Environmental Impact Assessment Report (EIAR)

Seskin Wind Farm, Co. Carlow

Chapter 7 - Birds

Table of Contents

7. BIRDS

7.1 Introduction

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

Particular attention has been paid to bird species with national and international protection under the Irish Wildlife Acts 1976-2022 and the European Union (EU) Birds Directive (2009/147/EC). Where potential impacts on avian receptors are identified, mitigation is described, and the residual effects are assessed. The cumulative effects of the Proposed Project and other plans and projects have also been assessed in this chapter.

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. Appendix 7-5 contains the Collision Risk Assessment (CRA) document which illustrates how the Collision Risk Modelling was undertaken for the Proposed Project. Appendix 7-6 contains the bird monitoring programme. Confidential Appendix 7-7 contains sensitive records of protected species breeding and roosting sites. The Proposed Wind Farm site and survey radii are provided in Figures 7-1 to 7-12.

The chapter is structured as follows:

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

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection Route' and the 'site'.

The following other definitions are used in this chapter:

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

7.1.1 Description of the Proposed Project

A full description of the Proposed Project is provided in Chapter 4 of this EIAR. In brief, the applicant is seeking a 10-year planning permission for a project consisting of 7 no. turbines and associated infrastructure.

As detailed in Section 1.7.3 in Chapter 1, the Proposed Wind Farm turbines to be installed on the site will have the following dimensions:

- Turbine Tip Height – Maximum height 180 metres, Minimum height 179.5 metres
- Hub Height – Maximum height 105 metres, Minimum height 102.5 metres
- Rotor Diameter - Maximum diameter 155 metres, Minimum diameter 149 metres.

The above turbine dimensions will result in an overall ground-to-blade tip height of between 179.5 to 180m and a lowest swept height ranging from 25m to 30.5m. The Proposed Project will have an operational life of 35 years from the date of commissioning.

7.1.2 Legislation, Guidance and Policy Context

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

- The Wildlife Act 1976. This Act was revised in October 2022 to present amendments since enactment.
- The Birds Directive (EU Directive 2009/147/EC on the conservation of wild birds)
- The European Communities (Birds and Natural Habitats) Regulations 2011, as amended (S.I. no. 477 of 2011). These regulations transpose the EU Birds Directive into Irish law. The regulations were amended in 2013 (290/2013 and 499/2013), 2015 (355/205) as well as Chapter 4 of the Planning, Heritage and Broadcasting (Amendment) Act 2021 (11/2021) and in 2021 (293/2021).
- The International Convention on Wetlands of International Importance (the Ramsar Convention), 1971. This convention protects 45 wetland sites of significant value for nature in Ireland.

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

- SNH (2000). Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf

- SNH (2009). Monitoring the impact of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Monitoring%20the%20impact%20of%20onshore%20windfarms%20on%20birds.pdf
- SNH (2016). Assessing connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf
- SNH (2018a) Avoidance rates for the onshore SNH wind farm collision risk model. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-09/Wind%20farm%20impacts%20on%20birds%20-%20Use%20of%20Avoidance%20Rates%20in%20the%20SNH%20Wind%20Farm%20Collision%20Risk%20Model.pdf
- SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Assessing%20the%20cumulative%20impacts%20of%20onshore%20wind%20farms%20on%20birds.pdf
- SNH (2018c). Assessing significance of impacts from onshore wind farms outwith designated areas. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected

The following Irish guidance documents were also consulted:

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

Furthermore, this assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below and as detailed in Section 1.2 in Chapter 1 of this EIAR:

- European Commission (2002). Assessment of plans and projects significantly affecting Natura 2000 sites. Publications Office of the European Union, Luxembourg.
- European Commission (2020). Guidance document on wind energy developments and EU nature legislation. Publications Office of the European Union, Luxembourg.
- Planning and Development Acts 2000 (as amended).
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Ireland.

- EPA (2022). Guidelines on the information to be contained in Environmental Impact Statement reports. Environmental Protection Agency, Johnstown Castle Estate, Wexford.
- DoHPLG (2018). Guidelines for planning authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government, Government of Ireland, Dublin.
- Carlow County Development Plan 2022-2028
- Kilkenny City and County Development Plan 2021
- Laois County Development Plan 2021-2027

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Donnacha Woods (B.Sc., M.Sc.), Project Ornithologist of MKO and reviewed by Padraig Cregg (B.Sc., M.Sc..), Principal Ornithologist. Both are suitably qualified ornithologists with experience in completing avifaunal assessments and competent experts for the purposes of the preparation of this EIAR. Donnacha Woods has over six years of experience in ornithological assessments for the purposes of EIA across a range of sectors. Padraig Cregg has over nine years' experience working in both the UK and Ireland in designing, executing and project managing ecological/ornithological assessments, and had worked on over 60 wind farm projects across the UK and Ireland.

The scope of works and survey methodology was devised by Padraig Cregg and is fully compliant with recent NatureScot (formerly Scottish Natural Heritage) guidance. Field surveys were undertaken by Conor Berney, Ian Hynes, John McMahon, Padraig Webb, Sean Pierce and Tom Ryan. Surveyors are suitably qualified competent experts in 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 use the Proposed Wind Farm site. The assessment included a thorough review of the available ornithological data including:

- Designated sites within the likely Zone of Influence (ZOI) of the Proposed Project;
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013);
- BirdWatch Ireland Bird sensitivity mapping tool;
- Online web-mappers[1] from the National Parks and Wildlife Service (NPWS), and Irish Wetland Bird Survey I-WeBS;;
- Irish Wetland Bird Survey data;
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2020 – 2026 (Gilbert et al., 2021); and
- Review of specially requested records from the National Parks and Wildlife Service Rare and Protected Species Database.

7.2.2 Consultation

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

Table 7-1 Consultation responsesTable 7-1 below provides a list of the organisations consulted with regard to ornithology during the scoping process and describes where any comments raised in the scoping responses received in relation to birds have been addressed in this Chapter.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter; Chapter 2 describes where the comments raised in the scoping responses received have been addressed.

Table 7-1 Consultation responses

	Consultee	Response
01	An Taisce	No response received
02	BirdWatch Ireland	No response received
03	Department of Agriculture, Food and the Marine	Response received 22/02/2023 outlining tree felling requirements. No correspondence relating to birds received.
04	Department of the Environment, Climate and Communications	No response received
05	Development Applications Unit (NPWS/NMS)	Response received stating Department is not in a position to make specific comment on this particular referral at this time.
06	Inland Fisheries Ireland	Response received on 12/01/2023 outlining recommended measures for the protection of

[1] *Accessed on 10th January 2024*

	Consultee	Response
		aquatic resources and associated riparian habitat. No correspondence relating to birds received.
07	Irish Peatland Conservation Council	No response received
08	Irish Red Grouse Association	No response received
09	Irish Raptor Study Group	No response received
10	Irish Wildlife Trust	No response received
11	Waterways Ireland	No response received

7.2.3 Identification of Target Species and Key Ornithological Receptors

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

- Species listed on Annex I of the EU Birds Directive.
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects.
- Red listed Birds of Conservation Concern in Ireland (BoCCI).
- Raptors and species that are particularly sensitive to wind farm developments.

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

7.2.4 Field Surveys

The survey work that was undertaken between April 2020 and May 2022 forms the core dataset for the assessment of impacts on ornithology.

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

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 Proposed Wind Farm site and its surroundings.

Field surveys, including a multidisciplinary walkover of the Proposed Grid Connection infrastructure is detailed within Chapter 6, Section 6.2.3 of this EIAR, and has been utilised within this assessment in Section 7.5.5.

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visits undertaken in March 2020, the likely importance of the Proposed 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

Field surveys were undertaken during the survey period April 2020 – May 2022, consisting of 2 breeding seasons (April – September) and 2 non-breeding seasons (October – March).

In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with the guidance document '*Recommended bird survey methods to inform impact assessment of onshore wind farms*' (SNH, 2017). The various ornithological surveys undertaken at the Proposed Wind Farm site and hinterland are described in detail below.

Note: The Proposed Wind Farm site has contracted from the extent of the site covered during surveys, which encompassed an additional area approximately 3km south of the Proposed Wind Farm site. Data from vantage point surveys, breeding walkover surveys, breeding woodcock surveys and winter walkover surveys carried out within this additional area are presented as additional supplementary data. The survey radii outlined below for breeding raptor surveys, waterbird distribution surveys and hen harrier roost surveys are a minimum distance; the surveys generally covered an area greater than the required radius. The survey locations / areas are shown in Figures 7-1 to 7-12.

7.2.4.2.1 *Vantage Point Surveys*

Vantage point (VP) surveys were undertaken in accordance with NatureScot (2017) to monitor flight activity within the Proposed Wind Farm site and within a 500m radius of the Proposed turbine positions. Surveys were conducted from one fixed point vantage point (VP1) with comprehensive coverage of the Proposed Wind Farm site (Figure 7-1). The vantage point locations were selected by undertaking a viewshed analysis (described below) and confirmed by a reconnaissance visit and initial field surveys to ensure that the Proposed Wind Farm turbine layout was entirely covered.

Surveys were also undertaken from an additional supplementary vantage point location (VP2) south of the Proposed Wind Farm site (Figure 7-2). As outlined above, the Proposed Wind Farm site has contracted from the extent of the site covered during surveys, which encompassed an additional area approximately 3km south of the Proposed Wind Farm site. As such, the viewshed of the vantage point VP2 no longer contains turbines. This vantage point is therefore not included in the collision risk analysis. However, data from this VP location is presented in this chapter as additional supplementary data.

Viewshed Analysis

Viewsheds were calculated using visibility analysis over raster DEM (Version 1.8) in QGIS (Version 3.28) using a notional layer suspended at 22m, 30m and 30.5m, which is representative of the minimum heights considered for the Potential Collision Risk Area based on a turbine model congruent with the proposed turbine range dimensions. While the relevance of being able to view as much of the site to ground level is acknowledged, the NatureScot guidance (2017) emphasises the importance of visibility of the 'collision risk volume' when the data is to be used to estimate the risk of collision with turbines by birds. Therefore, the viewshed analysis aims to identify the most suitable locations to site vantage points such that the airspace of the turbine rotor swept area is in view using the fewest possible number of vantage points.

The vantage point locations were tested for visibility coverage by creating a viewshed point 1.75m in height (to represent the height of the observer) on a map using 10m contours terrain data. The relative height of any surrounding vegetation and its effects on visibility was recorded during a site visit and is also accounted for in the analysis. Using the ZTV software, a viewshed of 360° was produced

calculating an area 20m from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180° to give the viewshed. A 500m buffer was applied to the outer most turbines of the Proposed Wind Farm in line with NatureScot (2017). The visible viewsheds at 25m, 30m and 30.5m are presented in Figures 7-3 to 7-5.

Data Recording and Digitisation

Survey methodology followed NatureScot (2017). The surveyor collected data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e. 6 hours total) per month. Surveys were conducted from April 2020 to March 2022 inclusive and were scheduled to provide a minimum of 36 hours per winter or breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity.

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 and Number of Vantage Points (VPs)	Effort per Vantage Point (VP)
Breeding Season 2020 (1 VP)	36 hours per VP
Winter Season 2020/2021 (1 VP)	36 hours per VP
Breeding Season 2021 (1 VP)	36 hours per VP
Winter Season 2021/2022 (1 VP)	36 hours per VP

Flight activity of target species was mapped and recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the site. Bands were split into 0-15m, 15-25m, 25-200m and >200m. All flight activity within the height band 25-200m is considered to be within the Potential Collision Height (PCH) with regard to the turbine swept area, based on the three Proposed turbine dimension scenarios (i.e. 25m to 180m, 30.5m to 179.5m & 30m to 180m). Please see Appendix 7-5 for further detail. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

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*

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 Proposed Wind Farm site and 500m radius. The methodology was based on Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitat. Transect routes were walked across different habitat complexes within the survey area where access allowed. Using binoculars, the surveyor regularly scanned the surroundings of each transect for target species. All target species were mapped, and breeding status was assigned following British Trust for Ornithology (BTO) breeding status codes[2]. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting

[2] https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence

habitat. The survey area for these surveys was the Proposed Wind Farm site and a 500m survey radius of the Proposed Wind Farm site.

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 non-target species observed were recorded to inform the evaluation of supporting habitat.

As outlined further above, the Proposed Wind Farm site has contracted from the extent of the site covered during surveys, which encompassed an additional area approximately 3km south of the Proposed Wind Farm site. Breeding walkover surveys were also undertaken within this additional area (Transect 2 - see Figure 7-7). Data from breeding walkovers within this area are presented in this chapter as additional supplementary data.

Breeding walkover surveys were carried out during daylight hours during the core breeding season months April to July (2020 and 2021), with the Proposed Wind Farm site being visited one day 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, including full details of dates, times and weather conditions for each survey. Note: due to the COVID-19 restrictions, no visits were conducted in April 2020. Figure 7-6 shows the survey area.

7.2.4.2.3 Breeding Raptor Surveys

Raptors include all harrier, falcon, buzzard, eagle, hawk, owl, kite and osprey species. Breeding raptor surveys were undertaken within the Proposed Wind Farm site and within a 2km radius to identify occupied territories and monitor their breeding success near or within the Proposed Wind Farm site. Survey methodology followed Hardey *et al.* (2013). Raptor surveys were undertaken in the form of short vantage point watches and walked transects. All raptor species observed were recorded and mapped and breeding status was assigned following BTO breeding status codes. Surveyors did not approach nest sites to avoid disturbance.

Each breeding raptor location was surveyed once per month during the core breeding season between April and July (2020 and 2021). Each round of surveys was undertaken over three days to survey the entirety of the survey area. Note: due to the COVID-19 restrictions, no visits were conducted in April 2020.

Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-8 shows the breeding raptor locations.

7.2.4.2.4 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken in accordance with Gilbert *et al.* (1998). Surveys were undertaken at the Proposed Wind Farm site in May and June (2020 and 2021). The survey area extended 500m beyond the site boundary and was 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 Proposed 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.

As outlined further above, the Proposed Wind Farm site has contracted from the extent of the site covered during surveys, which encompassed an additional area approximately 3km south of the Proposed Wind Farm site. Breeding woodcock surveys were also undertaken within this additional area (Transect 3 - see Figure 7-10). Data from breeding woodcock surveys within this area are presented in this chapter as additional supplementary data.

Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-9 shows the transect routes.

7.2.4.2.5 Winter Walkover Surveys

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

As outlined further above, the Proposed Wind Farm site has contracted from the extent of the site covered during surveys, which encompassed an additional area approximately 3km south of the Proposed Wind Farm site. Winter walkover surveys were also undertaken within this additional area (Transect 2 - see Figure 7-7). Data from winter walkovers within this area are presented in this chapter as additional supplementary data.

Winter walkover surveys were conducted in daylight hours over four visits between October and March (i.e. four visits in winter 2020/2021, four visits in winter 2021/2022). Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-5 shows the survey area.

7.2.4.2.6 Waterbird Distribution and Abundance Surveys

Waterbirds include: swans, geese and ducks; cormorant, shag, divers and grebes; auks and seabirds; gulls, terns and skuas; herons, egrets and crane; rails and crakes; waders; and kingfisher. Significant wetlands and waterbodies within a minimum 5km of the Proposed Wind Farm site were surveyed for waterbirds during the 2020/2021 and 2021/2022 winter and passage seasons (August to May inclusive) to provide information on their distribution and abundance in relation to the Proposed Wind Farm site. The area surveyed exceeds the 500m for foraging waterbirds and 1km for roosting waterbirds requirements of NatureScot (2017) and follows the recommendations of NatureScot (2016) to account for the core foraging range of whooper swan (<5km) which were determined to potentially occur in the area following the initial site assessment.

Survey methodology follows Gilbert *et al.* (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021). Surveys were undertaken during daylight hours from suitable vantage points at wetlands and waterbodies. All target waterbird species were recorded and mapped. Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2. Figure 7-11 shows the surveyed area.

7.2.4.2.7 Hen Harrier Roost Surveys

Hen harrier roost surveys were undertaken within the Proposed Wind Farm site and within a minimum 2km radius of the Proposed Wind Farm site. These surveys aimed to identify active winter hen harrier roosts near or within the Proposed Wind Farm site. Survey methodology followed Gilbert *et al.* (1998) and O'Donoghue (2019). Roost watches of 2-3 hours were conducted at four hen harrier vantage point

locations from dusk until last visible light during which time all hen harrier observations were recorded and mapped.

Each hen harrier vantage point was surveyed once per month during the winter season between October and March inclusive (in winter 2020/2021 and 2021/2022). Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-12 shows the hen harrier vantage point locations.

7.2.4.2.8 *Multidisciplinary Walkover Survey*

The Proposed Grid Connection Route options were surveyed in January 2023 through a multidisciplinary walkover survey. The site was systematically walked, while the surveyor recorded a range of protected species, including birds. Further details on this survey are available in Chapter 6: Biodiversity of this EIAR.

Map Legend

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

N

Drawing Title

Vantage Point Survey Location

Project Title

Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-1
Scale	Date
1:25000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

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

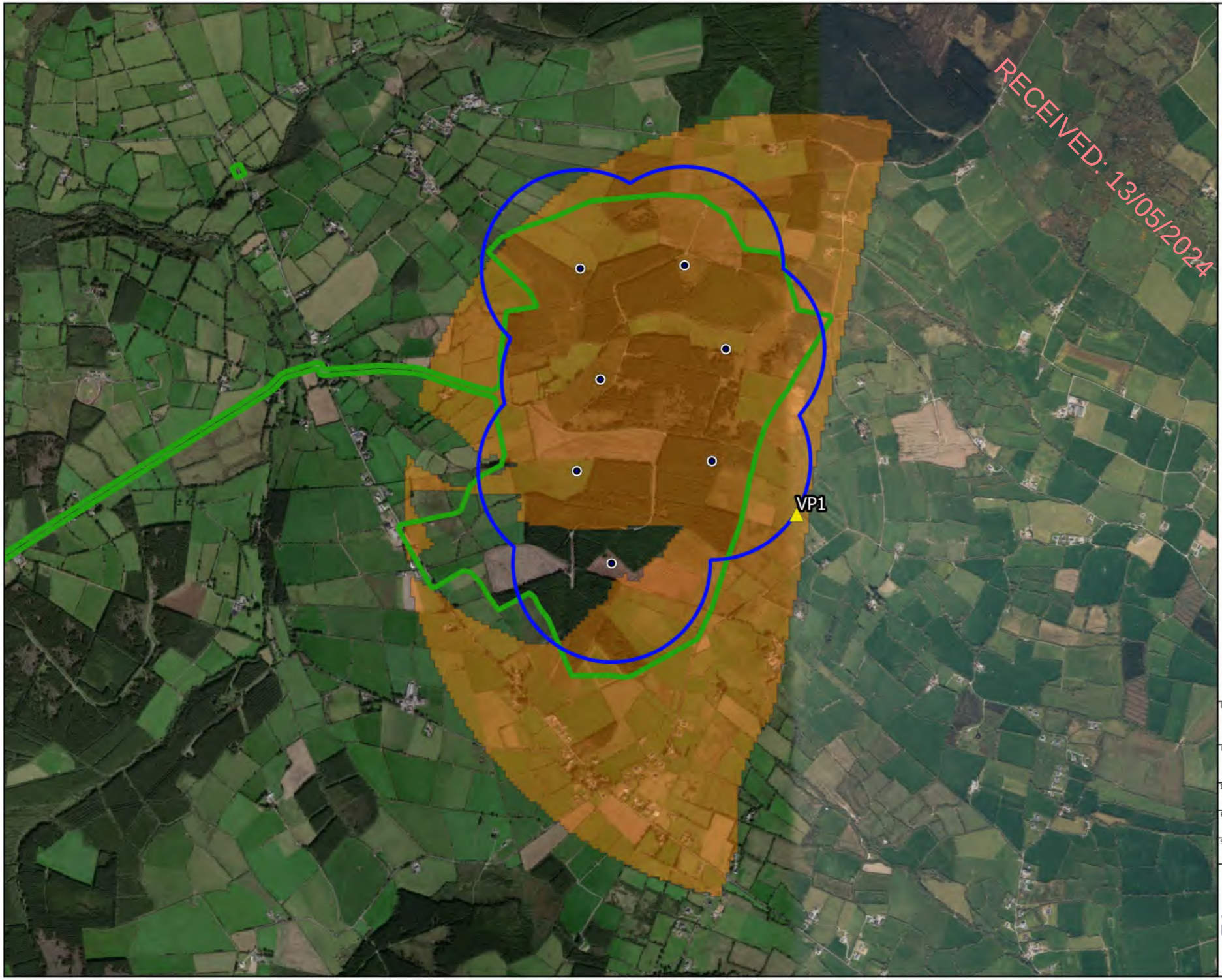
N

Drawing Title
Supplementary Vantage Point Survey Location

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-2
Scale	Date
1:50000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

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

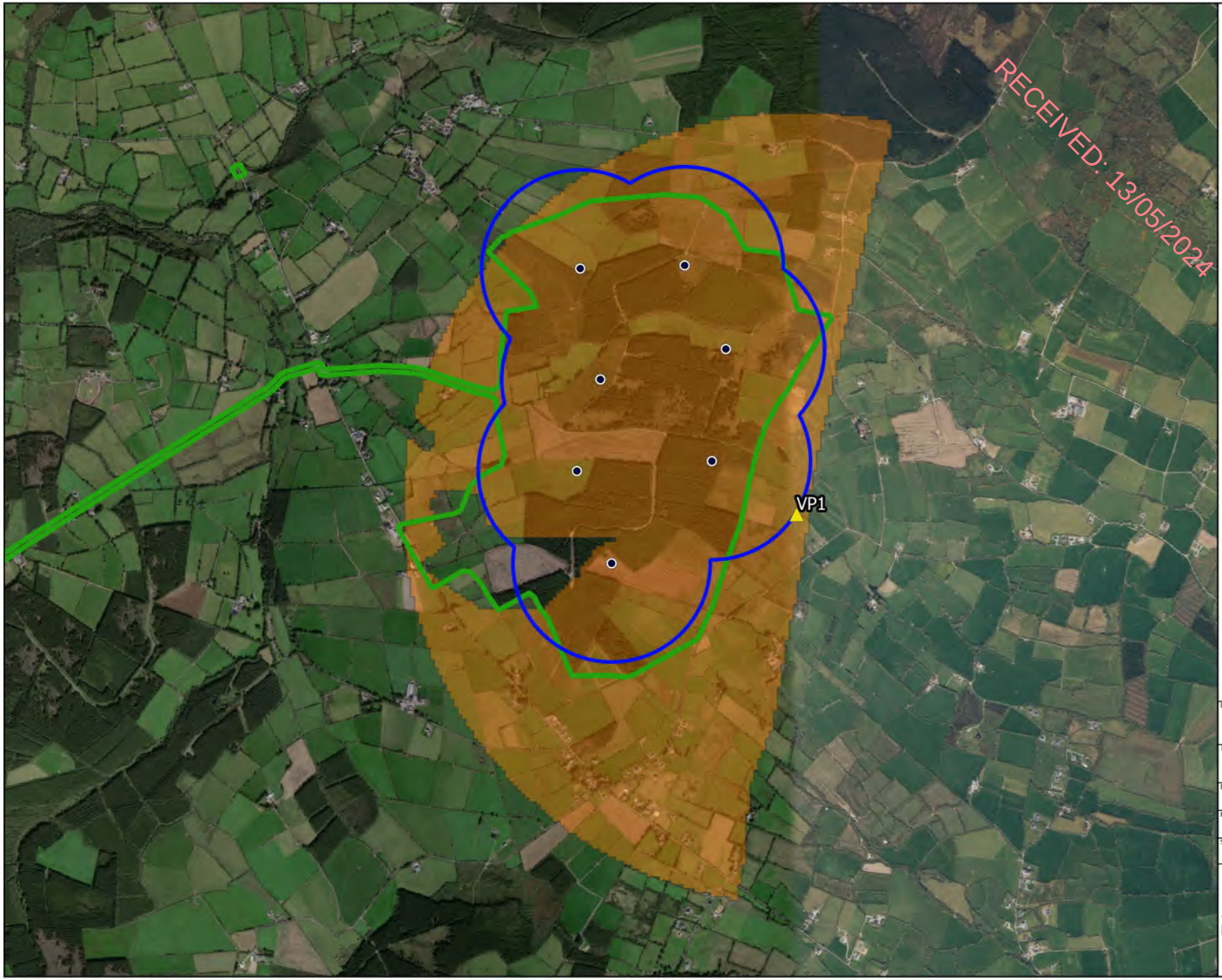
N

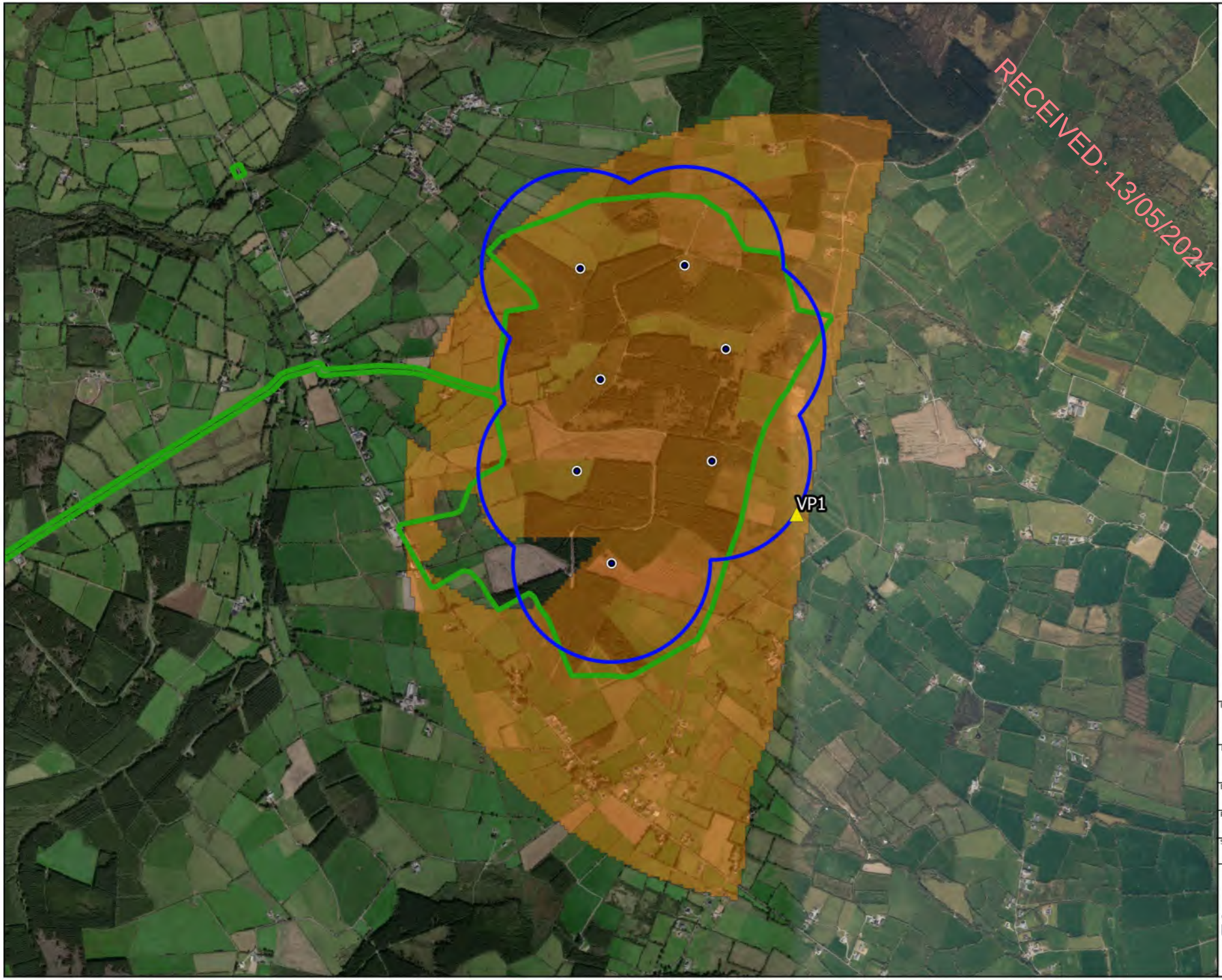
Drawing Title: Viewshed Coverage at 25m

Project Title: Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-3
Scale	Date
1:25000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie


RECEIVED: 13/05/2024
VP1
Map Legend
EIAR Site Boundary
Turbine Layout
500m Radius of Turbines
VP Locations
Viewshed
Microsoft product screen shots reprinted with permission from Microsoft Corporation
N
Drawing Title
Viewshed Coverage at 30m
Project Title
Seskin Wind Farm, Co. Carlow
Drawn By
D. Woods
Checked By
P. Cregg
Project No.
220246
Drawing No.
Fig. 7-4
Scale
1:25000
Date
10.01.24
MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

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

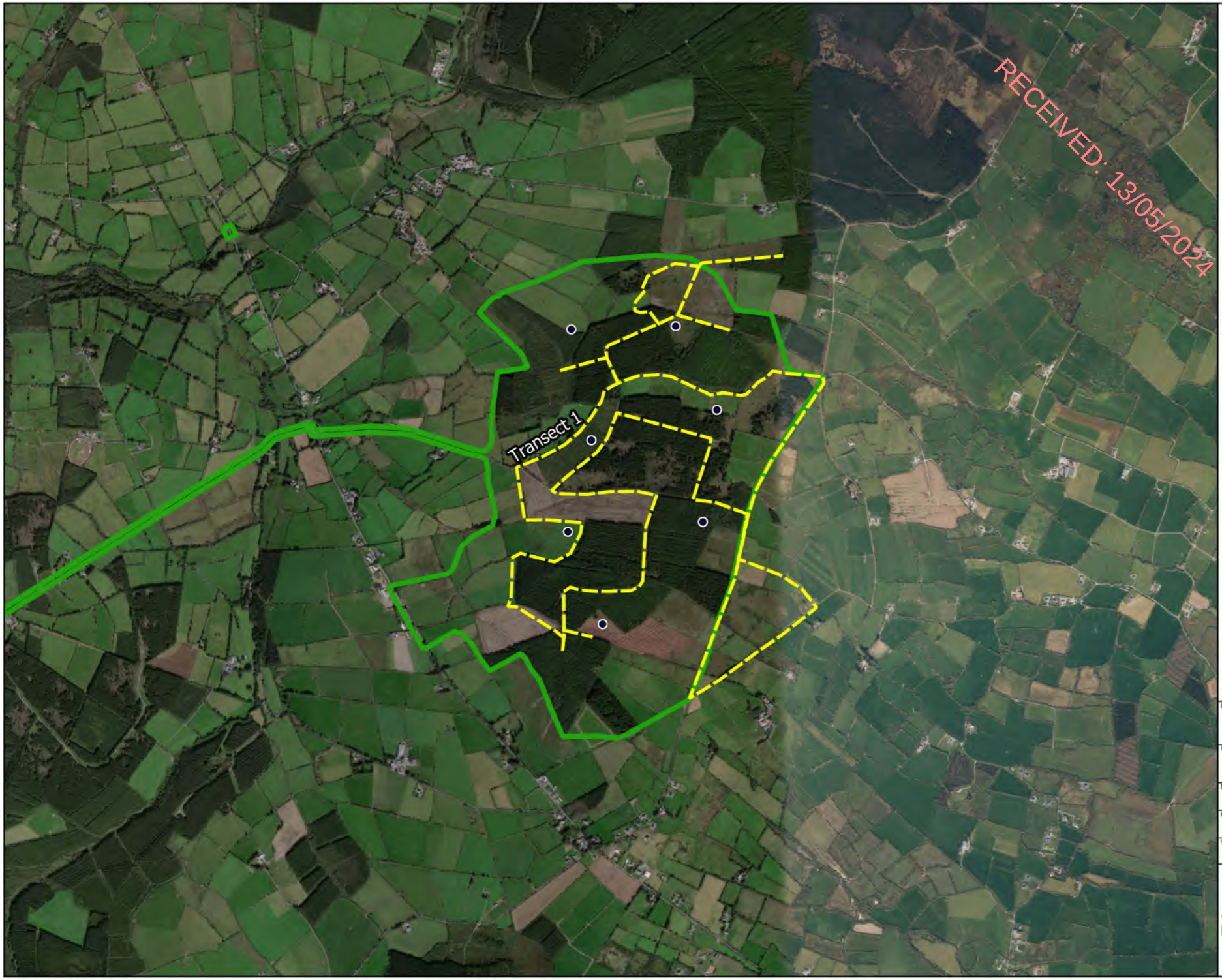
N

Drawing Title: Viewshed Coverage at 30.5m

Project Title: Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-5
Scale	Date
1:25000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Layout
- Transects

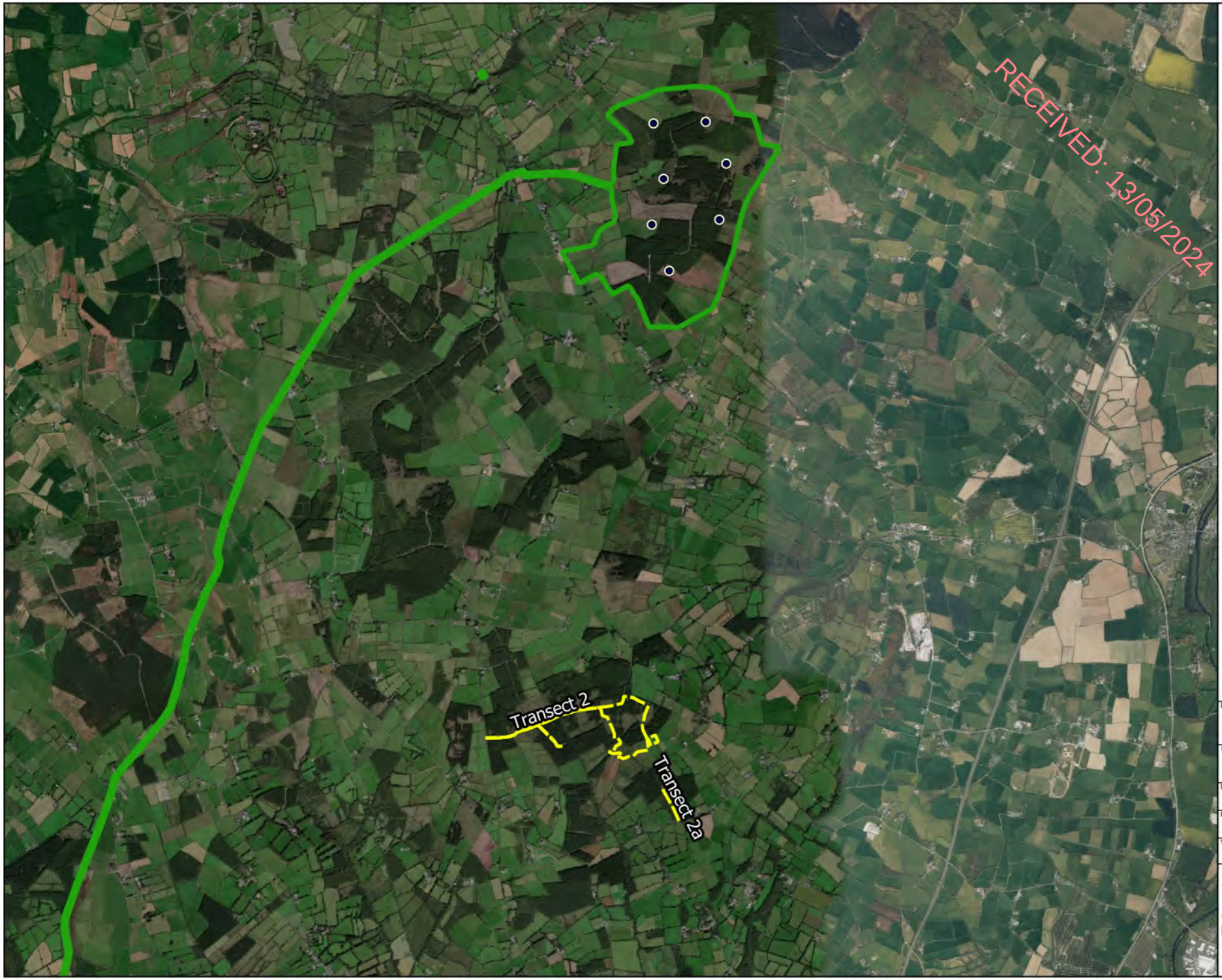
N

Drawing Title: Walkover Survey Transects

Project Title: Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-6
Scale	Date
1:25000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Layout
- Transects

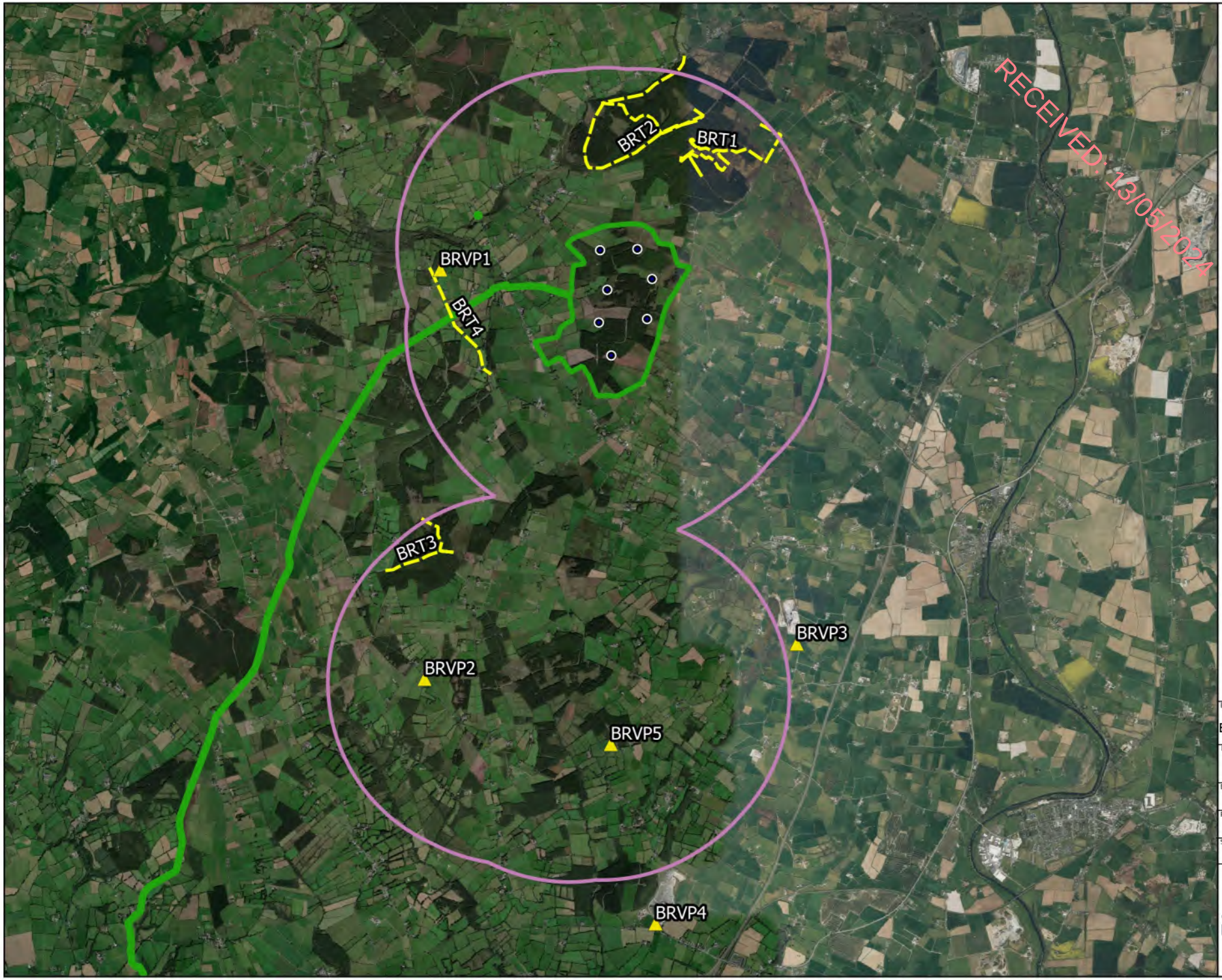
N

Drawing Title
Supplementary Walkover Survey Transects

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-7
Scale	Date
1:50000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Layout
- 2km Survey Area
- BRVP Locations
- BR Transects

N

Drawing Title

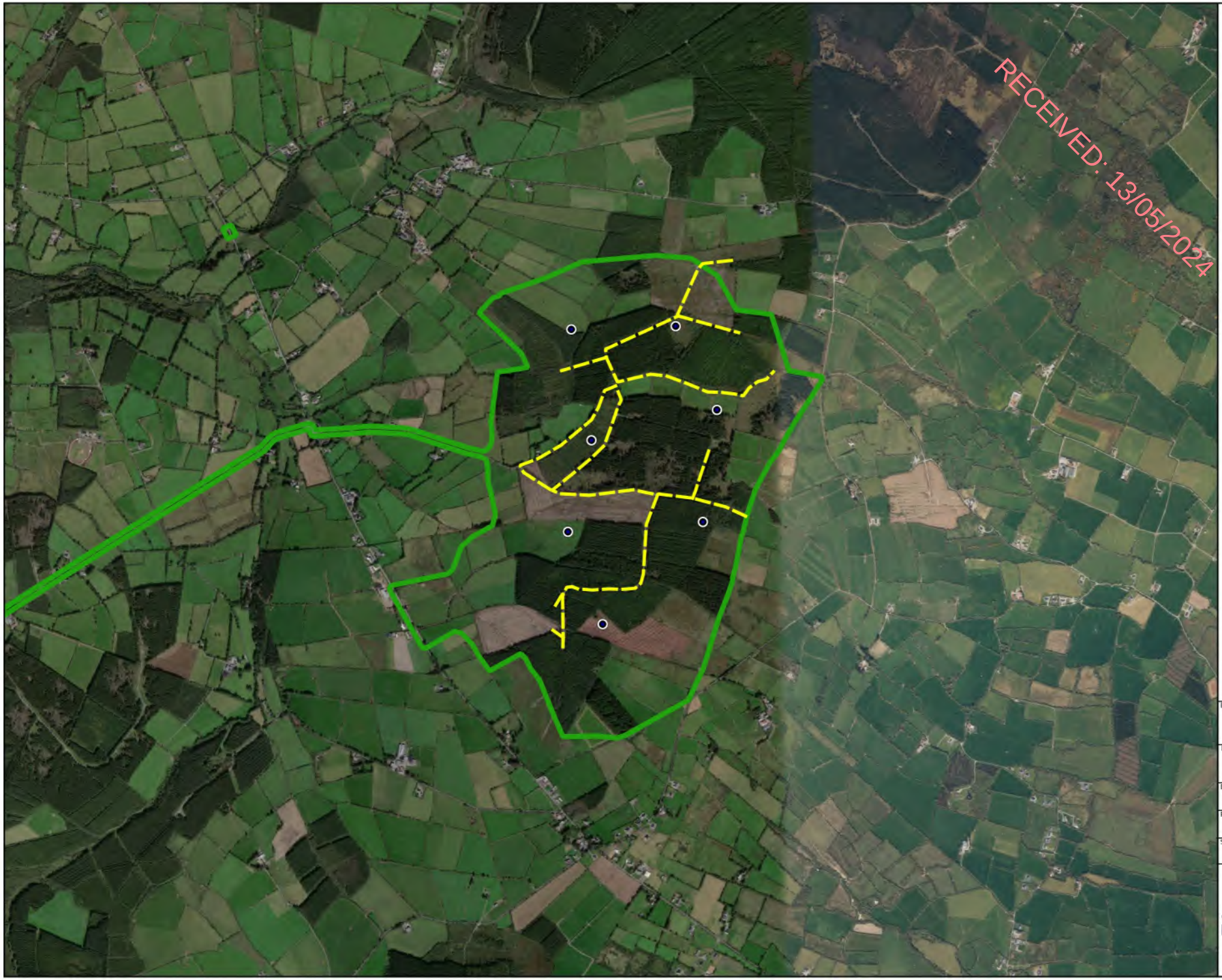
Breeding Raptor Survey Locations

Project Title

Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-8
Scale	Date
1:70000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

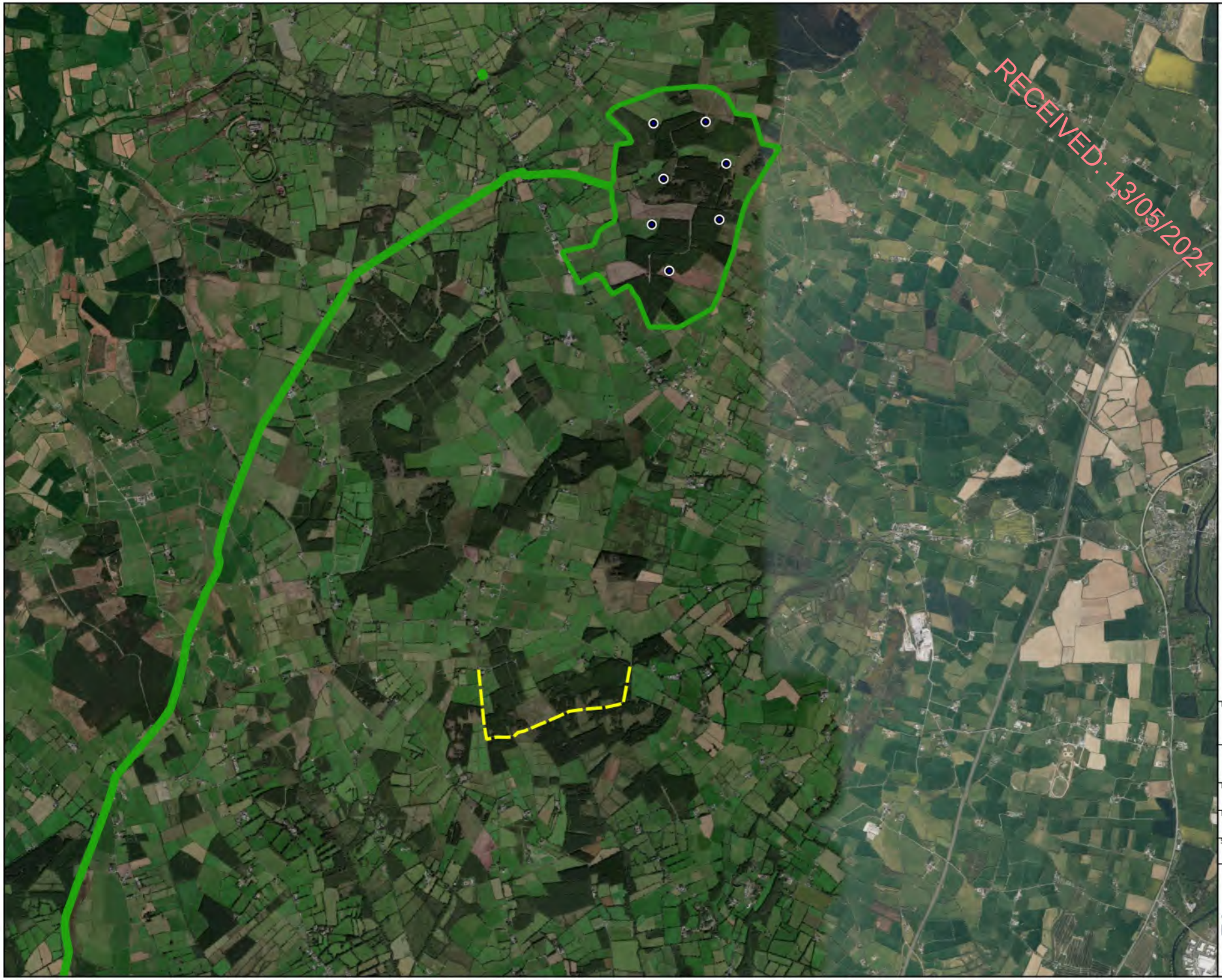


Drawing Title
Breeding Woodcock Survey Transects

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-9
Scale	Date
1:25000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Turbine Layout
- Transects

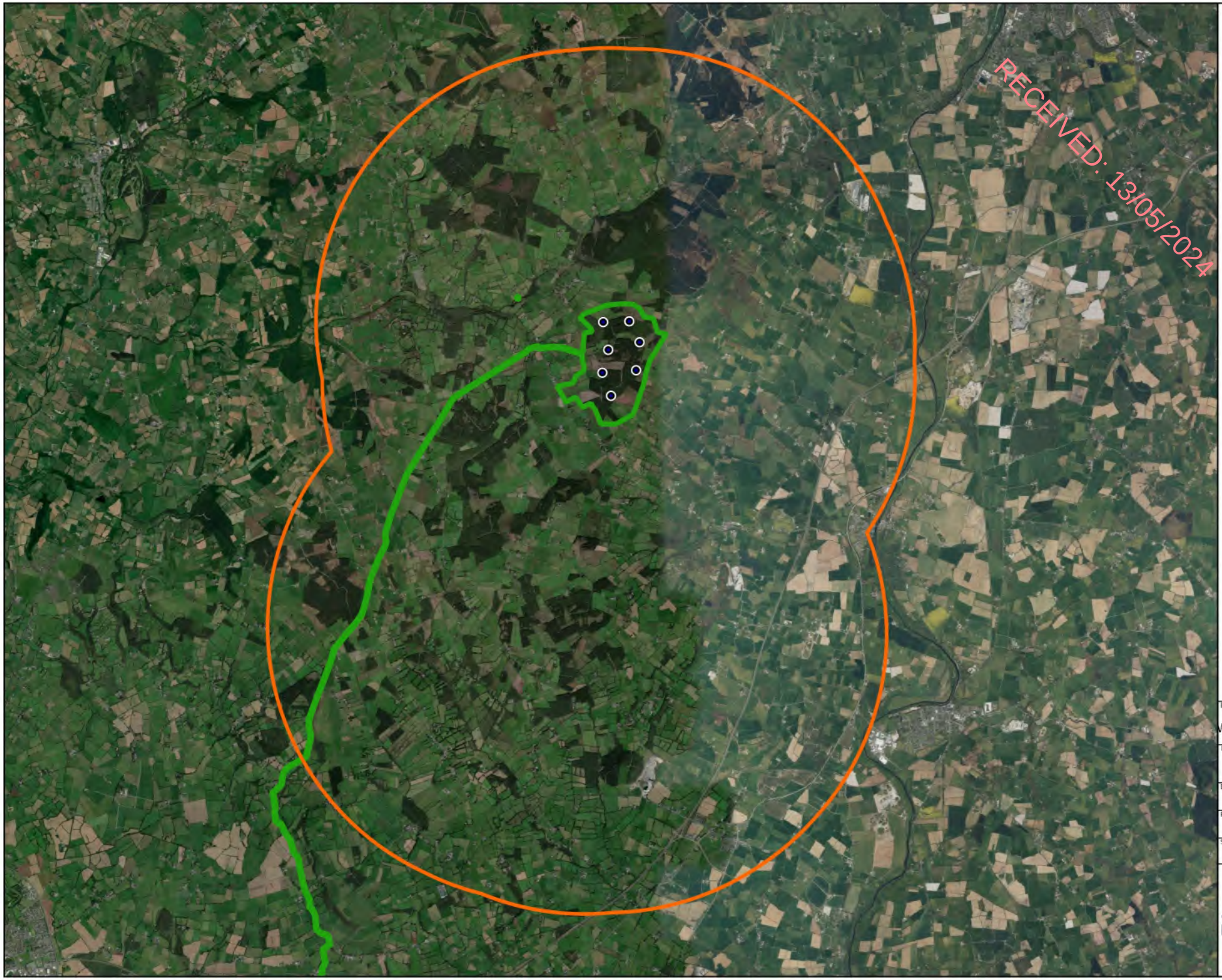
N

Drawing Title
Supplementary Breeding Woodcock Survey Transects

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-10
Scale	Date
1:50,000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Drawing Title

Waterbird Distribution Survey Area

Project Title

Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-11
Scale	Date
1:100000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- EIAR Site Boundary
- Turbine Layout
- 2km Survey Area
- HHVP Locations

N

Drawing Title
Hen Harrier Roost Survey Locations

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
220246	Fig. 7-12
Scale	Date
1:70000	10.01.24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

7.2.5 Receptor Evaluation and Impact Assessment

7.2.5.1 Potential Impacts Associated with Proposed Project

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

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

For each of these three risks, the detailed knowledge of bird distribution and flight activity within and surrounding the Proposed Wind Farm site has been used to predict potential impacts of the Proposed Project on birds. These impacts are also assessed cumulatively with other projects. The geographical framework and description of impacts are described below.

7.2.5.2 Geographical Framework

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

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

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

7.2.5.3 Description of Impacts

The sensitivity, magnitude and significance of impacts on bird populations resulting from the Proposed Wind Farm was quantified according to two assessment criteria: Percival (2003) and the Environmental Protection Agency (EPA, 2022) EIA Guidelines. 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 (Chapter 6) and Bird chapters of this EIAR, while Percival (2003) has also been followed given its specific focus on Irish birds.

Percival (2003) criteria

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

Table 7-5 (Determination of significance) outline the assessment criteria for each stage.

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

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

Table 7-4 Determination of magnitude of effects (from Percival, 2003)

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

Sensitivity	Description
	Guide: < 1% population/ habitat lost

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

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

EPA (2022) Criteria

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

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

The significance of the effect is quantified as:

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

The duration of effects can be:

- **Momentary** – effects lasting from seconds to minutes.
- **Brief** – effects lasting less than a day.
- **Temporary** – effects lasting less than a year.
- **Short-term** – effects lasting 1 to 7 years.
- **Medium term** – effects lasting 7 to 15 years.
- **Long term** – effects lasting 15 to 60 years.
- **Permanent** – effects lasting over 60 years.
- **Reversible** – effects that can be undone (e.g. through remediation or restoration).

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

- **Once, rarely, occasionally, frequently** or **constantly**
- **Hourly, daily, weekly, monthly** or **annually**

The probability of the effect may be:

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

The effects may also be described in relation to their extent and context. Extent describes the population affected by an effect, while context relates the effect to the established baseline conditions. Further details are available in the Chapter 1, Section 1.7.2 of this EIAR.

7.2.5.4 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the number of individual birds of a particular species that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows the Band Model (Band *et al.,* 2007), as recommended by NatureScot guidance. The Band Model first determines the number of birds transits through the air space swept by the rotor blades of the wind turbines. Then it calculates the collision risk for the birds. The product of the transits multiplied by the collision risk provides a collision rate. An avoidance factor is applied to this to account for birds actively avoiding turbines, providing a final "real world" annual collision rate for each species. See Appendix 7-5 for full details on the collision risk modelling method.

7.2.6 Assessment Justification

7.2.6.1 Survey Data

A comprehensive suite of bird surveys was undertaken at the Proposed Project between April 2020 – May 2022. Results derived from a continuous two years of surveying at the Proposed Wind Farm site and hinterland, undertaken in line with NatureScot guidance, are analysed to inform this assessment. As such, the surveys that were undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Project on avian receptors.

7.2.6.2 Mitigation

The Proposed Project has been designed to specifically avoid, reduce and minimise impacts on all avian receptors. Where potential impacts on KORs are predicted, mitigation has been prescribed to avoid, reduce and remove such impacts. Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed

design and will effectively address the effects on the identified KORs. As such, the potential impacts of the Proposed Project have been considered and assessed to ensure that all impacts on KORs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures and best practices (refer to Section 7.6 for further details).

7.2.6.3 Limitations

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

Note: Due to the COVID-19 outbreak and subsequent public health measures, breeding walkover and breeding raptor surveys were not completed in April 2020. This meant a reduction in survey effort in the 2020 breeding season for these surveys.

Breeding walkover and breeding raptor visits during the 2020 breeding season were completed in May, June and July 2020. While some early signs of breeding (courting/display behaviour) could potentially have been missed in April 2020, comprehensive further surveys in May, June and July 2020 (and in the following April, May, June and July 2021) are considered sufficient to have recorded any potential breeding activity of target species within the survey areas, and no significant limitations exist.

A site visit carried out on 21st September 2023, in addition to a review of available aerial imagery, confirm that the habitats within the Proposed Wind Farm site remain unchanged since surveys were completed. The only alterations comprise the felling and re-planting of small areas of forestry which is an on-going feature of this habitat type.

7.3 Baseline Ornithological Conditions

7.3.1 Designated Sites within the Likely ZOI of the Proposed Project

A screening assessment and Natura Impact Statement (NIS) were prepared to provide the competent authority with the information necessary to complete an Appropriate Assessment for the Proposed Project in compliance with Article 6(3) of the EU Habitats Directive (92/43/EEC). According to EPA (2022) "*A biodiversity section of an EIAR ... should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment*". Therefore, this section provides a summary of the key findings regarding SPAs and nationally designated sites. For a detailed assessment of any potential impacts on SPAs, refer to the Appropriate Assessment (AA) and NIS associated with Chapter 6 of this EIAR.

Sites designated for nature conservation within the potential ZOI of the Proposed Project were identified using GIS software. The ZOI is derived utilising a precautionary approach. Initially, sites within a 15km radius of the proposed works are identified. Then designated sites located outside the 15km buffer zone are accounted for and assessed for pathways for impacts. In this case, no potential for direct or indirect impacts for species listed as SCIs of SPAs more than 15km from the Proposed Wind Farm was identified.

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

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

Table 7-6 Designated sites in the Zone of Influence

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
River Nore SPA	15.7km from the Proposed Wind Farm site 1.8km from the Proposed Grid Connection Route at its closest point.	› Kingfisher (*Alcedo atthis*) [A229]	This SPA has the First-Order Site-specific Conservation Objectives: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA NPWS (2022) Conservation objectives for River Nore SPA [004233]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.	**Direct Effects (Disturbance)** There were no observations of kingfisher within a minimum 5km of the Proposed Wind Farm site during ornithological surveys undertaken between April 2020 and May 2022. Furthermore, no observation of kingfisher were made during walkover surveys of the Proposed Grid Connection Route. The Proposed Wind Farm site is located over 16.5km (overland) from the SPA therefore direct effects on kingfisher (SCI population) associated with development of the site have been ruled out. The Proposed Grid Connection Route is situated 1.8km from the nearest point of the SPA. A disturbance buffer for kingfisher of between 50-100m has been recommended by Goodship & Furness (2022)[1]. The SPA is significantly beyond this distance from the Proposed Grid Connection Route. The Proposed Grid Connection Route works will be confined to the existing road network and involve

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
				minor works over a short period, broadly analogous to existing activities in the general area (i.e. farm machinery, road works, vehicle movements etc.). No instream works are proposed as part of the Proposed Grid Connection Route as all watercourse crossings with be by way of HDD. As such, given the nature of the Proposed Grid Connection Route works and the distance from the SPA, the potential for direct impacts (disturbance) on populations of SCI species associated with the SPA as a result of the Proposed Project have been ruled out. **Indirect Effects (Deterioration in Water Quality)** Taking a precautionary approach a potential for indirect effect to the SPA (and associated SCI species) was identified via a direct surface water pathway between the SPA and the Proposed Project, both the Proposed Wind Farm site and Grid Connection Route are hydrologically linked to the SPA.

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
				Given the above there is potential for deterioration of water quality during the construction and operational phases of the Proposed Project. Potential pathways for indirect effects on kingfisher were identified via a deterioration in water quality potentially resulting in habitat degradation and reduced prey availability. A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The SPA is considered to be within the Likely Zone of Influence of the Proposed Project and further assessment is required and provided in the Natura Impact Statement accompanying this application.

7.3.2 Breeding and Wintering Bird Atlas Records

'*Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland*' (Balmer *et al.*, 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland. Previous bird atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007–11. The three previously published atlases were:

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

The Proposed Wind Farm site lies within hectad S66. The Proposed Grid Connection Route extends into hectads S55 and S56. Junction accommodation works are proposed within hectad S57. Table 7-7 and Table 7-8 below present a list of species of conservation interest recorded from the hectad encompassing the Proposed Wind Farm site, with regard to breeding and wintering respectively.

Table 7-7 Breeding Bird Atlas Data (Hectad S66).

Species Name	Breeding Atlas 1968-1972	Breeding Atlas 1988-1991	Breeding Atlas 2007-2011	Conservation Status
Barn Owl	Probable	-	-	RL
Corncrake	confirmed	-	-	BD
Curlew	confirmed	seen	-	RL
Grey Partridge	confirmed	-	-	RL
Grey Wagtail	confirmed	breeding	-	RL
Hen Harrier	probable	-	-	BD
Kestrel	confirmed	-	confirmed	RL
Kingfisher	confirmed	-	confirmed	BD
Lapwing	confirmed	-	-	RL
Meadow Pipit	confirmed	breeding	probable	RL
Redshank	-	breeding	-	RL
Snipe	confirmed	breeding	-	RL
Stock Dove	confirmed	breeding	probable	RL
Swift	confirmed	breeding	confirmed	RL
Yellowhammer	confirmed	breeding	confirmed	RL

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

Table 7-8 Wintering Bird Atlas Data (Hectad S66).

Species Name	Wintering Atlas 1981-1984	Wintering Atlas 2007-2011	Conservation Status
Barn Owl	present	-	RL
Bewick's Swan	present	-	BD
Curlew	present	-	RL
Golden Plover	present	present	BD

Species Name	Wintering Atlas 1981-1984	Wintering Atlas 2007-2011	Conservation Status
Grey Wagtail	present	present	RL
Hen Harrier	-	present	BD
Kestrel	present	present	RL
Kingfisher	present	-	BD
Lapwing	present	present	RL
Little Egret	-	present	BD
Meadow Pipit	present	present	RL
Pochard	present	-	RL
Redwing	present	present	RL
Snipe	present	present	RL
Whooper Swan	present	present	BD
Woodcock	present	present	RL
Yellowhammer	present	present	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 to provide a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (McGuiness *et al.*, 2015). The criteria for estimating a zone of sensitivity (i.e. 'low', 'medium', 'high' and 'highest') is based on a review of the behavioural, ecological and distributional data available for each species.

The Proposed Wind Farm site is not located within an area identified as sensitive to birds (i.e. there is no data available). The Proposed Wind Farm site is over 40km from the nearest area of high sensitivity, i.e., the Slieve Bloom Mountains.

7.3.4 Irish Wetland Bird Survey Records

The Irish Wetland Bird Survey (I-WeBS), coordinated by BirdWatch Ireland, monitors wintering waterbird populations at their wetland sites across Ireland. I-WeBS site locations are available at https://birdwatchireland.ie/our-work/.

The Proposed Wind Farm site is not covered by an I-WeBS site and the nearest site is located approximately 5km east of the Proposed Wind Farm site – i.e., the River Barrow (Goresbridge-Maganey Bridge). Owing to the geographical location of the Proposed Wind Farm site, at the meeting point of three counties (Co. Carlow, Co. Kilkenny and Co. Laois), data from I-WeBS sites within 25km of the site has therefore been used to estimate populations at the 'county' level for wintering waterbirds identified as KORs[3]. Datasets for the following sites were sourced from www.birdwatchireland.ie and reviewed:

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

- River Barrow (Goresbridge-Maganey Bridge) ***no data available**
- Graiguecullen New Bridge to Maganey bridge ***no data available**
- Sugar factory settling ponds Carlow ***no data available**
- Slaney Upper ***no data available**
- Durrow Curragh (River Erkina)
- Oak Park Lake ***no data available**
- Newpark Marsh ***no data available**
- Bishop's Lough Tullaherin ***no data available**

7.3.5 Rare and Protected Species Dataset

An information request was sent to NPWS requesting records from the Rare and Protected Species Database. The following records were obtained from the NPWS on the 09/11/2023:

Kingfisher

Six records of kingfisher were provided within the S67 and S76 from the 2010 national survey. All records related to the River Barrow, between 5.2km and 8.3km from the Proposed Wind Farm site.

Peregrine Falcon

The following peregrine nest locations or estimated centres of territory were recorded during 2017 National Peregrine Survey. The Proposed Wind Farm site is situated within hectad S66, and borders S67.

- Hectad S66: one occupied nest site (known in 2002); two unoccupied nest sites (not known in 2002)
- Hectad S67: one occupied nest site (known in 2002); one unoccupied nest site (not known in 2002)
- Hectad S77: one occupied nest site (not known in 2002); one unoccupied nest site (not known in 2002); one unsurveyed site (known in 2002)

The Proposed Wind Farm site is located entirely within hectad S66. The EIAR Site Boundary extends into hectads S67, S55, S56 & S57 (i.e. when including the Proposed Grid Connection Route, junction accommodation works, etc.). The occupied nest site from the 2017 National Survey within hectad S66 is considered likely to be the same nest site recorded 3.4km from the Proposed Wind Farm site during surveys by MKO in 2021 (see Section 7.3.6.3 for further detail, and Figure 7.7.1.2 in Confidential Appendix 7-7 for location). The next nearest suitable nesting habitat for peregrine (as investigated via satellite imagery and during survey work), are situated over 4km from the Proposed Wind Farm site, which likely refer to the occupied nest sites from hectads S67 and S77.

7.3.6 Field Survey Results

The target species recorded within the potential ZOI of the Proposed Wind Farm site during field surveys are listed in

Table 7-9, along with a summary of breeding and roosting status. The following sections describe the records of each target species under the individual survey headings.

Table 7-9 Target species recorded in the Potential ZOI of the Proposed Project

Species	Overall breeding status	Overall wintering status
Golden Plover (Annex I)	Non-breeding. There was no evidence of breeding at the site during surveys.	No regularly used roosts identified
Hen Harrier (Annex I)	Non-breeding. There was no evidence of breeding at the site during surveys.	No regularly used roosts identified
Peregrine Falcon (Annex I)	**Probable Breeding.** Probable breeding territory identified during 2021 breeding season approximately 3.6km from the Proposed Wind Farm site.	No regularly used roosts identified
Kestrel (Red Listed)	**Confirmed Breeding.** Up to three breeding territories identified within 6km of Proposed Wind Farm site.	No regularly used roosts identified
Lapwing (Red Listed)	Non-breeding. There was no evidence of breeding at the site during surveys.	No regularly used roosts identified
Snipe (Red Listed)	Non-breeding. There was no evidence of breeding at the site during surveys.	No regularly used roosts identified
Woodcock (Red Listed)	**Probable Breeding.** Roding males recorded in suitable habitat within Proposed Wind Farm site.	No regularly used roosts identified
Buzzard (Raptor)	**Confirmed Breeding.** One probable breeding territory identified within Proposed Wind Farm site and additional three probable and one confirmed breeding territories identified within 6.8km of the Proposed Wind Farm site.	No regularly used roosts identified
Long-eared Owl (Raptor)	**Confirmed Breeding.** Breeding territory identified 3.8km from Proposed Wind Farm site.	No regularly used roosts identified
Sparrowhawk (Raptor)	**Confirmed Breeding.** One probable breeding territory identified within Proposed Wind Farm site and additional two probable and three confirmed breeding territories identified within 4.4km of the Proposed Wind Farm site.	No regularly used roosts identified

The target species listed in Table 7-10 below were only recorded during waterbird distribution surveys and additional supplementary surveys greater than 4km from the Proposed Wind Farm site. The vast

majority of these records were from habitats associated with the River Barrow, which was encompassed by the waterbird distribution survey area. These species were not observed within a minimum 4km of the Proposed Wind Farm site and, therefore, there is no potential for impact from the Proposed Project. A summary of observations is provided in Table 7-10 below.

Table 7-10 Target species recorded outside the Potential ZOI of the Proposed Project.

Species	Observations
Kingfisher (Annex I)	Closest record = 5.3km distant from Proposed Wind Farm site. There were 11 observations of kingfisher during waterbird distribution surveys comprising between 1-2 birds travelling, calling and hunting. All observations were along the River Barrow.
Little Egret (Annex I)	Closest record = 5.3km distant from Proposed Wind Farm site. There were 18 observations of little egret during waterbird distribution surveys comprising between 1-6 birds travelling and feeding. All observations were associated with the River Barrow.
Whooper Swan (Annex I)	Closest record = 5.8km distant from Proposed Wind Farm site. There were 20 observations of whooper swan during waterbird distribution surveys comprising between 3-41 birds foraging on agricultural grassland adjacent to the River Barrow. The majority of observations (17 of 20) related to an area approximately 12.7km from the Proposed Wind Farm site.
Curlew (Red Listed)	Closest record = 4.7km distant from Proposed Wind Farm site. There were six observations of curlew during waterbird distribution surveys comprising between 1-33 birds foraging on agricultural grassland adjacent to the River Barrow over 5.5km from the Proposed Wind Farm site. There were three observations of curlew during supplementary breeding walkover surveys. Observations comprised flocks of between 7-11 birds during one day in July 2021, calling and landing on agricultural grassland approximately 4.7km south of the Proposed Wind Farm site.

A list of all bird species recorded during surveys is provided in Appendix 7-1. Appendix 7-3 presents results summary tables including:

- Summary of vantage point survey records
- Summary of breeding walkover survey records
- Summary of breeding raptor survey records
- Summary of breeding woodcock survey records
- Summary of winter walkover survey records
- Summary of waterbird distribution survey records
- Summary of hen harrier roost survey records
- Summary of non-target species recorded

Sensitive data relating to breeding sites are provided in Confidential Appendix 7-7.

7.3.6.1 Golden Plover

Golden plover were observed in the winter and passage[4] seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Golden plover were frequently recorded during vantage point surveys in winter 2020/21 and infrequently recorded in winter 2021/22. The species was overall observed on average once every 1.2 hours of vantage point surveys during winter season and once every 5.5 hours during breeding season, with an average flock size of 92 birds and a peak count of 500 individuals.

Observations were within the months of October - November and March - April, i.e. largely during the passage season with no observations during the core winter months of December - February. The majority of observations comprised birds travelling and circling, with flock sizes ranging from an individual up to 500 birds. Of the 70 observations 33 were within/partially within the Proposed Wind Farm site and 20 were within/partially within 500m of the Proposed Wind Farm site. Of the 70 observations, 61 were during the 2020/2021 winter season (41 of which were from two days in October and November 2020), with only nine observations during the whole 2021/2022 winter season.

There were 17 observations of Golden plover landing on ground, ranging from an individual up to 350 birds. None of these observations were within the Proposed Wind Farm site. There were seven observations of birds seen landing within 500m of the Proposed Wind Farm site (flocks of 2, 3, 6, 6, 7, 12 & 350 birds). The remaining 10 observations comprised birds landing over 500m from the Proposed Wind Farm site (flocks of 12 to 115 birds), with the majority relating to an area of agricultural grassland approximately 1.6km south-west of the Proposed Wind Farm site. There was a further one observations of birds seen low and possibly landing, but not confirmed, at boundary of Proposed Wind Farm site (flock of 84 birds in April 2021).

Winter Walkover Surveys

Golden plover was recorded on eight occasions during winter walkover surveys, in the months of March and October. All observations comprised birds in flight travelling with flocks ranging from an individual up to 700 birds. Of these observations, four were within/partially within the Proposed Wind Farm site and three were within/partially within 500m of the Proposed Wind Farm site.

Waterbird Distribution and Abundance Surveys

Golden plover was recorded on 29 occasions during waterbird distribution surveys, across the months of October – April. Observations comprised birds travelling, feeding and roosting and ranged in size from an individual up to 801 birds. There were no observations within the Proposed Wind Farm site, and one observation within 500m of the Proposed Wind Farm site, comprising a bird heard calling.

Incidental Records

There were 13 incidental records of golden plover during hen harrier roost surveys. All observations comprised birds travelling and/or circling with flock sizes ranging from an individual up to 801 birds. Of the 13 observations, five were within/partially within the Proposed Wind Farm site with no further observations within/partially within 500m of the Proposed Wind Farm site.

[4] *Passage season refers to the period when birds are on migration or movement between breeding and wintering areas, typically in the months of August, September, March and April.*

Supplementary Data

Golden plover was recorded on 10 occasions during supplementary vantage point surveys. The majority of observations comprised birds travelling and circling, with flock sizes ranging from an individual up to 200 birds. There was one observation of a flock of 172 birds coming in to land on agricultural grassland. All observations were greater than 500m from the Proposed Wind Farm site. All observations were during the 2020/2021 winter season.

7.3.6.2 Hen Harrier

Hen harrier was recorded during the winter and passage seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Hen harrier were infrequently recorded during vantage point surveys, the species was observed on average once every 36 hours of vantage point surveys. Hen harrier was recorded on four occasions during vantage point surveys, in the months of August, October and December. All observations comprised individual ringtail birds hunting and/or travelling. Of all observations, two were within/partially within the Proposed Wind Farm site and two were within/partially within 500m of the Proposed Wind Farm site.

Hen Harrier Roost Surveys

There were no observations of hen harrier during the dedicated hen harrier roost surveys.

Supplementary Data

Hen harrier was recorded on three occasions during supplementary vantage point surveys, in the months of October and November. Observations comprised individual birds travelling and hunting, two observations comprising adult females and one observation comprising adult male. All observations were greater than 500m from the Proposed Wind Farm site.

7.3.6.3 Peregrine

Peregrine was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Surveys

Peregrine was recorded on one occasion during vantage point surveys, comprising a single bird circling, calling and mobbing a buzzard in September partially within 500m of the Proposed Wind Farm site.

Breeding Raptor Surveys

Peregrine was recorded on 13 occasions during breeding raptor surveys. Of these observations, one was within the Proposed Wind Farm site, comprising a bird soaring / gliding over site in June 2020. There were no further observations within 500m of the Proposed Wind Farm site.

There were several observations of breeding behaviour recorded during the 2021 breeding season, comprising a pair active over a quarry in April, and observations of single birds dropping down into the quarry and perching on the quarry face in May and June, suggesting a probable breeding attempt at

this location approximately 3.4km from the Proposed Wind Farm site and 4.1km from the nearest proposed turbine location – T07 (Ref: PE-a – see Figure 7.7.1.2 in Confidential Appendix 7-7 for location).

Incidental Records

There were four incidental records of peregrine during waterbird distribution surveys. All observations were greater than 500m from the Proposed Wind Farm site.

Supplementary Data

Peregrine was recorded on three occasions during supplementary vantage point surveys, all comprising individual birds travelling. All observations were greater than 500m from the Proposed Wind Farm site.

7.3.6.4 Kestrel

Kestrel was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Surveys

Kestrel was frequently recorded during vantage point surveys, the species was observed on average once every 1 hour of vantage point surveys, with an average count of 1 bird and a peak count of 2 individuals. Kestrel were recorded on 182 occasions during vantage point surveys, comprising 160 flight observations and 22 non-flight observations. The majority of observations comprised single birds hunting and/or travelling. Of all observations, 130 were within/partially within the Proposed Wind Farm site and 52 were within/partially within 500m of the Proposed Wind Farm site.

There was one observation of two birds mobbing a buzzard in September 2021 partially within the Proposed Wind Farm site. There were no further observations of breeding behaviour.

Breeding Walkover Surveys

Kestrel was recorded on eight occasions during breeding walkover surveys. Observations comprised individual birds hunting, travelling and perching, with a single observation of two birds. There were no observations of breeding behaviour. Of the eight observations, six were within/partially within the Proposed Wind Farm site and two were within/partially within 500m of the Proposed Wind Farm site.

Breeding Raptor Surveys

Kestrel were frequently recorded during breeding raptor surveys, the species was observed on average once every 1.8 hours of survey. Observations largely comprised individual birds hunting, travelling and perching. There were several observations of breeding behaviour.

A pair was observed active within a quarry in May 2020 approximately 3.5km from the Proposed Wind Farm site. Chicks were then observed at a nest site at this location in June 2020 (Ref: K-a – see Figure 7.7.2.3 in Confidential Appendix 7-7 for territory locations).

In June 2021 kestrel activity was recorded in a quarry approximately 3.7km from the Proposed Wind Farm site (Ref: K-b). An adult was observed carrying prey to the nest in July 2021 confirming breeding at this location.

In July 2021 provisioning was observed at a quarry 5.5km from the Proposed Wind Farm site confirming breeding at this location (Ref: K-c).

Winter Walkover Surveys

Kestrel were frequently recorded during breeding raptor surveys, the species was observed on average once every 1.2 hours of survey. All observations comprised individual birds hunting, travelling and perching. Of the 22 observations, 15 were within/partially within the Proposed Wind Farm site and seven were within/partially within 500m of the Proposed Wind Farm site.

Incidental Records

There were 60 incidental records of kestrel during waterbird distribution surveys, hen harrier roost surveys, and breeding woodcock surveys. The majority of observations were of single birds hunting and travelling. Of the 60 observations, 11 were within/partially within the Proposed Wind Farm site and seven were within/partially within 500m of the Proposed Wind Farm site.

Supplementary Data

Kestrel was frequently recorded during supplementary vantage point surveys, the species was observed on average once every 35 minutes of supplementary vantage point surveys. The majority of observations were of single birds hunting, travelling and perching. A breeding territory was confirmed during these surveys approximately 3.5km from the Proposed Wind Farm site (Ref: K-a) during both the 2020 and 2021 breeding seasons. The majority of observations from the supplementary vantage point survey related to activity associated with this breeding territory situated in close proximity to the vantage point location.

Kestrel was recorded on three occasions during supplementary breeding walkover surveys. All observations were of single birds travelling and hunting.

Kestrel was recorded on seven occasions during supplementary winter walkover surveys. All observations were of single birds travelling, hunting and perching.

Breeding Summary

- **2020** – One confirmed breeding territory (Ref: K-a) 3.5km from Proposed Wind Farm site.
- **2021** – Three confirmed breeding territories (Refs: K-a (i.e. same location as 2020), K-b & K-c) 3.5km, 3.7km and 5.5km from the Proposed Wind Farm site respectively.

7.3.6.5 Lapwing

Lapwing was recorded during the breeding, passage and winter seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Lapwing was infrequently recorded during vantage point surveys, the species was observed on average once every 48 hours of vantage point surveys, with an average flock size of 5 birds and a peak count of 12 individuals. Observations were from May and June. All three observations were partially within the Proposed Wind Farm site and comprised birds travelling. One of the observations comprised of a flock of 2 birds potentially landing in agricultural field approximately 300m from the Proposed Wind Farm site in May 2020.

Waterbird Distribution Surveys

Lapwing was recorded on 16 occasions during waterbird distribution surveys. Observations comprised birds travelling, feeding and roosting and ranged in size from an individual up to 878 birds. There were no observations within 500m of the Proposed Wind Farm site. All observations related to birds at habitats associated with the River Barrow, between 5km and 12km from the Proposed Wind Farm site.

Incidental Records

There was one incidental record of lapwing during hen harrier roost surveys, comprising a flock of eight birds travelling 1.6km form the Proposed Wind Farm site in January 2021.

7.3.6.6 Snipe

Snipe was recorded during the winter, passage and breeding seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Snipe was infrequently recorded during vantage point surveys, the species was observed on average once every 5 hours of vantage point surveys, with an average flock size of one bird and a peak count of three individuals. Observations comprised birds travelling, calling and flushing. All observations were during the winter and passage seasons, with no observations during the core breeding season months of May – July. Of the 30 observations, seven were within/partially within the Proposed Wind Farm site and 23 were within/partially within 500m of the Proposed Wind Farm site. No drumming or indications of breeding were recorded.

Winter Walkover Surveys

Snipe was infrequently recorded during winter walkover surveys, the species was observed on average once every 5.3 hours of survey. All observations comprised birds flushed, ranging from an individual up to five birds. All five observations were within the Proposed Wind Farm site.

Incidental Records

There were 28 incidental records of snipe during hen harrier roost surveys. Observations comprised birds flushed, travelling and calling and ranged from an individual up to eight birds. Of the 28 observations, two were within the Proposed Wind Farm site and one was within 500m of the Proposed Wind Farm site.

Supplementary Data

Snipe was infrequently recorded during supplementary vantage point surveys, the species was observed on average once every 11 hours of supplementary vantage point surveys. Observations comprised birds travelling and calling and were from April, October and December, with one observation in May.

7.3.6.7 Woodcock

Woodcock was recorded during the breeding and winter seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Survey

Woodcock was infrequently recorded during vantage point surveys; the species was observed on average once every 18 hours of vantage point surveys. All observations comprised single birds and were during the months of April, May and December. There were three observations of woodcock in display flight in May 2020 within the Proposed Wind Farm site.

Breeding Woodcock Survey

Woodcock was frequently recorded during the dedicated breeding woodcock surveys; the species was observed on average once every 10 minutes of survey. The majority of observations comprised roding males, indicating probable breeding throughout the Proposed Wind Farm site in suitable habitat, with a minimum of three breeding areas identified within the Proposed Wind Farm site, each containing a minimum of one pair (Refs: WK-a, WK-b & WK-c - see Figure 7.7.3.2 in Confidential Appendix 7-7 for breeding area locations).

Winter Walkover Survey

There were two observations of woodcock during winter walkover surveys, comprising an individual travelling and flushed within the Proposed Wind Farm site.

Incidental Records

There were 11 incidental records of woodcock during hen harrier roost surveys. There were five observations of roding males during surveys in March 2021 indicating probable breeding in this area, approximately 1.1km north of the Proposed Wind Farm site (Ref: WK-g).

Supplementary Data

There was one observation of woodcock during supplementary vantage point surveys, comprising a single bird travelling in December 2020.

Woodcock was frequently recorded during the supplementary breeding woodcock surveys, the species was observed on average once every 15 minutes of supplementary survey. The majority of observations comprised roding males, indicating probable breeding areas in suitable habitat, with a minimum of three breeding areas identified approximately 3.5km – 4.5km from the Proposed Wind Farm site, each containing a minimum of one pair (Refs: WK-d, WK-e & WK-f).

There was one observation of woodcock during supplementary winter walkover surveys, comprising a single bird flushed in March 2021.

7.3.6.8 Buzzard

Buzzard was recorded during the breeding and winter seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Surveys

Buzzard was frequently recorded during vantage point surveys, the species was observed on average once every 1 hour of vantage point surveys, with an average count of 1 bird and a peak count of 3 individuals. The majority of observations comprised single birds soaring, travelling and hunting. Of the

149 observations, 80 were within/partially within the Proposed Wind Farm site and 67 were within/partially within 500m of the Proposed Wind Farm site.

There was one observation of breeding behaviour, comprising a bird in display flight in July 2021 indicating a probable breeding territory at a location partially within the Proposed Wind Farm site (Ref: BZ-a - see Figure 7.7.4.4 in Confidential Appendix 7-7 for breeding territory locations).

Breeding Walkover Survey

Buzzard was frequently recorded during breeding walkover surveys, the species was observed on average once every 1 hour of survey, with an average count of 1 bird and a peak count of 4 individuals. Of the 28 observations, 27 were within / partially within the Proposed Wind Farm site and one was within 500m of the Proposed Wind Farm site. There were several observations of breeding behaviour. These all related to the probable breeding territory detailed above (BZ-a) within the Proposed Wind Farm site. Alarm calling was heard from this location in June 2021. Juveniles were then observed at this location in July 2021.

Breeding Raptor Survey

Buzzard was infrequently recorded during breeding raptor surveys, the species was observed on average once every 4 hours of survey, with an average count of 1 bird and a peak count of 4 individuals. The majority of observations comprised single birds soaring, travelling and hunting. There were several observations of breeding behaviour.

During survey in July 2020 two juvenile were recorded begging with an adult also present in the vicinity, approximately 4.4km from the Proposed Wind Farm site. As the juveniles were capable of flight it cannot be confirmed that this is the site of the breeding territory, however adopting a precautionary approach a probable breeding territory has been attributed to this location (Ref: BZ-b).

In May 2021 a pair were observed in display flight over forestry indicating probable breeding at this location approximately 4.5km from the Proposed Wind Farm site (Ref: BZ-c).

A pair was also recorded in display flight and emerging from forestry alarm calling at a location 2.5km from the Proposed Wind Farm site in May 2021 (Ref: BZ-d).

In July 2021 an adult was observed provisioning a nest approximately 6.9km from the Proposed Wind Farm site, confirming breeding at this location (Ref: BZ-e).

Winter Walkover Survey

Buzzard was infrequently recorded during winter walkover surveys; the species was observed on average once every 3 hours of survey. Of the eight observations, six were within/partially within the Proposed Wind Farm site and two were within/partially within 500m of the Proposed Wind Farm site. All observations comprised birds soaring, travelling, calling and hunting, with most observations being of a single bird and one observation of two birds.

Incidental Records

There were 67 incidental records of buzzard during breeding woodcock, waterbird distribution and hen harrier roost surveys. The majority of observations comprised single birds soaring, travelling and hunting, with a maximum of four birds recorded. Of the 67 observations, eight were within/partially within the Proposed Wind Farm site and five were within/partially within 500m of the Proposed Wind Farm site.

Supplementary Data

Buzzard was frequently recorded during supplementary vantage point surveys; the species was observed on average once every 1.5 hours of supplementary vantage point survey. The majority of observations comprised single birds soaring, travelling and hunting. There were some observations of breeding behaviour. In May 2021 a bird was observed in display flight over suitable breeding habitat, indicating probable breeding at this location, approximately 3.8km from the Proposed Wind Farm site (Ref: BZ-f).

Buzzard was recorded on 15 occasions during supplementary breeding walkover surveys. Observations comprised between 1-2 birds soaring, travelling, hunting, perching and calling.

Buzzard was recorded on 3 occasions during supplementary winter walkover surveys. All observations comprised single birds travelling and/or calling.

Breeding Summary

- **2020** – One probable breeding territory (Ref: BZ-b) 4.4km from Proposed Wind Farm site.
- **2021** – Four probable breeding territories (Refs: BZ-a, BZ-c, BZ-d & BZ-f) within the Proposed Wind Farm site and 4.5km, 2.5km and 3.8km from the Proposed Wind Farm site respectively; and one confirmed breeding territory (Ref: BZ-e) 6.9km from the Proposed Wind Farm site.

7.3.6.9 Long-eared Owl

Long-eared owl was recorded during the breeding and winter seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Breeding Raptor Survey

There was one observation of long-eared owl during breeding raptor surveys, comprising an individual flying over a track between conifer plantations in May 2020, approximately 2.3km from the Proposed Wind Farm site.

Incidental Records

There were two incidental records of long-eared owl during breeding woodcock and hen harrier roost surveys. An adult and juvenile begging was recorded approximately 3.8km from the Proposed Wind Farm site in June 2020, confirming breeding at this location (Ref: LE-a - see Figure 7.7.5.2 in Confidential Appendix 7-7 for breeding territory location). The other incidental record comprised an individual hunting approximately 1.2km from the Proposed Wind Farm site in March 2021.

7.3.6.10 Sparrowhawk

Sparrowhawk was recorded during the breeding and winter seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Survey

Sparrowhawk was infrequently recorded during vantage point surveys, the species was observed on average once every 4 hour of vantage point surveys, with an average count of 1 bird and a peak count of 2 individuals. The majority of observations comprised single birds travelling and hunting. There were two observations of breeding behaviour, both comprising a female in display flight and dropping down into forestry within Proposed Wind Farm site in March 2021, indicating probable breeding at this location (Ref: SH-a - see Figure 7.7.6.4 in Confidential Appendix 7-7 for breeding territory locations).

Breeding Walkover Survey

Sparrowhawk was infrequently recorded during breeding walkover surveys, the species was observed on average once every 5 hour of survey. All observations comprised individual birds travelling and/or hunting within the Proposed Wind Farm site.

Breeding Raptor Survey

Sparrowhawk was infrequently recorded during breeding raptor surveys, the species was observed on average once every 5 hours of survey. The majority of observations comprised single birds soaring, travelling and hunting. There were several observations of breeding behaviour.

In May 2020 agitated calling was heard from an adult within forestry approximately 3.1km from the Proposed Wind Farm site, indicating probable breeding at this location (Ref: SH-b).

In July 2020 chicks were heard calling from nest site within forestry approximately 1.4km from the Proposed Wind Farm site, confirming breeding at this location (Ref: SH-c).

Also in July 2020, a pair was observed soaring together and descending into forestry approximately 2.2km from the Proposed Wind Farm site, indicating probable breeding at this location (Ref: SH-d).

Winter Walkover Survey

Sparrowhawk was infrequently recorded during winter walkover surveys, the species was observed on average once every 6.5 hours of survey. All observations comprised individuals travelling and/or hunting and all four observations were within the Proposed Wind Farm site.

Incidental Records

There were 22 incidental records of sparrowhawk during waterbird distribution surveys and hen harrier roost surveys. All observations comprised individuals travelling and/or hunting. Of the 22 observations, four were within/partially within the Proposed Wind Farm site and one was within/partially within 500m of the Proposed Wind Farm site.

Supplementary Data

Sparrowhawk was frequently recorded during supplementary vantage point surveys; the species was observed on average once every 4 hours of supplementary vantage point survey. The majority of observations comprised single birds travelling and hunting.

Sparrowhawk was recorded on six occasions during supplementary breeding walkover surveys. The majority of observations comprised single birds travelling and hunting. In July 2020 chicks were observed calling from nest sites at two locations, 3.8km and 4.3km from the Proposed Wind Farm site, confirming breeding at these locations (Refs: SH-e & SH-f).

Sparrowhawk was recorded on one occasion during supplementary winter walkover surveys, comprising a single bird hunting.

7.4 Receptor Evaluation

7.4.1 Determination of Population Importance

A determination of population importance for birds within the likely ZOI is provided below, following criteria described in Section 7.2.5. Estimates of national population sizes were obtained from the most recent species-specific national survey, or national surveys by Burke *et al.* (2018), Lewis *et al.* (2019a), Crowe *et al.* (2014) and Lewis *et al.* (2019b), or Ireland's Article 12 Reporting 2013-2018 (EU, 2022), depending on what literature was available. Estimates for mean county population sizes were obtained from species-specific surveys, a review of I-WeBS sites within 25km of the Proposed Wind Farm site[5], or derived from national estimates, according to what literature was available.

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

7.4.1.1 Golden Plover

Wintering

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

To estimate the county population, a review of all I-WeBS sites within 25km of the Proposed Wind Farm site was conducted. It should be noted that the population estimate based on I-WeBS figures alone is likely to be an underestimate of the county population[6]. This is due to the foraging ecology of wintering golden plover that will utilise agricultural grasslands and other terrestrial habitats not typically surveyed during I-WeBS counts, as this is a survey of wetland habitats. To account (partly) for the birds that occur in terrestrial habitats that would not have been counted by I-WeBS surveyors, the golden plover that occur at terrestrial locations outside of any I-WeBS sites within the 5km survey radius of the Waterbird Distribution Survey were added to the county population estimate.

Below are the mean count values recorded for I-WeBS sites over the most recent 5-season period, i.e. for the period 2016/17 – 2020/21 (note that sites with a mean of zero birds were excluded from this list) and the mean peak count from the 5km survey radius of the Waterbird Distribution Surveys for the two winter seasons (2020/21 & 2021/22):

- Little Brosna Callows (mean = 552)
- Terrestrial habitats7

[5] *Please note that these figures are estimates based on the best available information but should be interpreted with a degree of caution.*
[6] *As per Burke et al (2018) in relation to the golden plover count, "these estimates must be treated as conservative on the basis that they are widely disturbed in a variety of wetland and non-wetland habitats that are under-sampled during I-WeBS."*
[7] *Peak count from terrestrial areas within the 5km survey radius of the Waterbird Distribution Surveys from the two winters surveyed.*

- Winter 2020/2021 = 1,276
- Winter 2021/2022 = 50
- Mean = 663

Based on the above, the mean wintering population[8] from 25km radius of the Proposed Wind Farm site is 1,215 birds. However, as previously stated this likely remains an underestimate. Therefore, a regularly occurring population of 12 or more birds (>1% of the county population, as per NRA (2009)) is required to be classified as County Importance.

Flocks of 12 birds or more (County Importance) were regularly recorded within 500m of the Proposed Wind Farm site. The population recorded within 500m of Proposed Wind Farm site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

Breeding

The only observation of golden plover during the breeding season are from early April. These observations are believed to be birds on passage given the breeding range of the species[9], flock size, time of year and no further observations during the breeding season months of May to August inclusive.

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

7.4.1.2 Hen Harrier

Wintering

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated national wintering population of hen harrier in Ireland is 311-435 therefore 1% of the ROI National wintering population is 3-4 birds. A regularly occurring wintering population of 3-4 hen harrier is required for classification of National/International Importance.

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

Hen harrier was only observed on one occasion within the Proposed Wind Farm site during winter, comprising an individual ringtail travelling. There were a further two observations within 500m of the Proposed Wind Farm site, both on the same day within 30 minutes of each-other both comprising an individual ringtail travelling.

The Proposed Wind Farm site is of **No Ecological Importance** to this species, given that there was only one observation of this species within the Proposed Wind Farm site over the two winters of surveying, comprising a bird travelling.

[8] *Please note that these figures are estimates based on the best available information and should be interpreted with a degree of caution.*
[9] *The breeding range is largely restricted to western and northern coastal counties.*

Breeding

There was only one observation of hen harrier within 500m of the Proposed Wind Farm site during the breeding season, comprising a ringtail hunting in August 2021. The Proposed Wind Farm site is of **No Ecological Importance** to this species during the breeding season.

7.4.1.3 Peregrine

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), 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 Carlow population of peregrine. Assuming an even distribution of peregrine across the 26 counties of the Republic of Ireland, the population of peregrine in Co. Carlow is roughly 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 only observed on one occasion within 500m of the Proposed Wind Farm site over the two years of surveying, comprising an individual soaring / travelling in June 2020. A probable nest site was identified during 2021 breeding season, located approximately 3.4km from the Proposed Wind Farm site.

The Proposed Wind Farm site is of **No Ecological Importance** to this species, given that there was only one observation of this species within the Proposed Wind Farm site over the two years surveying and that the activity recorded, including the probable nest site, related to habitats distant from the Proposed Wind Farm site.

7.4.1.4 Kestrel

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimates of kestrel in the ROI 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 Carlow population of kestrel. Assuming an even distribution of kestrel across the 26 counties of the ROI[10], the population of kestrel in County Carlow is estimated to be 519 birds (national population divided by 26 counties). Therefore, a regularly occurring population of five birds is required for classification of County Importance.

There were no breeding territories identified within the Proposed Wind Farm site or within 500m of the Proposed Wind Farm site. There was a maximum of three breeding territories per year (2020–2021) identified in the surrounding area, the closest of which was 3.5km from the Proposed Wind Farm site. This indicates a resident population of six adult birds during the breeding season in the wider area. Kestrel were regularly recorded hunting within the Proposed Wind Farm site, and it can therefore be assumed birds from these territories utilise the Proposed Wind Farm site as hunting grounds. This population would be bolstered by fledglings at the end of the breeding season, which will remain present in the area 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[11], it is likely that there would be a population of approximately six adults and five juvenile birds by the end of each winter season. The population recorded at the Proposed Wind Farm site was therefore

[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).*
[11] *https://app.bto.org/birdfacts/results/bob3040.html*

assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

7.4.1.5 Lapwing

Wintering

There were no observations of lapwing within 500m of the Proposed Wind Farm site over the two winters surveyed. The Proposed Wind Farm site is of **No Ecological Importance** to this species during the winter, given that there were no observations of this species within the Proposed Wind Farm site.

Breeding

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

There are no published figures for the County Carlow population of lapwing. Taking a precautionary approach, a population of one pair is required for the classification of County Importance.

There were no breeding territories identified within the Proposed Wind Farm site or surrounding surveys areas during the 2020 or 2021 breeding seasons. There were three observations of lapwing within 500m of the Proposed Wind Farm site during the two breeding seasons surveyed. These comprised two observations of two birds within a few minutes of each other in May 2020 and a flock of 12 birds in July 2021. All were of birds travelling and there were no observations of birds utilising habitats within the Proposed Wind Farm site.

The Proposed Wind Farm site is of **No Ecological Importance** to this species, given that there was only one observation of this species within 500m of the Proposed Wind Farm site in each breeding season, and no observations of birds utilising habitats within the Proposed Wind Farm site.

7.4.1.6 Snipe

Wintering

There are no population estimates for wintering snipe in Ireland. As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimates of snipe in the Republic of Ireland is 4,275 breeding pairs. In the absence of wintering population estimates, using these latest figures, 1% of the National population of snipe is taken to be 43 pairs. Taking a highly conservative approach it has been assumed that the number of birds is double the number of pairs. Note: as wintering snipe population in Ireland is bolstered by migration of European birds, this represents a considerable underestimate of the wintering population. Therefore, as per NRA 2009, a regularly occurring population of 86 birds is required for classification as Nationally Important.

There are no published figures for the County Carlow populations of snipe. Assuming an even distribution of snipe[12] 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), or 328 birds in the absence of wintering population estimates. Therefore, a regularly occurring population of 1 pair, or two birds, is required for the classification of County Important.

[12] *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).*

There were 32 observations of snipe within 500m of the Proposed Wind Farm site during the winter months, with a max count of five birds. As such, given that there is a regularly occurring wintering population of >2 birds, the wintering population recorded within 500m of the Proposed Wind Farm site was assigned **County Importance**.

Breeding

The only observations of snipe during the breeding season within 500m of the Proposed Wind Farm site are from early April and likely represent birds on passage and are therefore taken to be part of the wintering population. There were no observations of snipe during the months of May – August and no observations of drumming or breeding behaviour. The Proposed Wind Farm site is of **No Ecological Importance** to this species during the breeding season, given that there were no observations of this species within the Proposed Wind Farm site during the main breeding season.

7.4.1.7 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. An estimate of between 2,500 – 9,999 breeding pairs has previously been suggested (BirdLife International, 2004). In the absence of other available data and given the age of this estimate and the conservation status of this species, the lower end of the range is taken as a best available estimate of breeding population, i.e. 2,500 pairs.

There were between a minimum of three breeding areas identified at, or within 500m of, the Proposed Wind Farm site in both 2020 and 2021 breeding season, each containing a minimum of one pair. Taking a precautionary approach (given the species' unfavourable conservation status) the population recorded within 500m of the Proposed Wind Farm site was assigned **County Importance**.

7.4.1.8 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.

7.4.1.9 Long-eared Owl

Long-eared Owl is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). There were no observations of long-eared owl within the Proposed Wind Farm site or within 500m of the Proposed Wind Farm site. The only observation was greater than 1km distance from the Proposed Wind Farm site; therefore, the Proposed Wind Farm site is of **No Ecological Importance** to this species, given that there were no observations of this species within the 500m of the Proposed Wind Farm site.

7.4.1.10 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.

7.4.2 Identification of Key Ornithological Receptors

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

Table 7-11 Receptor evaluation and selection criteria rational

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List (Breeding & Wintering Populations) & Irish Wildlife Act	**Wintering** County Importance	There was a single record of this species utilising habitats within the Proposed Wind Farm site. All other observations within the Proposed Wind Farm site comprised birds in flight travelling or circling. As such, there is limited potential for impacts relating to habitat loss within the Proposed Wind Farm site. However, adopting a precautionary approach, and considered flocks were recorded on habitats within 500m of the Proposed Wind Farm site, **an assessment of direct habitat loss is required.** Birds were regularly recorded in flight within the Proposed Wind Farm site, therefore the potential for displacement exists. **An assessment of displacement effects is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
		Breeding No population of ecological significance recorded	Golden plover was recorded infrequently and in low numbers during the breeding season, with no observations within the Proposed Wind Farm site. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species during the breeding season. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Hen Harrier	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	The only observations of hen harrier within 500m of the Proposed Wind Farm site during the winter season comprised two occurrences of a single bird travelling. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
		Breeding No population of ecological significance recorded	There was only a single record of hen harrier within 500m of the Proposed Wind Farm site during the two breeding seasons surveyed. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Peregrine	Annex I, EU Birds Directive & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	There was only a single record of peregrine within 500m of the Proposed Wind Farm site during the two years of surveys, comprising a bird travelling. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Kestrel	BoCCI Red Listed (Breeding Populations) &	**All Seasons** County Importance	There were no kestrel territories identified within the Proposed Wind Farm site. However, up to three territories were observed within the area of the Proposed Wind Farm site and kestrel were regularly recorded hunting within the Proposed Wind Farm site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
	Irish Wildlife Act.		This species was regularly recorded within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	
Lapwing	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	There were no observations of lapwing within 500m of the Proposed Wind Farm site over the two winters surveyed. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No population of ecological significance was recorded. No pathways for significant effects were identified**	**No**
		Breeding No population of ecological significance recorded	There were no records of this species utilising habitats within the Proposed Wind Farm site. All observations comprised birds in flight travelling or circling. As such, there is limited potential for impacts relating to habitat loss within the Proposed Wind Farm site. There were only three records of lapwing within 500m of the Proposed Wind Farm site during the two breeding seasons surveys, comprising two observations of two birds within a few minutes of each other and a flock of 12 birds, both travelling. As such, there is limited potential for impacts relating to displacement within the Proposed Wind Farm site. No significant collision risk is predicted based on infrequency of observations. **No population of ecological significance was recorded. No pathways for significant effects were identified.**	**No**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Snipe	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act.	**Wintering** County Importance	Snipe was regularly recorded within the Proposed Wind Farm site during the winter season. **An assessment of direct habitat loss is required.** This species was regularly recorded within the Proposed Wind Farm site during the winter season. **An assessment of displacement effect is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone during the winter season. **A collision risk assessment is required.**	**Yes**
		Breeding No population of ecological significance recorded	There were no observations of snipe during the breeding season, with records from early April considered to be part of wintering population and considered above. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species during the breeding season. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Woodcock	BoCCI Red Listed (Breeding Populations)	**Breeding** County Importance	There were a minimum of three breeding territories identified on, or within 500m of, the Proposed Wind Farm site between the 2020 and 2021 breeding seasons. **An assessment of direct habitat loss is required.** This species was recorded within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Buzzard	BoCCI Green List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	There was one probable breeding territory identified within the Proposed Wind Farm site and an additional four territories identified in the surrounding area. Buzzard were regularly recorded hunting within the Proposed Wind Farm site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was regularly recorded hunting within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was regularly recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Long-eared Owl	BoCCI Green List & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	Long-eared owl was not recorded within 500m of the Proposed Wind Farm site. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of significance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Sparrowhawk	BoCCI Green List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	There was one probable breeding territory identified within the Proposed Wind Farm site and an additional four to five territories identified in the surrounding area. Sparrowhawk were regularly recorded hunting within the Proposed Wind Farm site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was regularly recorded hunting within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
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 bird species are not significantly impacted by wind farms due to their ecology. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. Furthermore, commercial forestry, the dominant habitat within the Proposed Wind Farm site, is of limited ecological value to the red-listed passerine species recorded in the locality during surveys, i.e. grey wagtail, meadow pipit, redwing and swift.	**No**

7.4.3 Key Ornithological Receptor Sensitivity Determination

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

Medium Sensitivity KORs include:

- Golden Plover (Annex I; EU Birds Directive)
- Kestrel (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)
- Woodcock (BoCCI Red Listed)

The remaining KORs identified were classified as Low Sensitivity:

- Buzzard
- Sparrowhawk

7.5 Potential Effects

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

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

7.5.1 Do-Nothing Effect

If the Proposed Project for which this EIAR has been prepared was not to proceed, the site would continue to be managed under the various current management practices. The site is characterised by commercial forestry plantations and improved agricultural grassland utilised for livestock grazing. It is reasonable to assume that the character of the bird community, including the KORs identified, will remain much as it is described in the baseline ornithological conditions.

7.5.2 Effects on Key Ornithological Receptors during Construction and Operation

The following sections describe potential effects on KORs that may occur during the construction and operation of the Proposed Wind Farm. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022) criteria.

7.5.2.1 Golden Plover (Wintering)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Golden plover was only recorded utilising habitats within the Proposed Wind Farm site on one occasion over the two years of bird surveys, comprising a flock of 84 birds observed possibly landing in field at boundary of the Proposed Wind Farm site in April 2021. The Proposed Wind Farm site is therefore not an important foraging or roosting habitat for golden and the potential for construction works to result in ecologically significant habitat loss for golden plover is limited. The land lost to the Proposed Project development footprint is small, comprising a total of 7.3 hectares (ha) (or 2%) of the overall site (370 ha). In addition, the majority of habitat within the Proposed Project development footprint comprises commercial forestry which is a habitat that is not utilised by golden plover. Furthermore, suitable habitat is abundant in the wider surroundings of the Proposed Wind Farm site, i.e. agricultural grassland. No significant effects are predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	Golden plover was only recorded utilising habitats within the Proposed Wind Farm site on one occasion over the two years of bird surveys, comprising a flock of 84 birds observed possibly landing in field at boundary of the Proposed Wind Farm site is April 2021.	The magnitude of the effect is assessed as *Negligible*.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	There were seven records of birds utilising habitats within 500m of the Proposed Wind Farm site (flocks of 2, 3, 6, 6, 7 & 350 birds). These observations were from two days, in October 2020 and April 2021. Six of the observations were from the same two adjoining agricultural fields 100-500m east the Proposed Wind Farm site (flocks of 2 to 7 birds), and the remaining observation comprised a flock of 350 birds approximately 100m west of the Proposed Wind Farm site. The activity recorded, comprising usage of habitat within 500m of the Proposed Wind Farm site on only two days over the full two years of surveying, does not represent regular usage nor does it demonstrate any dependency on the habitats within 500m of the Proposed Wind Farm site. As such, there is limited potential for construction works to result in ecologically significant disturbance for golden plover. In addition, the closest area of construction works to these locations are situated over 250m distant and are separated by existing hedgerows and/or areas of mature forestry. No significant effects are predicted.	The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	As detailed above, golden plover was only recorded utilising habitats within the Proposed Wind Farm site on one occasion over the two years of bird surveys, in addition to a further seven records of birds utilising habitats within 500m of the Proposed Wind Farm site. The activity recorded, comprising usage of habitat within 500m of the Proposed Wind Farm site on only two days over the full two years of surveying, does not represent regular usage nor does it demonstrate any	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* 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 Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	dependency on the habitats within 500m of the Proposed Wind Farm site. As such, there is limited potential for displacement effects to golden plover. In addition, the results of waterbird distribution surveys in the surrounding area of the Proposed Wind Farm site demonstrate that the habitats regularly utilised by golden plover in the local area are outside of the Proposed Wind Farm site and a minimum of 1.8km distant. No significant effects are predicted.		
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). A key factor in calculating the predicted rate of collisions for a given species is the application of an avoidance rate. The avoidance rate accounts for the ability of a bird to take evasive action to avoid a collision with a turbine. Where species-specific avoidance rates are available these rates are usually very high, e.g. all swan species have been shown to avoid colliding with operating turbines 99.8% of the time. Until recently a species-specific avoidance rate has not been available for golden plover. A review of golden plover collision avoidance from four UK wind farms has been undertaken and is outlined in Appendix 7-5. The output of this new research was a golden plover avoidance rate of 99.6 to 99.8%. This avoidance rate was used in the collision risk analysis. Note: The level of golden plover activity recorded during surveys varied considerably between the two winters surveyed. The vast majority of golden plover records from all surveys were during the 2020/2021 winter season (c.87%), with only a handful of records from the 2021/2022 winter season. A review of bird survey data from other local developments indicates that the large numbers recorded during the 2020/21 winter was an aberration, e.g. the	The magnitude of the effect is assessed as *Medium*. The cross tablature of a *Medium* sensitivity species and *Medium* impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	species was infrequently recorded at White Hills Wind Farm (within 2km) in the 2019/20 winter. Please see Section 7.9 for further details. The collision risk has been calculated at a rate of 42.978 (99.8% avoidance)–85.956 (99.6% avoidance) collisions per year. Annual mortality of adult golden plover has been calculated at 27% per annum (Sandercock, 2003). If 42.978 – 85.956 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[13] (i.e. 1,215 birds (please see Section 7.4.1 for further details)) by 13.10% - 26.20%. However, no significant effects are predicted as this collision risk is likely an over-estimate based on the following rationale: › The predicted collision risk is likely inflated due to the aberrant increase in activity recorded during the 2020/21 winter season, i.e. *c.* 87% of records were from this winter and *c.* 59% of all records were from a two-day period in October and November 2020. Please see Section 7.10.2.1 for further details. › The habitats of the site (predominantly forestry) are unsuitable for this species and would not be expected to attract birds to the site. › As discussed in Section 7.4.1, the county population number utilised for the mortality calculation is highly likely to be a considerable under-estimate of the actual wintering county population. The county population was calculated partly using data from surveys of terrestrial habitat within a 5km radius of the Proposed Wind Farm site. The population figure from this area was over 600 birds. The addition of birds from all remaining terrestrial habitats within a 25km radius, which have not been included in the calculation, would give a much larger county population figure.		

[13] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a mobile and widespread species (as per the Bird Atlas 2009-11) that utilises a widespread habitat type (agricultural grassland), it is, therefore, unlikely to be a distinct local population and reasonable to conclude that there is some exchange of individuals in suitable habitat within a 25km radius. As outlined in Section 7.3, a 25km radius has been used as a proxy for a county given the location of the Proposed Wind Farm site on the border of several counties.*

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	› The majority of the I-WeBS sites within 25km of the Proposed Wind Farm site have no available data (see Section 7.3.4), and golden plover which may occur at these sites have therefore not been included in the county population estimate. Notwithstanding the above, in line with best practice and following a precautionary approach, a comprehensive programme of operational phase surveys is proposed in the EIAR. 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 if required.		

7.5.2.2 Kestrel (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There were no kestrel breeding territories recorded within the Proposed Wind Farm site. There were up to three breeding territories identified across the two breeding seasons during surveys. These were situated between 3.5km – 5.5km from the Proposed Wind Farm site. There will be minimal loss of suitable breeding habitat, given the extent of suitable woodland habitat greater than 500m from the Proposed Wind Farm. Kestrel were regularly recorded foraging within the Proposed Wind Farm site. However, direct (physical) loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the Proposed Project development footprint is small, comprising a total of 7.3ha (or 2%) of the overall site (370 ha) In addition, the results of breeding raptor surveys and supplementary surveys outside of the Proposed Wind Farm site recorded similar levels of kestrel activity across areas of similar habitat, i.e. agricultural grassland and commercial forestry, which are the abundant habitat types in the surrounding area. The Proposed Wind Farm site is therefore not a unique or scarce resource for kestrel and the potential for construction works to result in ecologically significant habitat loss for kestrel is therefore limited. Substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed 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 *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	As outlined above, there were up to three breeding territories identified, situated between 3.5km – 5.5km from the Proposed Wind Farm site.	The magnitude of the effect is assessed as *Low*.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	A disturbance buffer zone of between 100-200m from construction works is recommended for kestrel during the breeding season, and <50m during non-breeding season (Goodship & Furness, 2022). The identified breeding territories are significantly beyond these distances from the Proposed Wind Farm site and any construction works. While kestrel were recorded foraging within the Proposed Wind Farm site, the site does not contain habitats that are unique or rare in the local area. The results of breeding raptor surveys and supplementary surveys outside of the Proposed Wind Farm site recorded similar levels of kestrel activity across areas of similar habitat, i.e. agricultural grassland and commercial forestry, which are the abundant habitat types in the surrounding area. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local kestrel population. Significant impacts are not predicted.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Raptor studies have generally found only low levels of turbine avoidance (Hötker et al. 2006; Madders & Whitfield 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins et.al 2009). Moreover, significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. Onsite habitats are not considered unique to the Proposed 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 *Medium* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 1.603 collisions per year. Annual mortality of adult kestrel has been calculated 31% per annum (Village, 1990). If 1.603 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[14] (i.e. 519 birds (please see Section 7.4.1 for further details)) by 0.99%. The predicted collision risk is therefore negligible as per Percival (2003).	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 **Not Significant** Negative Effect

[14] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a mobile and widespread species (as per the Bird Atlas 2009-11) that utilises widespread habitat types (agricultural grassland, commercial forestry), it is, therefore, unlikely to be a distinct local population and reasonable to conclude that there is some exchange of individuals in suitable habitat within a 25km radius. As outlined in Section 7.3, a 25km radius has been used as a proxy for a county given the location of the Proposed Wind Farm site on the border of several counties.*

7.5.2.3 Snipe (Wintering)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Snipe was recorded within the Proposed Wind Farm site on 14 occasions over the two years of surveying. The majority of these observations comprised birds in flight travelling. There were 6 observations of snipe utilising habitats within the Proposed Wind Farm site (comprising birds seen taking off, landing and flushed from ground). Five of these observations were of single birds and one observation was of five birds. These utilised habitats comprised areas of recently felled and newly planted forestry. These habitats are abundant in the wider area and are not unique to the Proposed Wind Farm site. In addition, the land lost to the permanent development footprint is small, comprising a total of 7.3ha (or 2%) of the overall site (370 ha). No significant effects are predicted.	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 **Not Significant** Negative Effect
Disturbance	Snipe was only recorded utilising habitats within the Proposed Wind Farm site on six occasions over the two years of bird surveys. There were nine records of birds utilising habitats within 500m of the Proposed Wind Farm site (between 1-2 birds). These observations were from agricultural grassland between 200-500m east of the Proposed Wind Farm site. The closest area of construction works to this area are situated over 400m away and are separated by existing hedgerows and/or areas of mature forestry. Incidental records from hen harrier roost surveys and supplementary surveys distant from the Proposed Wind Farm site recorded similar levels of snipe activity across areas of similar habitat, i.e. agricultural grassland and commercial forestry, which are the abundant habitat types in the surrounding	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	area. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local snipe population. Significant impacts are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Snipe was only recorded utilising habitats within the Proposed Wind Farm site on six occasions over the two years of bird surveys, with an additional nine records of birds utilising habitats within 500m of the Proposed Wind Farm site. Pearce-Higgins et. al (2009), found that breeding snipe showed significant avoidance of turbines extending to a distance of 400m, with breeding density reduced by up to 50% within this area (Pearce-Higgins et. al 2009). There is also evidence of avoidance of access tracks. The above study relates to breeding snipe. Breeding activity was not recorded for snipe within the Proposed Wind Farm site or within 500m of the Proposed Wind Farm site. Wintering non-breeding birds are assumed to be at less risk of disturbance effects, as they are not tied to a fixed location (i.e. nest site) and are therefore less restricted in their selection of habitats. The habitats within the Proposed Wind Farm site and a 500m radius comprise commercial forestry and agricultural grassland. These are the abundant habitat types in the surrounding landscape and are not unique to the Proposed Wind Farm site. Significant displacement is not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6).	The magnitude of the effect is assessed as *Negligible*.	Long-term **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	The collision risk has been calculated at a rate of 0.188 collisions per year. Annual mortality of adult snipe has been calculated 37.5% per annum (Spence, 1988). If 0.188 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[15] (i.e. 328 birds (please see Section 7.4.1 for further details)) by 0.15%. The predicted collision risk is therefore of negligible as per Percival (2003).	The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a **Very Low** effect significance.	

[15] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a mobile and widespread species (as per the Bird Atlas 2009-11) that utilises a widespread habitat type (agricultural grassland, commercial forestry), it is, therefore, unlikely to be a distinct local population and reasonable to conclude that there is some exchange of individuals in suitable habitat within a 25km radius. As outlined in Section 7.3, a 25km radius has been used as a proxy for a county given the location of the Proposed Wind Farm site on the border of several counties.*

7.5.2.4 Woodcock (Breeding)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was regularly recorded during the breeding seasons at the Proposed Wind Farm site. Roding male woodcock were frequently recorded during dedicated woodcock surveys, indicating a minimum a minimum of three breeding territories within the Proposed Wind Farm site. Sections of the site are dominated by commercial forestry which provides suitable breeding habitat for woodcock. Some of these areas with identified breeding territories overlap with the Proposed Project development footprint. However, direct loss of breeding habitat relative to its availability onsite, will be minimal. The land lost to the Proposed Project development footprint is small, comprising a total of 7.3ha (or 2%) of the overall site (370 ha). In addition, any potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Proposed Wind Farm site nor rare locally and extensive areas of suitable foraging and nesting habitat will remain post construction. Supplementary breeding woodcock surveys undertaken distant from the Proposed Wind Farm site in similar habitat (i.e. commercial forestry and agricultural grassland) recorded similar levels of breeding woodcock activity. 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	There were a minimum of three breeding territories identified within 500m of the Proposed Wind Farm site. Sections of the site are dominated by commercial forestry which provides suitable breeding habitat for woodcock. Some of these areas with identified breeding territories overlap with the Proposed Project development footprint and therefore construction works.	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

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	The construction of the Proposed Wind Farm site will result in a measurable reduction in the breeding habitat onsite/around the margins of the Proposed Wind Farm site. However, construction works will be within a small footprint relative to the total area within the Proposed Wind Farm site. In addition, any potential impact will not result in the loss of a scarce resource given these habitats are not unique to the Proposed Wind Farm site nor rare locally and extensive areas of suitable foraging and nesting habitat will remain post construction. Supplementary breeding woodcock surveys undertaken distant from the Proposed Wind Farm site in similar habitat (i.e. commercial forestry and agricultural grassland) recorded similar levels of breeding woodcock activity. Considering the above, no significant disturbance effect is predicted.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	There is no published research on displacement/avoidance buffers for woodcock around operational wind infrastructure. The breeding habitats on-site (i.e. commercial forestry) are not unique to the Proposed Wind Farm site nor rare locally and extensive areas of suitable foraging and nesting habitat exists beyond 500m from the Proposed Wind Farm turbine layout. Considering the above, no significant displacement effects are predicted.	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 **Slight** Negative Effect
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6).	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and	Long-term **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	The collision risk has been calculated at a rate of 0.033 collisions per year. A single bird collision has been predicted over the 35-year lifetime of the Proposed Wind Farm. The predicted collision risk is therefore of negligible as per Percival (2003).	*Negligible* impact corresponds to a **Very Low** effect significance.	

7.5.2.5 Buzzard (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There was one buzzard breeding territory identified within the Proposed Wind Farm site during the 2021 breeding season. This breeding territory does not overlap with any Proposed Project infrastructure (approximately 300m from nearest turbine – T06). This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. The construction of the Proposed Wind Farm will not result in the loss of a significant amount of foraging habitat given the development footprint is small, comprising a total of 7.3ha (or 2%) of the overall site (370 ha). In addition, the majority of suitable nesting habitat (e.g. mature forestry and treelines) are outside the Proposed Project development footprint and there will be no significant reduction in these habitats. Significant impacts are not predicted.	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	There was one buzzard breeding territory identified within the Proposed Wind Farm site during the 2021 breeding season. This breeding territory does not overlap with any Proposed Project infrastructure (approximately 300m from the nearest turbine – T06).	The magnitude of the effect is assessed as *Medium*.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. The disturbance associated with construction works has the potential to result in a measurable reduction in the breeding density of buzzard on-site and a reduction in the amount of available foraging habitat around the construction works areas. However, these lands (e.g., commercial forestry and agricultural grassland) are not considered unique to the Proposed Wind Farm site or rare in the wider surroundings. Results of breeding raptor surveys show the highest density of buzzard breeding territories in the locality are outside of the Proposed Wind Farm site, with four breeding territories identified 2.5 – 4.5km south of the Proposed Wind Farm site during the 2020 and 2021 breeding seasons. Significant displacement effects are not predicted at the county, national or international scale.	The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. There was one buzzard breeding territory identified within the Proposed Wind Farm site during the 2021 breeding season. Pearce-Higgins (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. There was one breeding territory identified within 500m of the Proposed Wind Farm turbine layout (300m to nearest turbine – T06). Extensive areas of suitable foraging and breeding habitat exist and will remain in the wider area (i.e. outside 500m from the Proposed Wind Farm turbine layout).	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

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	Additionally, buzzard were regularly recorded within 500m of the Proposed Wind Farm turbine layout. There will be a measurable reduction in the frequency of commuting and foraging buzzard within 500m of the Proposed Wind Farm turbine layout. However, onsite habitats are not considered unique to the Proposed Wind Farm site and suitable habitat is abundant for this species greater than 500m from the Proposed Wind Farm turbine layout within the Proposed Wind Farm site and its surroundings. Results of breeding raptor surveys show the highest density of buzzard breeding territories in the locality are outside of the Proposed Wind Farm site, with four breeding territories identified 2.5 – 4.5km south of the Proposed Wind Farm site during the 2020 and 2021 breeding seasons. Significant displacement effects are not predicted at the county, national or international scale.		
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 1.626 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 1.626 birds per year from the local population of a Green-listed (BoCCI) species is considered to be 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

7.5.2.6 Sparrowhawk (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. The construction of the Proposed Wind Farm will not result in the loss of a significant amount of foraging habitat given the Proposed Project development footprint is small comprising a total of 7.3ha (or 2%) of the overall site (370 ha). There was one probable breeding territory identified within the Proposed Wind Farm site in 2021. This probable territory does not overlap with any Proposed Wind Farm turbine locations. There is potential for the loss of nesting habitat within the Proposed Wind Farm site. However, these lands (e.g. commercial forestry) are not considered unique to the Proposed 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 *Low.* 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 within the Proposed Wind Farm site. Construction activity adjacent to the probable nest site within the Proposed Wind Farm site could potentially cause disturbance of breeding and foraging sparrowhawk. The disturbance associated with construction works has the potential to result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Proposed Wind Farm site. However, these lands (e.g., commercial forestry and agricultural grassland) are not considered unique to the Proposed Wind Farm site or rare in the wider surroundings. Breeding sparrowhawk territories were recorded in similar habitats distant form the Proposed Wind Farm site during breeding raptor and supplementary surveys.	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

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	Significant population level disturbance effects are not predicted at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	As previously discussed, the Proposed 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 Proposed Wind Farm turbine locations as with other raptors (Pearce-Higgins et al., 2009). There was one probable breeding territory identified within the Proposed Wind Farm site in 2021. The disturbance associated with operational turbines has the potential result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Proposed Wind Farm site. Notwithstanding this, extensive areas of suitable foraging habitat exist and will remain in the wider area (i.e. outside 500m from the Proposed Wind Farm turbine layout). Moreover, onsite habitats are not considered unique to the Proposed Wind Farm site with significant areas of similar habitats available in the surrounding area. 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 Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6).	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Low* sensitivity species and *Negligible*	Long-term **Imperceptible** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	The collision risk has been calculated at a rate of 0.335 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 0.335 birds per year from the local population of a Green-listed (BoCCI) species is considered of low significance.	Impact corresponds to a **Very Low** effect significance.	

7.5.3 Effects on Key Ornithological Receptors during Decommissioning

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

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

7.5.4 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 the Natura Impact Statement and its appendices. The measures ensure that the construction and operation of the Proposed Project does not adversely affect the integrity of European sites.

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

7.5.5 Effect Associated with the Proposed Grid Connection Route and Turbine Delivery Route

The Proposed Grid Connection Route will commence from the proposed onsite 38kV substation and will run along the existing public roads network via a 38kV underground electrical cable connection to the existing 110kV Kilkenny substation, in the townland of Scart near Kilkenny, Co. Kilkenny. Required works are minor and are predominantly located within the existing road corridor (0.1km of the route is located within agricultural lands where it accesses the proposed onsite 38kV substation). Full details in Chapter 4 of this EIAR and Appendix 4-7.

Some minor accommodation works are located at several locations along the turbine delivery route (TDR) (detailed in Chapter 4) including the following:

- The junction between the N78 and the L1834 will require the construction of a new temporary link road to facilitate the delivery of the turbine components; and,
- Permanent carriageway strengthening works are required at the Black Bridge, where the L1835/L3037 crosses the River Dinin

The majority of habitats along both the Proposed Grid Connection Route and TDR are of low ecological value (i.e. existing roads/tracks, agricultural land) and do not have the potential to support species of conservation interest in the area. On a precautionary basis, it is assumed that some temporary disturbance may occur during construction works. However, given the extent of suitable habitat in the wider area; significant displacement effects are not predicted. The TDR does not have the potential to result in any significant habitat loss or displacement of any KOR species. No significant effects are predicted.

As per Percival (2003) the magnitude of the effect on KOR is assessed as **Negligible**. The cross tablature of a **Medium** sensitivity species (e.g. golden plover, kestrel, lapwing, snipe and woodcock - the highest sensitivity species identified as a KOR at the Proposed Project site) and **Negligible** impact corresponds to a **Very Low Effect Significance**. The significance of the potential impact is classed as a **Short-term Not Significant Negative** effect following EPA criteria (2022). As no further works are proposed following construction, no significant effects are predicted during the operational phase.

7.6 Mitigation and Best Practice Measures

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

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

7.6.1 Mitigation by Design

The layout of the Proposed Project has been designed following the basic principles outlined below to avoid the potential for significant effects on avian receptors:

- Hard standing areas have been designed to the minimum size necessary to accommodate the Proposed Project, whilst also assuming the precautionary scenario of the turbine model with the largest potential footprint.
- The Proposed Grid Connection Route has been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.

7.6.2 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 Project.

7.6.2.1 Construction Phase

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

- Works will commence outside the bird nesting season (1st of March to 31st of August inclusive) if possible. Any requirement for construction works to commence or run into the breeding season following commencement will be informed by pre-construction bird surveys.
- The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022.
    - A Biodiversity and Management Enhancement Plan (BMEP) has been prepared for and is Appendix 6-4 to this EIAR.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. Please see Chapter 12: Noise and Vibration for more detail associated with noise during the construction phase.
- Silt fences will be installed as an additional water protection measure around existing watercourses.
- An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include:
    - Organise the undertaking of a pre-construction walkover bird survey to ensure that significant effects on birds will be avoided.
    - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Wind Farm site.
    - Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise.

- Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.
- Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary.

- If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.6.2.2 Operational Phase

No significant operational phase impacts requiring mitigation were identified.

7.6.2.3 Decommissioning Phase

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

7.7 Sharing Ecological Data

As a measure to support conservation research and policy, it is proposed to submit the pre-planning survey data and information to the National Biodiversity Data Centre (NBDC) and to BirdWatch Ireland to contribute to the upcoming bird atlas (2027) on relevant ecological records, for example, information on the location of breeding territories and nest sites of bird species of conservation concern. The submission of the data will follow relevant standards and will be provided in the preferred NBDC excel template. This measure will be fulfilled within the first year of the construction phase in the event of a successful application.

7.8 Monitoring

The following monitoring measures are proposed as industry best practice rather than in response to any identified impacts associated with the Proposed Project.

7.8.1 Pre-Construction

Pre-construction surveys will be undertaken prior to the initiation of works at the Proposed Wind Farm. The survey will include a thorough walkover survey to a 500m radius of the Proposed Project footprint and all works areas, where access allows. If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If it is found to be active during the construction phase, no works shall be undertaken within a disturbance buffer in line with industry best practice (e.g. Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.8.2 Post-Construction

A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project (please refer to Appendix 7-6 for further details). The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the Proposed Project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 and 15

of the lifetime of the Proposed Wind Farm. Monitoring measures are broadly based on guidelines issued by NatureScot (2009, 2017). The following individual components are proposed:

- Vantage point surveys to monitor flight activity in the vicinity of Proposed Wind Farm turbines;
- Breeding walkover surveys to monitor breeding bird activity at the Proposed Wind Farm site;
- Collision monitoring, including carcass searches with trained dogs to monitor bird fatalities due to collision. These will include searcher efficiency and scavenger removal trails as a best practice measure.

7.8.3 Decommissioning

Decommissioning monitoring surveys will be undertaken prior to works associated with decommissioning at the wind farm. The survey will include a thorough walkover survey to a 500m radius of the Proposed Project footprint and all works areas, where access allows. If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the decommissioning phase. If it is found to be active during the decommissioning phase, no works shall be undertaken within a disturbance buffer (Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022) in line with industry best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.9 Residual Effects

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

- Golden Plover (wintering)
- Kestrel (all seasons)
- Snipe (wintering)
- Woodcock (breeding)
- Buzzard (all seasons)
- Sparrowhawk (all seasons)

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

7.10 Cumulative Effects

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

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

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

7.10.1 Other Plans and Projects

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

7.10.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Carlow County Development Plan 2022-2028
- Kilkenny City and County Development Plan 2021
- Laois County Development Plan 2021-2027
- National Biodiversity Action Plan 2023-2030

7.10.1.2 Projects Considered in the Cumulative Impact Assessment

NatureScot guidance (SNH, 2012; 2018) was consulted while undertaking the cumulative assessment. SNH (2012; 2018) emphasises that its priority is to 'maintain the conservation status of the species population at the national level.' However, it is acknowledged that consideration should also be allowed for impacts at the regional level 'where regional impacts have national implications (for example where a specific region holds the majority of the national population)'. 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 Proposed Wind Farm site was considered a reasonable approximation of the size of a county and a 5km radius of the Proposed Wind Farm site was considered a reasonable approximation for the local level.

To conduct the cumulative impact assessment, county council online planning registers, relevant EIAR (or EIS) documents, planning application details and planning drawings in the vicinity of the Proposed 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.

7.10.1.2.1 *Forestry and Agricultural Practices*

The wider surroundings of the Proposed Wind Farm primarily consist of land managed for agriculture in the form of livestock grazing and commercial conifer plantations, both of low ecological value. The forestry works (felling/planting) associated with the forestry in the wider surroundings of the Proposed Wind Farm will be subject to relevant licencing and guidance from the Forestry Service.

These land-uses have been taken into account in this cumulative assessment.

7.10.1.2.2 *Other Developments*

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

7.10.1.2.3 *Other Wind Farm Developments*

Existing and permitted wind farm projects within 25km of the Proposed Wind Farm are provided in Table 7-12, including details of their planning status. A total of 16 existing turbines were identified for consideration. The environmental impacts of each permitted or existing wind farm are outlined in detail in this section.

Table 7-12 Existing and permitted wind farms within 25km of the Proposed Wind Farm site.

Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)	County
Bilboa Wind Farm	Permitted	5	c.1.3km	Co. Carlow & Co. Kilkenny
White Hills Wind Farm	Permitted	7	c.2.1km	Co. Carlow & Co. Kilkenny
Gortahile Wind Farm	Existing	8	c.3.1km	Co. Laois
Coolglass Wind Farm	Proposed	6	c.15.6km	Co. Laois
Pinewood Wind Farm	Conditional	11	c.16.6km	Co. Laois
Greenoge Wind Farm	Existing	4	c.24.6km	Co. Carlow
Lisdowney Wind Farm	Existing	4	c.24.9km	Co. Kilkenny
Freneystown Wind Farm	*Pre-planning*	*8*	*c.8.3km*	*Co. Kilkenny*

Permitted Bilboa Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted Bilboa Wind Farm was considered. The EIAR[16] for permitted Bilboa Wind Farm was consulted. Permitted Bilboa Wind Farm shared the following key ornithological receptors with the Proposed Wind Farm: golden plover, 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 of low significance for golden plover and of very low significance for kestrel, snipe, woodcock, buzzard and sparrowhawk. Disturbance/displacement was assessed to be of high significance for kestrel, low significance for golden plover, woodcock and sparrowhawk and of very low significance for snipe and buzzard. Barrier effect was assessed to be of low significance for golden plover, kestrel, snipe, woodcock and sparrowhawk and of very low significance for buzzard.

The cumulative assessment for the permitted Bilboa Wind Farm assessed the in-combination collision risk and the in-combination barrier effect of the Proposed Wind Farm when wind farms within 20km were taken into consideration. It was concluded that given the distances of these wind farms from the permitted Bilboa Wind Farm, the low predicted collision rates, and the lack of migration highways in the area, any in-combination collision risk on KORs was assessed as negligible. The in-combination barrier effect was assessed as long-term imperceptible.

[16] https://www.eplanning.ie/CarlowCC/AppFileRefDetails/22340/0

Permitted White Hill Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted White Hill Wind Farm was considered. The EIAR[17] for White Hill Wind Farm was consulted. The permitted White Hill Wind Farm assessed the following species which are shared as key ornithological receptors with the Proposed Wind Farm: golden plover, kestrel, snipe, buzzard and sparrowhawk. 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. Disturbance/displacement and barrier effect were assessed to be not significant for all species apart from golden plover which was assessed as a potential slight negative effect.

The cumulative assessment for the permitted White Hill Wind Farm assessed the in-combination collision risk and the in-combination barrier effect of the Proposed Wind Farm when wind farms within 15km were taken into consideration and concluded no likelihood for cumulative collision risk or cumulative barrier effect on birds.

Existing Gortahile Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Gortahile Wind Farm was considered. The EIS[18] for Gortahile Wind Farm was consulted. There is very limited information on birds available in the EIS, with a mention of snipe and kestrel occurring at the site. The existing Gortahile Wind Farm is situated within agricultural grassland, commercial forestry and some areas of heath. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Gortahile Wind Farm, i.e. golden plover, kestrel, snipe, woodcock, buzzard and sparrowhawk.

Permitted Coolglass Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted Coolglass Hills Wind Farm was considered. The EIAR[19] for Coolglass Wind Farm was consulted. The permitted Coolglass Wind Farm assessed the following species which are shared as key ornithological receptors with the Proposed Wind Farm: golden plover, kestrel, snipe and woodcock. This EIAR assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be of low significance for kestrel; of negligible significance for golden plover and snipe and no effect for woodcock. Disturbance/displacement and barrier effect were assessed to be of negligible significance for snipe and woodcock and no effect for golden plover and kestrel.

The cumulative assessment for the permitted Coolglass Wind Farm assessed the in-combination collision risk and the in-combination barrier effect of the Proposed Wind Farm when wind farms within 20km were taken into consideration. It was concluded that it is unlikely that any significant cumulative effects will occur in combination with the Wind Farm.

Permitted Pinewood Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted Pinewood Wind Farm was considered. The EIS[20] for Pinewood Wind Farm was consulted. Pinewood Wind Farm assessed the following species which are shared as key ornithological receptors with the Proposed Wind Farm: kestrel, woodcock and sparrowhawk. This

[17] https://www.eplanning.ie/LaoisCC/AppFileRefDetails/04935/0
[18] https://www.eplanning.ie/LaoisCC/AppFileRefDetails/22507/0
[19] https://coolglasswindfarmsid.ie/
[20] https://www.eplanning.ie/LaoisCC/AppFileRefDetails/22507/0

EIS assessed collision risk and displacement for the operational phase of this development and concluded it highly unlikely that there will be any significant collision or disturbance related effects. A collision risk model was not conducted for this site, however collision risk was assessed as negligible for the three species.

Existing Greenoge Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Greenoge Wind Farm was considered. The planning file[21] was reviewed on the Carlow County Council Planning Register and no information regarding potential effects on birds was available. The existing Greenoge Wind Farm is situated within predominantly commercial forestry and some areas of heath. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Greenoge Wind Farm, i.e. kestrel, snipe, woodcock, buzzard and sparrowhawk.

Existing Lisdowney Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Lisdowney Wind Farm was considered. The EIS[22] for the existing Lisdowney Wind Farm was consulted. The existing Lisdowney Wind Farm assessed the following species which are shared as key ornithological receptors with the Proposed Wind Farm: kestrel, snipe, buzzard and sparrowhawk. The EIS concluded no significant effects on these species due to collisions or disturbance.

Proposed Freneystown Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Freneystown Wind Farm was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. The proposed Freneystown Wind Farm is situated within agricultural grassland with some commercial forestry. As such, there is potential for KOR species of the Proposed Wind Farm to occur at proposed Freneytown Wind Farm, i.e. golden plover, kestrel, snipe, woodcock, buzzard and sparrowhawk.

7.10.2 Assessment of Cumulative Effects

There were seven KORs identified at the Proposed Wind Farm: golden plover, kestrel, snipe, woodcock, buzzard and sparrowhawk. A key consideration in the assessment of the potential for cumulative impacts to result in significant effects on KORs is proximity and whether the projects under consideration all contain suitable habitats for the species in question. For the purposes of this cumulative assessment, the local scale is considered to be a 5km radius of the Proposed Wind Farm site. There is only one existing and two permitted wind farms within 5km of the Proposed Wind Farm; the remaining are greater than 15km distant.

Following SNH (2012) guidance, the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor: National Importance (none); County Importance (golden plover, kestrel, snipe and woodcock); and Local Importance Higher Value (buzzard and sparrowhawk). The assessment of cumulative effects on KORs is provided in Table 7-13 below. In particular, cumulative habitat loss and displacement and collision risk associated with the Proposed Wind Farm operational turbines is assessed. For this reason, it is not considered further.

[21] https://www.eplanning.ie/CarlowCC/AppFileRefDetails/08527/0
[22] https://www.eplanning.ie/KilkennyCC/AppFileRefDetails/12172/0

Table 7-13. Collision risk from wind farms within 25km of the Proposed Wind Farm site[23].

KOR	Permitted Bilboa Wind Farm	Permitted White Hill Wind Farm	Permitted Coolglass Wind Farm	Permitted Pinewood Wind Farm
Golden plover	0.046	*not significant negative*	0.0311	n/a
Kestrel	0.04	*moderate negative*	0.95	*negligible*
Snipe	0.01	n/a	0.43	n/a
Woodcock	n/a	n/a	n/a	*negligible*
Buzzard	0.04	n/a	n/a	n/a
Sparrowhawk	0.01	n/a	n/a	*negligible*

7.10.2.1 Golden Plover

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

The Proposed Wind Farm is sited predominantly in commercial forestry, which is of limited ecological value for golden plover. The permitted Bilboa Wind Farm is located entirely within commercial forestry habitat, the permitted White Hill Wind Farm, existing Gortahile Wind Farm, permitted Coolglass Wind Farm, permitted Pinewood Wind Farm, and existing Lisdowney Wind Farms are located within a mix of commercial forestry and agricultural grassland; and the existing Greenoge Wind Farm is located within a mix of commercial forestry and heath habitat. The agricultural grassland habitat is suitable for foraging and roosting golden plover. These habitats are not a rare resource locally or unique to the Proposed 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 golden plover, significant cumulative impacts are not anticipated.

The cumulative collision risk when including wind farms within 25km of the Proposed Wind Farm is a combined total of 43.06 – 86.03 birds per year (see Table 7-13 above). 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.

It is noted that golden plover activity recorded at the permitted White Hill Wind Farm (situated within 2km of the Proposed Wind Farm site) showed a similar pattern to activity recorded during surveys for the Proposed Wind Farm, i.e. high levels of activity in winter 2020/21 and low levels of activity in winter 2021/22. Surveys were also conducted at the permitted White Hill Wind Farm in winter 2019/20, i.e. the winter previous to surveys completed for the Proposed Wind Farm. Activity during winter 2019/20 was broadly in line with winter 2020/21 and therefore indicates that winter 2020/21 was an anomaly.

"*The pattern of occurrence and abundance of wintering flocks of Golden Plover varied significantly interannually. In the winter of 2019/2020, relatively large flocks of up to 300 no. birds were observed from time to time (10 no. flightlines), although very occasionally occurring over the site. In all, Golden*

[23] *No collision risk assessment information available for Gortahile, Greenoge, Lisdowney or Freneystown Wind Farms.*

Plovers were present on site for a cumulative total of a little over 2-minutes during that winter period. In the following winter (2020/2021), sightings of Golden Plover were far more frequent (53 no. flightlines) and these sightings were highly concentrated in the early and late parts of the winter season. In total, Golden Plovers were recorded on site for a cumulative total of almost 2-hours during the winter VPs. Golden Plovers were observed outside of the wind farm site for a total of almost 8.5-hours during that winter. In strong contrast, in the final winter season [2021/2022] *there were only 5 no. observations of Golden Plover and none of these were of birds within the wind farm site. Golden Plovers were not observed foraging or at rest (i.e. on the ground) within the site.*[24]"

No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius of the Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, 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 (or national or international) scale.

7.10.2.2 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 Wind Farm were considered.

The Proposed Wind Farm is sited predominantly in commercial forestry with some areas of agricultural grassland, habitat types that are predominantly utilized for hunting and/or nesting. The permitted Bilboa Wind Farm is located entirely within commercial forestry habitat, the permitted White Hill Wind Farm, existing Gortahile Wind Farm, permitted Coolglass Wind Farm, permitted Pinewood Wind Farm and the existing Lisdowney Wind Farm are located within a mix of commercial forestry and agricultural grassland; and the existing Greenoge Wind Farm is located within a mix of commercial forestry and heath habitat. These habitats are suitable for foraging and breeding kestrel. However, these (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 overall. Extensive areas of suitable foraging and nesting habitat will remain post construction and suitable habitat is abundant in the surrounding area.

The cumulative collision risk when including wind farms within 25km of the Proposed Wind Farm is a combined total of 2.59 birds per year (see Table 7-13 above). 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 Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, 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, national, or international scale.

7.10.2.3 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 Wind Farm were considered.

[24] *Environmental Impact Assessment Report for permitted White Hills Wind Farm (Chapter 5 page 113).*

The Proposed Wind Farm is sited predominantly in commercial forestry, which is of limited ecological value for snipe. The permitted Bilboa Wind Farm is located entirely within commercial forestry habitat, the permitted White Hill Wind Farm, the existing Gortahile Wind Farm, the permitted Coolglass Wind Farm permitted Pinewood Wind Farm and the existing Lisdowney Wind Farm are located within a mix of commercial forestry and agricultural grassland; and the existing Greenoge Wind Farm is located within a mix of commercial forestry and heath habitat. The agricultural grassland habitat is suitable for foraging and roosting snipe. These habitats are not a rare resource locally or unique to the Proposed 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 snipe, significant cumulative impacts are not anticipated.

The cumulative collision risk when including wind farms within 25km of the Proposed Wind Farm is a combined total of 0.63 birds per year (see Table 7-13). 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 Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, 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 (or national or international) scale.

7.10.2.4 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 Wind Farm were considered.

The permitted Bilboa Wind Farm, the permitted White Hill Wind Farm, the existing Gortahile Wind Farm, the permitted Coolglass Wind Farm, permitted Pinewood Wind Farm the existing Lisdowney Wind Farm and the existing Greenoge Wind Farm 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 the Proposed Wind Farm, significant cumulative impacts are not anticipated.

The collision risk from wind farms within 25km of the Proposed Wind Farm is zero, as such there is no cumulative effect (see Table 7-13 below).

No significant impacts on this species were identified for any of the local wind farms (within 5km). Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius of the Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, 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 (or national or international) scale.

7.10.2.5 Buzzard

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

The Proposed Wind Farm is sited predominantly in commercial forestry with some areas of agricultural grassland, 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 local wind farms (within 5km). However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.

The cumulative collision risk when including wind farms within 25km of the Proposed Wind Farm is a combined total of 1.67 birds per year (see Table 7-13 above). 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). Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, 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 (or county, national or international) scale.

7.10.2.6 Sparrowhawk

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

The Proposed Wind Farm is sited predominantly in commercial forestry with some areas of agricultural grassland, 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 local wind farms (within 5km). However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.

The cumulative collision risk when including wind farms within 25km of the Proposed Wind Farm is a combined total of 0.35 birds per year (see Table 7-13 above). 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). Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

7.11 Conclusion

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