blanket bog that is surrounded by the Wind Farm Site at Knockaphunta and to the Gortacullin Bog NHA. No turbines have been sited within this disturbance buffer. Knockaphunta and Gortacullin Bogs are key habitat for local hen harrier. Please see Confidential Appendix 7-5, Figure 7.5.28.
- The Proposed Development avoids wildlife refuge sites (e.g. waterbodies)
- Hard standing areas have been designed to the minimum size necessary to minimise habitat loss.

7.7.2 Mitigation During Construction, Operation and Decommissioning

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

7.7.2.1 Construction Phase Mitigation and Best Practice Measures

The following measures are proposed for the construction phase:

- Construction will not commence until the forestry which hosted the 2023 hen harrier nest is no longer suitable for nesting hen harrier (please see Appendix 7-5, Figure 7.5.7). This is predicted to occur when the canopy closes. This measure to delay the onset of construction works, ensures the area remains undisturbed while the habitat is still suitable for nesting. This forestry was planted in 2018. It is considered that pre-thicket forestry is suitable for breeding hen harrier within the first ten years of planting, it is therefore considered that without intervention, this forestry block will become unsuitable for hen harrier in c. 2028. Before construction works can begin, habitat surveys must be undertaken to demonstrate that the forestry is no longer suitable for breeding hen harrier. The forestry must be confirmed to be unsuitable closed canopy forestry. These surveys will be conducted after the breeding season has ended (September/October) by a suitably qualified ornithologist, at the location of the 2023 hen harrier nest site, from 2026 onward, until it can be demonstrated that the forestry is no longer suitable for breeding hen harrier. The proposed development has been specifically designed to ensure other areas of suitable unaffected nesting habitat remain that could be utilised by the 2023 pair following canopy closure. This unaffected nesting habitat as previously outlined has been utilised for nesting previously and has been, by design, avoided and is buffered by 750m from the nearest turbine. Please see Appendix 7-5, Figure 7.5.28 for location details.
- A Construction and Environmental Management Plan (CEMP) has been prepared. The CEMP will be in effect prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. The CEMP is included as an Appendix to Chapter 4.

- All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e., dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with the European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001 (S.I. No. 632/2001) and other relevant legislation.
- An Ecological Clerk of Works (eCoW) will be appointed. Duties will include:
    - Oversee a pre-construction transect/walkover bird survey, to avoid significant effects on breeding birds will be avoided. Further details are provided in Section 7.9 below.
    - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development.
    - Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise.
    - Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.
    - Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.

7.7.2.2 Operational Phase Mitigation

No operational phase impacts requiring mitigation were identified. However, compensation, enhancement and monitoring in line with best practice is proposed, please see Sections 7.8 and 7.9 below for details.

7.7.2.3 Decommissioning Phase Mitigation

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

7.8 Compensation and Enhancement Measures

7.8.1 Hen Harrier Compensation and Enhancement

As outlined in Section 7.6.2.1, there is the potential for long term significant negative effect (EPA, 2022) on foraging hen harrier during the operational phase of the Wind Farm Site. As outlined, there is the potential for the loss of 58.57 hectares of foraging habitat for hen harrier through displacement within the Wind Farm Site post-construction. It is proposed to reduce the impact on foraging hen harrier through compensation and enhancement of the surrounding lands. A detailed description of the compensation and enhancement measures for hen harrier are outlined in the Biodiversity Management Plan in Appendix 6-5 of this EIAR. The key benefit of this plan is the permanent felling of 54.2 ha of forestry and the planned restoration of the underlying peatland which ensures the ongoing (permanent) availability of optimal foraging, nesting and roosting habitat locally. The permanent felling of forestry alone would provide significant benefits to the local hen harrier population in that it involves the creation of optimal peatland habitat that will be permanently available to hen harrier, as opposed to the onsite forestry it is replacing which is only available periodically when it is less than 12 years old before canopy closure. A total of 54.2 hectares of forestry is proposed for compensation. A further 46.5 hectares of land is proposed for enhancement, which will consist of managing farmland to safeguard and improve this habitat for foraging hen harrier. It is proposed to enhance habitats such as heath/bog, scrub and grassland through the retention and reinstatement of beneficial landscape features (e.g. scrub and hedgerows), through rushes management, and through the management of grazing timing and intensity. The proposed measures are based on industry best practices, as prescribed by the Hen Harrier Project (www.henharrierproject.ie), which provides confidence in their likely success.

Further details of the compensatory clear-felling and enhancement of farmland is provided in the Biodiversity Management Plan in Appendix 6-5. The total area being proposed for compensation and enhancement for hen harrier is 100.7 hectares, which will reduce the impact of the Wind Farm Site on foraging hen harrier. It is proposed that these compensation and enhancement measures will be in place before the construction phase begins, to ensure that there is ample foraging habitat for the local hen harrier pair before disturbance or displacement occurs.

7.9 Monitoring

7.9.1 Commencement and Construction Phase Monitoring

Pre-commencement surveys will be undertaken prior to the initiation of any site clearance or enabling works at the Wind Farm Site, with particular attention focused on previously identified hen harrier nest/roost locations. The phasing and programming of construction work will be reviewed by the contractor in consultation with the developer and their ecological advisors in light of the results of the pre-commencement bird surveys. If an active nest / roost location of a protected Annex 1 species are discovered, no works shall be undertaken within a species-specific buffer (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) in line with best practice. The Ecological Clerk of Works (ECoW) will liaise with and seek advice on suitable buffer distances with an ornithologist. The ECoW will be responsible for demarcating and monitoring observance of the exclusion zones as well as communicating the location of the exclusion zones to site staff on an ongoing basis. The ECoW should carry out at a minimum daily checks of exclusion zones to ensure there is no incursion into these areas.

During the construction phase focused breeding season monthly surveys (March to August inclusive) of historical hen harrier nest sites and all suitable habitat within 750 m of the development footprint and/or all works areas will be carried out. The survey methods will follow that outlined in NatureScot (2019) guidance on raptor searches. Vantage point watches will be carried out over areas of suitable hen harrier breeding habitat to locate any active nests by an Ornithologist. The ornithologist will be required to submit written records of survey work completed and findings to the client / client's representative on a monthly basis. Findings that require immediate action will be conveyed to the client / client's representative and the contractor as soon as the issue arises by phone followed thereafter by written advice. 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 clearly marked off to alert all personnel on site to the suspension of works within that area.

The ornithological monitoring programme may require amendment or adaptation from time to time during the construction phase in response to changes in the baseline environment where species, particularly hen harrier, are discovered to be using areas of the site or adjacent to the site that were previously not used. Any changes to the monitoring programme will be notified and agreed with the client / client representative and will be clearly documented by the ECoW, specialist ornithologist, contractor and client / client's representative.

7.9.2 Operational Phase Monitoring

These surveys will aim to monitor ongoing hen harrier activity within the wind farm. A comprehensive survey scope is proposed in this regard. Survey methods employed for operational monitoring will be in line with guidelines issued by the Scottish Natural Heritage (SNH, 2009). operational monitoring will be undertaken in Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. Operational monitoring will include vantage point surveys, breeding bird surveys to monitor hen harrier activity and a programme of regular corpse searching of birds that may potentially collide with operating turbines during the operational phase of the wind farm project. The following individual components are proposed:

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

The 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.

In addition to the outlined bird surveys, annual monitoring of the compensation and enhancement lands will be undertaken. Please refer to Appendix 6-5 for details.

7.9.2.1 Vantage Point Surveys

As the vantage points used during the pre-planning surveys were invaluable in identifying the hen harrier breeding and roosting sites, these locations will continue to be used for operational monitoring surveys, However, it is noted that factors such as forestry growth will necessitate the relocation of the vantage point location over the monitoring period. Vantage point surveys will be undertaken monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. The methodology for vantage point watches will follow guidelines issued by the SNH (2009) and SNH (2017). The proposed vantage point watches will adhere to a minimum of 36 hours/VP per season as per guidelines issued by SNH. During monitoring years, monthly visits will be undertaken for twelve months commencing at the beginning of the breeding (April) or non-breeding (October) season: depending on which comes first.

During each visit, six-hour vantage point watches will be undertaken from each fixed vantage point location that offers an un-interrupted view of the study area. Vantage points will be undertaken from the same locations that pre-planning surveys which informed the EIAR application of the Proposed Development (i.e. VPs 1, 3, 4, 5 & 6)[19]. Vantage point surveys will be timed to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Behavioural categories for the observation of bird interactions with operational wind farms will be in line with terminology outlined by Meredith *et al.*, (2002).

7.9.2.2 Breeding Bird Surveys

During monitoring years, operational breeding bird surveys will be conducted to monitor hen harrier breeding activity at the Wind Farm Site. Survey methodology will be similar to methods employed for baseline EIAR surveys which will allow a comparison of data to be made for each monitoring year.

The timing of visits will follow the recommendations of Hardey *et al.* (2013). Surveys will be conducted over areas of suitable breeding habitat for hen harrier to establish breeding territories present within the Wind Farm Site. A total of four site visits will be undertaken during the bird breeding season for each monitoring year and timed to coincide with the core breeding period April - July. The number of surveys days required per visit will be established based on requirements to establish hen harrier territories within the Wind Farm Site. Notes will be recorded on nesting and territorial behaviour and breeding signs using standard BTO codes. Non-breeding behaviour such as birds flying over the site will also be recorded.

7.9.2.3 Collision Searches (Bird Casualties)

Surveys for bird casualties will follow survey methods broadly based on guidelines issued by the Scottish Natural Heritage (2009) and search methods adopted by Duffy & Steward (2008).

It is proposed to undertake a minimum of one visit per month during each survey year by a trained dog and handler. During each visit, searches will be undertaken at each operating turbine location by a trained dog and handler. Edkins (2014) recommends the "search width should be equal to the maximum rotor tip height". Given a turbine rotor tip height of between 179.5 and 185 meters the search area surrounding the base of the turbine would be taken as a radius of between 89.75 and 92.5 meters centred on the turbine base. This area will be the subject of target searches for bird casualties. Searches will incorporate the use of transects spaced at 10m intervals apart with the observer covering 5m on either side for each transect. Locations and coordinates of transect routes will be confirmed using a portable GPS recording device. Recording sheets will be used to document bird carcasses encountered in the field.

The following details will be considered during field surveys: GPS location of each bird carcass, photographic record, carcass condition (intact (carcass that is completely intact or not badly composed), scavenged (evidence that the carcass was fed upon by a scavenger/predator) or feather spot (ten or more

[19] *The adequacy of the vantage point viewsheds will be monitored throughout the lifetime of the wind farm.*

feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty)), distance from the turbine location, date, time, etc.

Carcass removal trials and searcher efficiency trials will be undertaken to account for the ability of the dog team to find bird carcasses and the likelihood of scavenging of corpses by animals. This is done to ensure a more accurate estimation of the total number of collision victims. During carcass removal trials, a carcass is placed in a study area periodically and is monitored for a set number of days or until scavengers remove the carcass (this can be done with the use of a trail camera). A determination on carcass removal is made when no body parts containing flesh or bone or >10 disarticulated feathers can be found. During searcher efficiency trials, a number of carcasses are placed in a study area by one worker, then searched for by another worker with the dog. These may be conducted on the same day as surveys are carried out to avoid flooding the area with carcasses and increasing scavenger activity. The result of these trials provides a correction factor that can be applied to the results of the carcass searches.

7.9.2.4 Monitoring of Hen Harrier Enhancement and Compensation Lands

The compensation and enhancement lands for hen harrier will be the subject of annual monitoring to assess the effectiveness of the measures proposed and employed and to contribute to advances in habitat management methods, which can be applied to future similar projects. The monitoring can also aid adaption and implementation of improved methods and measures as they emerge, or intensification of successful measures deployed from farm plan to farm plan.

The monitoring measures will include as relevant:

- The areas proposed for compensation and enhancement will be the subject of ongoing monitoring during the operational phase of the wind farm to ensure it is offering supporting habitat for breeding hen harrier. The ongoing monitoring will take place during the breeding bird season. The monitoring will seek to identify whether hen harrier are utilising the areas under active management for foraging and will be conducted by way of vantage point surveys (six hours in duration). These surveys will be undertaken once a month March to August inclusive, each year.
- Passerine point counts will be undertaken monthly from April to September inclusive in each monitoring year at each of the compensation and enhancement areas. The monitoring aims to investigate to what extent enhancement measures e.g. seed crops, increase the availability of prey species for hen harrier. These surveys will be conducted each year.
- Areas of favourable hen harrier foraging habitat (i.e. scrub, blanket bog, wet heath and heather banks) within the compensation and enhancement areas should be accurately mapped and should be monitored annually to check that the areas so covered have not altered in size and that the grazing regime that is in place is maintaining the current state of these habitats (i.e. neither poaching nor overgrowth of open areas is occurring). As well as mapping, this monitoring will be recorded by means of fixed-point photography.
- Vegetation sampling: A number of fixed relevé sites (i.e. permanent quadrats) will be set up in the compensation and enhancement areas. Data will be recorded prior to the commencement of habitat enhancement activities. The character of each relevé will be recorded (e.g. species proportions present using Domin scale, vegetation structure) and photographs will be taken of each relevé from a fixed point. These relevés will then be re-examined yearly following commencement of the plan in place to establish the extent of habitat improvement resulting from management practices.

Following commencement of the plan, the efficacy of the enhancement measures will be reviewed yearly. Analysis of the data collected will be the basis for a review of the measures and techniques employed. This analysis will be contained in an annual report. Should any adjustments to the plan be deemed necessary or advisable, these should be undertaken in consultation with the NPWS prior to any alterations to the plan.

Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared and submitted to the planning

authority yearly following commencement of the plan. The farm plan agreements and enhancement area plan agreements will provide for such amendments.

7.9.3 Decommissioning Phase Monitoring

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.

Decommissioning surveys will be undertaken prior to the initiation of works at the Wind Farm Site. The survey will aim to identify sensitive sites (e.g., nests or roosts). Any requirement for decommissioning works to run into subsequent breeding seasons following commencement will be subject to additional bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question.

Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the decommissioning phase. If the roost/nest is found to be active during the construction phase no works shall be undertaken, works will cease within a species-specific buffer of this location (e.g., Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) in line with best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost or 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 off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.

7.10 Residual Effects

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

- Hen Harrier
- Peregrine
- Kestrel
- Red Grouse
- Snipe
- Woodcock
- Buzzard
- Sparrowhawk

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

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

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

7.11 Cumulative Effects

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

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

7.11.1 Other Plans and Projects

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the Wind Farm Site and was verified on the 15/07/2024. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. The projects and plans considered in relation to the potential for in-combination or cumulative effects and for which all relevant data was reviewed (e.g., individual EISs/EIARs, layouts, drawings etc.). All plans and projects reviewed are outlined below.

7.11.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Clare County Development Plan 2023-2029.
- National Biodiversity Action Plan 2017-2021
- Threat Response Plan for the Hen Harrier 2024-2028 (Draft[20])

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

7.11.1.2 Projects Considered in the Cumulative Impact Assessment

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

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

[20] *At the time of writing this report this document was drafted and available for public consultation.*

7.11.1.3 Forestry and Agricultural Practices

Some areas within the Wind Farm Site and surrounding area are planted with commercial forestry. The forestry works (felling/planting) associated with the forestry within the Wind Farm Site and in the wider surroundings 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.

7.11.1.4 Other Wind Farm Developments

The wind farm projects within a 25-kilometre radius of the Wind Farm Site are provided in Table 7-12 below and are presented in terms of their proximity to the Wind Farm Site and whether the project is permitted/operational or pending/under appeal. A total of five wind farms and two one off turbines, composing of 20 existing/permitted turbines and 38 proposed/pending turbines, fall within a 25-kilometre radius of the proposal as detailed in Table 7-12.

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

Wind Farm	Status	No. of Turbines	Separation Distance of Nearest Turbines
Oatfield	Proposed	10	500m
Fahybeg	Appeal	8	4.3km
Ballycar	Proposed	12	4.8km
Lackareagh	Proposed	7	5km
Carrownagowan	Permitted	19	5.7km
Knockballynameath	Permitted	1	8.9km
Vistaken	Operational	1	12.1km
Total Existing		1	
Total Permitted		19	
Total Proposed		38	

The results of a review of the planning files for the wind farms mentioned in Table 7-12 are provided in the following sections (Section 7.11.1.4.1 to 7.11.1.4.7). This information has informed the cumulative impact assessment that is included in Section 7.11.2.

7.11.1.4.1 *Oatfield Wind Farm*

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Oatfield Wind Farm, which is c.500m from the nearest proposed turbine, was considered. The EIAR[21] for Oatfield Wind Farm was consulted. Oatfield Wind Farm shared the following key ornithological receptors with Knockshanvo Wind Farm: hen harrier, peregrine, kestrel, red grouse, snipe, woodcock and buzzard. 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 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.

7.11.1.4.2 *Fahybeg Wind Farm*

The potential for the Proposed Development to result in significant cumulative effects when assessed alongside Fahybeg Wind Farm, which is c.4.3km from the nearest proposed turbine, was considered.

[21] *https://oatfieldplanning.ie/environmental-impact-assessment-report*

The EIAR[22] for Fahybeg Wind Farm was consulted. Fahybeg Wind Farm shared the following key ornithological receptors with Knockshanvo Wind Farm: hen harrier, peregrine, kestrel, snipe, woodcock, buzzard 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 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 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.

This project was refused planning permission and is currently under appeal.

7.11.1.4.3 Ballycar Wind Farm

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Ballycar Wind Farm, which is c.4.8km from the nearest proposed turbine, was considered. The EIAR for Ballycar Wind Farm was consulted. Ballycar Wind Farm shared the following key ornithological receptors with Knockshanvo Wind Farm: hen harrier, peregrine, kestrel, woodcock, buzzard and sparrowhawk. The collision risk was assessed to be moderate (as per EPA, 2022) for peregrine, slight (as per EPA, 2022) for kestrel and buzzard, and imperceptible (as per EPA, 2022) for hen harrier and sparrowhawk. Displacement was assessed to be slight for hen harrier, kestrel and buzzard and imperceptible for peregrine and sparrowhawk. Displacement for woodcock was not assessed.

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 effects on avian KORs in-combination with other wind farms.

7.11.1.4.4 Lackareagh Wind Farm

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Lackareagh Wind Farm, which is c.5km from the nearest proposed turbine, was considered. The EIAR for Lackareagh Wind Farm was consulted. Lackareagh Wind Farm shared the following key ornithological receptors with Knockshanvo Wind Farm: hen harrier, peregrine, kestrel, red grouse, snipe, buzzard and sparrowhawk. The collision risk was assessed to be Very Low (as per Percival, 2003) for hen harrier (all seasons), peregrine, kestrel, red grouse, snipe, buzzard and sparrowhawk. Disturbance/displacement was assessed to be Low (as per Percival, 2003) for hen harrier (breeding) and peregrine and Very Low (as per Percival, 2003) for hen harrier (wintering), kestrel, red grouse, snipe, buzzard and sparrowhawk.

The cumulative assessment for the Lackareagh 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 effects on avian KORs in-combination with other wind farms.

7.11.1.4.5 Carrownagowan Wind Farm

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Carrownagowan Wind Farm, which is c.5.7km from the nearest proposed

[22] https://www.eplanning.ie/ClareCC/AppFileRefDetails/23148/0

turbine, was considered. The EIAR[23] for Carrownagowan Wind Farm was consulted. Carrownagowan Wind Farm shared the following key ornithological receptors with Knockshanvo wind farm: hen harrier, peregrine, kestrel, red grouse, woodcock, buzzard and sparrowhawk. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be Low (as per Percival, 2003) for hen harrier, kestrel and woodcock, and Very Low (as per Percival, 2003) for peregrine, red grouse, buzzard and sparrowhawk. Disturbance/displacement was assessed to be Low (as per Percival, 2003) for hen harrier, peregrine and woodcock, and Very Low (as per Percival, 2003) for kestrel, red grouse, buzzard and sparrowhawk.

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.

7.11.1.4.6 *Knockballynameath Turbine*

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Knockballynameath turbine, which is c.8.9km from the nearest proposed turbine, was considered. The planning files[24] on the Clare Count Council website was reviewed. Given the size of the development, it did not fall under the mandatory requirement for EIA. Therefore, no impact assessment on birds was conducted. This turbine is located within improved agricultural grassland.

7.11.1.4.7 *Vistaken Turbine*

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Vistaken Turbine, which is c.12.1km from the nearest proposed turbine, was considered. The EIS[25] for the Vistaken Turbine was consulted. No significant impacts on birds were identified in the EIS.

[23] *https://www.pleanala.ie/en-ie/case/308799*

[24] *https://www.eplanning.ie/ClareCC/AppFileRefDetails/15812/0*
[25] *https://www.eplanning.ie/LimerickCCC/AppFileRefDetails/13746/0*

7.11.2 Assessment of Cumulative Effects

There were eight key ornithological receptors (KOR) identified at the Wind Farm Site: hen harrier, peregrine, kestrel, red grouse, snipe, woodcock, buzzard and sparrowhawk. Construction disturbance is a short-term impact that is unlikely to give rise to significant cumulative effects.

A key consideration in the assessment of the potential for cumulative impacts to result in significant effects is proximity and whether the projects under consideration all contain suitable habitats for the species in question. There are four proposed wind farms within 5km of the Wind Farm Site. With a further one wind farm and two single turbine developments located between 5km and 25km of the Wind Farm Site. The assessment of cumulative effects on key ornithological receptors is provided below. In particular, cumulative habitat loss, displacement and collision risk (as relevant) associated with operational turbines is assessed.

7.11.2.1 Hen Harrier

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[26]. As outlined in Article 12 reporting[27] 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 (TRPHH) 2024-2028 prepared by NPWS includes a similar summary of the Article 12 threat/pressures. It is noted that the proposed development includes a comprehensive compensation and enhancement plan which has been specifically designed to target the two key threats/pressures of high importance of forestry and agricultural intensification to offset the potential for impacts associated with the proposed wind farm. Following the permanent felling of 54.2ha of forestry and the enhancement of a further 46.5ha of agricultural land and scrub for the benefit of hen harrier, residual impacts of no greater than low are predicted. This sustainable development of the proposed wind farm site ensures the continuing availability of suitable habitat for hen harrier locally.

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

The Proposed Development is sited predominantly in commercial forestry, with accompanying areas of bogland around the periphery. There was a breeding hen harrier present at, or adjacent to, the Wind Farm Site. Fahybeg, Ballycar and Lackeragh wind farms are located within commercial forestry and open farmland, which are of limited ecological value for hen harrier. Carrownagowan Wind Farm is sited predominantly in commercial forestry, with accompanying areas of bogland around the periphery. Between two and four hen harrier breeding territories were identified at Carrownagowan and its hinterland. Oatfield Wind Farm is located adjacent to Knockshanvo Wind Farm and is located within the territory of the hen harrier territory identified at, or adjacent to, the Wind Farm Site.

Given the separation distance of Knockshanvo and Carrownagowan Wind Farms, the proposed compensation/enhancement measures proposed at both wind farms to minimize the impact on hen harrier and the residual effects on hen harrier for both wind farms, no significant cumulative impacts are anticipated.

The key project that requires detailed consideration in this cumulative assessment is the Oatfield Wind Farm. The proximity of this project to the proposed Knockshanvo Wind Farm (<1km) means there is the

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

potential for a significant cumulative impact on a nationally important receptor. It is noted that both projects are currently proposed and awaiting a planning permission decision from ABP. To assess this potentially significant cumulative impact, the two projects have been assessed as if they were a single large wind farm.

7.11.2.1.1 *Oatfield Wind Farm*

The three key areas that have been identified for consideration are the foraging habitat loss, nesting and roosting habitat loss and collision risk.

Foraging Habitat Loss

The proposed Oatfield Wind Farm the Knockshanvo Wind Farm sites contain a mosaic of habitats that are utilized by foraging hen harrier. In particular, the wet grassland and peatland are favoured with the areas of young forestry also used. The mature forestry has little to no ecological value. The impact assessment for each project identified the potential for significant habitat loss impacts on hen harrier and again similarly both projects have proposed compensation and enhancement measures to offset the identified significant impacts. Respectively the two projects are proposing:

- Oatfield Wind Farm: this project proposed the enhancement of lands for the benefit of hen harrier. This project aims to improve existing habitat for the benefit of hen harrier.
- Knockshanvo Wind Farm: it is proposed to both compensation and enhancement habitat to offset impacts on hen harrier. A key component of the measures proposed is the creation of new habitat through the permanent felling of forestry and restoration of the underlying peatland. The habitat loss will be compensated with new habitat at a ratio of near 1:1. Additionally, enhancement lands are also proposed to improve the productivity of surrounding habitat for foraging hen harrier.

In common with each other, the two projects would enhance habitats such as heath/bog, scrub and grassland through the retention and reinstatement of beneficial landscape features (e.g. scrub and hedgerows), through rushes management, and through the management of grazing timing and intensity. Both projects follow industry best practices which provides confidence in their likely success in benefiting local hen harrier. As previously outlined and reiterated herein, the key point of difference between the two projects, is the proposed permanent felling of a large area (54.2ha) of forestry, which is proposed as part of the Knockshanvo Wind Farm Biodiversity Management Plan. This measure ensures that not only, a like for like quantum of habitat is provided but also the provision of high-quality replacement peatland habitat in compensation for the loss of predominantly sub-optimal commercial forestry. Commercial forestry is only of limited value to hen harrier while young and of little to no ecological value once its canopy closes at c.12 years old. This permanent felling of forestry ensures the ongoing (permanent) availability of optimal foraging, nesting and roosting habitat locally. Please see Appendix 6-5 for details.

No significant cumulative foraging habitat loss is predicted given the combined approx. 100.7 ha of enhancement and compensation lands proposed to offset predicted impacts resulting from the proposed Knockshanvo Wind farm and Oatfield Wind Farm on foraging hen harrier.

Nesting and Roosting Habitat Loss

In 2023 a nest was confirmed (following Hardey *et al.* (2013) criteria) in open pre-thicket (young) forestry onsite in close proximity to the proposed Knockshanvo Wind Farm turbines, however no significant impacts are predicted for this nesting habitat as a result of the proposed development due to the timing of the proposed construction phase. By design no works are proposed until the canopy closes in this location[28]. Following canopy closure, the forestry is predicted to no longer be suitable for nesting. This will

[28] *Coillte forestry compartments containing the 2023 nest is predicted to close at this location by 2028 (if not before). The forestry will be ten years old by then, which is typically the age when the forestry canopy closes making it unsuitable for the ground nesting hen harrier.*

be confirmed during pre-commencement surveys (Please see Section 7.9 for details). No significant impacts are therefore predicted at this location.

As outlined in Section 7.4.2, the resident pair of hen harrier frequently moved nesting locations in alternate years. Of these, the most suitable and frequently used habitat (by design) is greater than 750m from the nearest turbine. Ruddock and Whitfield (2007) noted disturbance displacement to a distance of 500m-750m for hen harrier breeding (nests) and resting (roosts) locations. This most favoured habitat was an area of peatland where breeding was attempted or confirmed in 2019 and 2022. Similarly, the same peatland habitat was regularly used for roosting. Due to the separation distance of 750m from this peatland habitat to the nearest turbines no significant impacts are predicted for potentially breeding or roosting birds in this key peatland habitat. Please see Confidential Appendix 7-5, Figure 7.5.29 which provides the 750m buffer relative to the Knockshanvo Wind Farm and nearby Oatfield Wind Farm proposed turbines. Furthermore, and as previously outlined it is proposed to create optimal peatland habitat in compensation for the loss of forestry habitat onsite through the permanent felling of forestry. This forestry was specifically chosen for its strategic value in linking the two key foraging, nesting and roosting bogs which are currently separated by forestry. The creation of this larger area of contiguous open optimal habitat is another key benefit of the proposed development, particularly in its reduction of local habitat fragmentation and predation associated with edge effects[29].

As provided in Confidential Appendix 7-5, Figure 7.5.29, three of the proposed Oatfield Wind Farm turbines are located within 750m of this key peatland habitat (for nesting and roosting). As per Ruddock and Whitfield (2007) there is the potential for avoidance of a large proportion of this key peatland habitat if displacement occurs to a distance of 750m from these Oatfield Wind Farm turbines[30]. This would result in the loss of the most optimal nesting and/or roosting habitat locally. However, as part of the proposed Oatfield Wind Farm application it is proposed to offset any loss of habitat through the management of habitat for nesting and roosting hen harrier. Assuming the successful implementation of the Oatfield Wind Farm enhancement measures no significant habitat loss is predicted.

Therefore, no significant cumulative impacts are predicted given the (spatial and temporal) avoidance of nesting and roosting habitat by the Knockshanvo Wind Farm and enhancement proposed by the Oatfield Wind Farm.

Collision Risk

It is noted that no significant collision risk was predicted to result from either the proposed Knockshanvo or Oatfield wind farms for the hen harrier breeding locally. This finding is in line with the literature which identifies the species to be less susceptible to significant collision risk than other larger (soaring) raptor species. This is primarily due to the low elevation flights typical of the foraging ecology of the species. The species can fly at higher elevation during the undulating display flights that occur during a discrete period early in the breeding season. However, as previously stated, significant cumulative collision risk is not predicted despite hen harrier breeding locally. Furthermore, no significant collision risk was predicted at any of the other wind farms in the wider surroundings.

Therefore, no significant cumulative collision risk is predicted.

7.11.2.1.2 *In summary*

As previously outlined and reiterated herein, the proposed development includes a comprehensive compensation and enhancement plan which has been specifically designed to ensure residual impacts of

[29] *For example, forest habitats may act as reservoirs of predators that prey on the ground-nesting birds in the surrounding area (Andren, 1994; Batary & Balde, 2004; Mazgajski & Rejt, 2005) with proven negative edge effects of predation on ground nests close to forest edges (Manolis et al., 2002). Irwin et al., (2011) speculated there may be an association of large-scale afforestation with an increase in abundance of nest predators such as Pine Martens and Fox in Hen Harrier breeding areas.*
[30] *It is noted that the impact assessment of Knockshanvo Wind Farm was undertaken with reference to this 750m buffer, which is why the same criteria have been applied in the assessment of the cumulative impact associated with the Oatfield Wind Farm.*

no greater than low are predicted. This sustainable development of the proposed wind farm site ensures the continuing availability of suitable habitat for hen harrier locally.

No significant cumulative impacts on this species were identified for all other local wind farms, and any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

7.11.2.2 Peregrine

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

The Proposed Development is sited predominantly in commercial forestry, which is of limited ecological value for peregrine. Oatfield, Fahybeg, Ballycar, Lackeragh and Carrownagowan wind farms are located partially within commercial forestry and open farmland, which are of limited ecological value for peregrine. These habitats are not a rare resource locally or unique to the Wind Farm Site. Additionally, commercial forestry is a non-native habitat of low ecological value. Given the separation distance and that these habitats are not considered optimal for peregrine, 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 farm located to a 25km radius of the Wind Farm Site. Taking into consideration the above reported effects and the predicted effects with the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Collision risk effects on this species were predicted to be Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) Cumulative collision risk is therefore not considered to be significant as the predicted impact is effectively zero.

Significant cumulative impacts are not predicted to occur at the county scale.

7.11.2.3 Kestrel

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

The Proposed Development is sited predominantly in commercial forestry with a mixture of bog and other woodland habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. Oatfield, Fahybeg, Ballycar, Lackeragh and Carrownagowan wind farms are located partially within commercial forestry and open farmland and are therefore suitable for foraging and breeding kestrel. However, the habitats at Knockshanvo wind farm and these wind farms (commercial forestry/farmland) 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 nesting habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area.

The predicted collision risk at Oatield Wind Farm was 0.3233 (combined winter and breeding), at Fahybeg Wind Farm was 0.28 birds per year and at Carrownagowan Wind Farm was 0.365 birds per year. Collsion risk for the remaining wind farms is not available they are at the pre-planning stage and an impact assessment has not been completed. However, the available collision risks in combination with the collision risk at Knocksanvo Wind Farm will result in a combined total of 2.83 birds per year. The addition of the low number of collisions at these wind farms is insignificant. Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

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 Wind Farm Site. Taking into consideration the above reported effects and the predicted effects

with the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county scale.

7.11.2.4 Red Grouse

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

Fahybeg, Ballycar, Lackeragh 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 is likely to support red grouse populations. There are three proposed turbines in Oatfield wind farm which may cause displacement of red grouse, however any potential impacts have been offset by the proposed Oatfield enhancement measures.

The Proposed Development includes a comprehensive compensation and enhancement plan which includes permanent felling of 54.2ha of forestry. This will create additional open peatland habitat for the benefit of red grouse and increasing the connectivity between existing habitats.

The majority of wind farms within 25km of the Proposed Development (including Knockshanvo Wind Farm) 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 Wind Farm Site.

Collision risk effects on this species were predicted to be Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) 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 Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county scale.

7.11.2.5 Snipe

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

Oatfield, Fahybeg, Ballycar and Lackeragh wind farms are located partially within open farmland and are therefore suitable for foraging and breeding snipe. However, the habitats at Knockshanvo wind farm (bogland) and these wind farms (farmland) are not considered to be a scarce resource in the area. Extensive areas of suitable foraging and nesting habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area. Carrownagowan Wind Farm is within habitats of limited ecological value for snipe (commercial forestry).

However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Knockshanvo Wind Farm, 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 Wind Farm Site.

Collision risk effects on this species were predicted to be Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) 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 Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county scale.

7.11.2.6 Woodcock

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

Oatfield, Fahybeg, Ballycar, Lackeragh and Carrownagowan wind farms are located within, or partially within, commercial forestry and are therefore suitable for breeding woodcock. However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of Knockshanvo Wind Farm, 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 farm located within a 25km radius of the Wind Farm Site.

Collision risk effects on this species were predicted to be Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) 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 Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county, national or international scale.

7.11.2.7 Buzzard

The potential for local developments (<5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered.

The Proposed Development is sited predominantly in commercial forestry with a mixture of bog and other woodland habitats 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 a rare habitat locally. Therefore, significant cumulative impacts are not predicted.

Collision risk effects on this species were predicted to be Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) Cumulative collision risk is therefore not considered to be significant as the predicted impact is effectively zero.

No significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the local scale.

7.11.2.8 Sparrowhawk

The potential for local developments (<5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered.

The Proposed Development is sited predominantly in commercial forestry with a mixture of bog and other woodland habitats 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 sparrowhawk onsite. Similar displacement impacts are predicted on other Wind Farm Sites locally. However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.

Collision risk effects on this species were predicted to be Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) Cumulative collision risk is therefore not considered to be significant as the predicted impact is effectively zero.

No significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the local scale.

7.12 Conclusion

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

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