7. BIRDS

7.1 Introduction

This chapter assesses the likely significant impacts of the Umma More Renewable Energy Development (hereafter the "Proposed Development") 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 full description of the Proposed Development is detailed in Chapter 4.

This chapter is supported by Technical Appendices 7-1 to 7-7. Appendix 7-1 lists all bird species recorded during ornithological surveys undertaken at the Wind Farm Site and hinterland, Appendix 7-2 contains all information on survey effort, Appendix 7-3 provides summary results and Appendix 7-4 contains raw data and maps. Technical Appendix 7-5 contains a collision risk assessment of birds with turbines, illustrating how collision risk modelling was undertaken for the Proposed Development. Technical Appendix 7-6 contains a bird monitoring programme. Finally, Technical Appendix 7-7 contains merlin breeding data, which is considered highly sensitive information.

The chapter is structured as follows:

- The Introduction provides a description of the Proposed Development and the relevant legislation, guidance and policy context.
- The Assessment Approach and Methodology section is a comprehensive description of the ornithological surveys and impact assessment methodology used to inform a robust assessment of potential impacts of the Proposed Development on birds.
- The Baseline Ornithological Conditions section describes the existing bird population at the Proposed Development 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 Development: 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 Development if planning permission is granted: pre-construction and construction, operation, and decommissioning.
- The Residual Effects section considers the implications of the proposed mitigation, best practice and monitoring.
- Finally, the Cumulative Effects section considers potential cumulative effects of the Proposed Development 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 Development', 'the Site', 'Wind Farm Site' and 'Grid Connection'. The following other definitions are used in this chapter:

- "Zone of Influence" (ZOI) for individual ornithological receptors refers to the zone 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 Development upon which potential impacts are anticipated and assessed.

7.1.1 Description of the Proposed Development

A full description of the Proposed Development is provided in Chapter 4 of this EIAR. In brief, the applicant is seeking planning permission to construct a renewable energy development which will comprise 9 No. wind turbines and all associated infrastructure in the townland of Umma More, and adjacent townlands in Co. Westmeath (the Wind Farm Site), and a 110kV on-site substation and associated works, including 110kV underground electrical cabling connection to the national grid at Thornsberry 110kV substation in the townland of Derrynagall or Ballydaly, near Tullamore, Co. Offaly (the Grid Connection). Refer to Chapter 4 of the EIAR for a detailed description of the Proposed Development (Wind Farm Site & Grid Connection). The turbines will be 104m at hub height, with 3 blades of a diameter of 162m, giving a maximum rotor height of 185m and minimum rotor height of 23m. The Proposed Development will have an operation life of 30 years from the date of commissioning.

7.1.2 Legislation, Guidance and Policy Context

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

- Irish Wildlife Acts 1976 to 2022. The original Act of 1976 (39/1976) was amended in 2000 (38/2000), 2010 (19/2010) and 2012 (29/2012), as well as in Part 3 of the Heritage Act 2018 (15/2018), Part 2 Chapter 3 of the Planning and Development, Heritage and Broadcasting (Amendment) Act 2021 (11/2021) and in the Flora (Protection) Order 2022 (235/2022).
- 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 Act 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.
- Westmeath County Development Plan 2021-2027.

- Offaly County Development Plan 2021-2027.

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Donnacha Woods (MSc.), Project Ornithologist of MKO and reviewed by Susan Doyle (Ph.D), Senior Ornithologist. Both are suitably qualified ecologists with experience in completing avifaunal assessments and competent experts for the purposes of the preparation of this EIAR. The scope of works and survey methodology was devised by Padraig Cregg (MSc.), Senior Ornithologist, and is fully compliant with recent NatureScot guidance. Field surveys were undertaken by Peter Capsey (BA), John Curtin (BSc.), Niamh Graham, Patrick Manley (BSc.), Eric Dempsey, Jack Kennedy (BSc.), Pádraig Webb (BSc.), Kristina O'Connor (MSc.) and Tom Ryan (BSc.). Surveyors are suitably qualified for the purposes of the preparation of this EIAR.

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

- Designated sites within the likely ZOI of the Proposed Development.
- Bird Atlases.
- Bird sensitivity mapping tool.
- Online web-mappers from the National Biodiversity Data Centre.
- Irish Wetland Bird Survey (IWeBS) data.
- Review of specially requested records from the NPWS Rare and Protected Species Database.
- Hen Harrier Winter Survey records.

7.2.2 Consultation

Consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Chapter 2 of this EIAR. Table 7-1 below provides a list of the organisations consulted with regard to ornithology during the scoping process and notes where scoping responses were received.

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 on 10th August 2021 outlining tree felling requirements. No correspondence relating to birds received.
04	Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media	Response received on 6th August 2021 stating the consultation of developments no longer falls under the remit of the Department. No correspondence relating to birds received.
05	Department of the Environment, Climate and Communications	Response received on 9th August 2021 indicating that, in the event of any observations, a coordinated heritage-related response would be sent via email from the Development Applications Unit

	Consultee	Response
		(DAU). No observations were received from the DAU.
06	Irish Red Grouse Association	No response received
07	Irish Raptor Study Group	No response received
08	Irish Wildlife Trust	Response received on 10th February 2022 indicating organisation does not have the staff to respond to consultation.
09	The Heritage Council	No response received
10	National Parks and Wildlife Service	No response received

7.2.3 Identification of Target Species and Key Ornithological Receptors

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

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

Following analysis of the collated 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

In the absence of specific national bird survey guidelines, ornithological field 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). Field surveys were undertaken during the survey period April 2019 and March 2021, consisting of two breeding seasons (April – September) and two non-breeding seasons (October – March). Based on the results of the desk study, consultation and reconnaissance site visits described in the previous sections (Section 7.2.1-7.2.3), the assemblage of bird species in the Wind Farm Site and hinterland and the likely importance of the Wind Farm Site for these species was ascertained. Then, adopting a precautionary approach, a site-specific scope for ornithological surveys was devised. This survey work forms the core dataset for the assessment of impacts on ornithology. The data provided is robust and allows clear, precise and definitive conclusions to be made on the avian receptors identified within the Wind Farm Site.

The various ornithological surveys undertaken at the Wind Farm Site and hinterland are described in detail below. The proposed Grid Connection underground electrical cabling route was surveyed as part of a multidisciplinary walkover (details in Chapter 6 of this EIAR).

7.2.4.1 Vantage Point Surveys

Vantage point surveys were undertaken in accordance with SNH (2017) from April 2019 to March 2021. These surveys aimed to monitor flight activity on the Wind Farm Site to a 500m radius of the potential turbine positions. Surveys were conducted monthly throughout this period from two fixed point vantage points with comprehensive coverage of the Wind Farm Site (Figure 7-1). The vantage point locations were selected by undertaking a viewshed analysis (described below) and confirmed by a recce visit and initial field surveys to ensure that the proposed turbine layout is entirely covered. Surveys were also undertaken from an additional five supplementary vantage point locations between April and September 2019 (Figure 7-3). Surveys at these vantage point locations was ceased due to a reduction in the extent of the Wind Farm Site.

Viewshed analysis was carried out to inform coverage of the Wind Farm Site from the fixed vantage point location. A 500m buffer was applied to the outermost potential turbines, in line with SNH (2017). Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with Mapinfo Professional (Version 10.0) using a notional layer suspended at the minimum height considered for the Potential Collision Risk Area based on potential turbine models at the time the vantage point locations were selected. The notational layer was suspended at 20m. Note that while the relevance of being able to view as much of the site to ground level is acknowledged, the NatureScot guidance 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.

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. The analysis aims to achieve this using the fewest possible number of vantage points. The vantage point locations were tested for visibility coverage by creating a viewshed point 1.5m in height (to represent the height of observer) on a map using 10m contours terrain data. The relative height of any surrounding forestry and its effects on visibility is also accounted for in the analysis. Using the ZTV software, a viewshed of 360 degrees was produced calculating an area from the height of the notational layer above ground level up to a 2km radius. The resulting viewshed image was then cropped to 180 degrees to give the viewshed, in line with SNH (2017). The visible viewshed is presented in Figure 7-2. The visible viewshed for the additional five supplementary vantage point locations is presented in Figure 7-4.

Data on bird observations and flight activity was collected from a scanning arc of 180° and a 2km radius by an observer at the fixed vantage point locations for two 3-hour watches separated by a minimum 30 minute break (ie. 6 hours total) per month. Surveys were scheduled to provide a spread over the full daylight period, including dawn and dusk watches to coincide with the highest periods of bird activity. Along with target species, the presence of any additional (non-target) species observed was recorded to inform the evaluation of supporting habitat. The survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Table 7-2 below provides a brief summary of the survey effort. Note that data from VP1 and VP3 was used to inform the collision risk assessment and receptor evaluation. Supplementary VP2, VP2a, VP2b, VP4 and VP4a provide additional supporting data.

Table 7-2 Vantage point survey effort

Survey Season	Months	Effort per Vantage Point
2019 Breeding Season (2 VPs and 5 *supplementary VPs*)	Apr - Sep	36 hours at VP1 36 hours at VP3 *18 hours at VP2* *6 hours at VP2a* *6 hours at VP2b*

Survey Season	Months	Effort per Vantage Point
		24 hours at VP4 *6 hours at VP4a*
2019/2020 Non-Breeding Season (2 VPs)	Oct – Mar	36 hours at VP1 36 hours at VP3
2020 Breeding Season (2 VPs)	Apr – Sep	36 hours at VP1 36 hours at VP3
2020/2021 Non-Breeding Season (2 VPs)	Oct - Mar	36 hours at VP1 36 hours at VP3

Each flight observation was assigned a unique identifier when mapped in the field and subsequently digitised using QGIS software. Observed flight activity was recorded as per defined flight bands. Bands were split into 0-10m, 10-25m, 25-175m and >175m. All flight activity within the height bands 10-25m, 25-175m and >175m is considered to be within the Potential Collision Height (PCH) with regard to the proposed turbine swept area.

7.2.4.2 Breeding Walkover Surveys

Breeding walkover surveys were undertaken to determine possible, probable or confirmed breeding bird activity within the Wind Farm Site to a 500m radius. The methodology was based on Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitat, as per SNH (2017) recommendations. Transect routes were walked across different habitat complexes where access allowed. The surveyor regularly scanned with their binoculars the wider surroundings of each transect for target species. Along with target species, the presence of all additional (non-target) species observed were recorded to inform the evaluation of supporting habitat.

Breeding walkover surveys were conducted in daylight hours (08:00-18:00) over three visits during the core breeding season months April to July. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-5 shows the survey area.

7.2.4.3 Winter Walkover Surveys

Winter walkover surveys were undertaken to record the presence of bird species within the Wind Farm Site to a 500m radius. The methodology was adapted from the breeding walkover surveys outlined above. Transect routes were walked across different habitat complexes within the surveyed area where access allowed. Along with target species, the presence of all additional (non-target) species observed were recorded to inform the evaluation of supporting habitat.

Winter walkover surveys were conducted in daylight hours over four visits between October and March (ie. four visits in winter 2019/2020 and four visits in winter 2020/2021). All target species observations were mapped. 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.

7.2.4.4 Breeding Raptor Surveys

Raptors include all harrier, falcon, buzzard, eagle, hawk, owl, kite and osprey species. Breeding raptor surveys were undertaken within the Wind Farm Site and within a 2km radius. Survey methodology followed Hardey *et al.* (2013), as per SNH (2017) recommendations. All raptor species were recorded

during these surveys to identify occupied raptor territories and monitor their breeding success within the surveyed area.

Breeding raptor watches of 3 hours (supplemented by transects if necessary) were conducted at nine raptor vantage point (RVP) locations during daylight hours. Raptor vantage points were surveyed once per month during the core breeding season between April and July. However, due to COVID-19 restrictions, a visit was not conducted in April 2020. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-6 shows the RVPs.

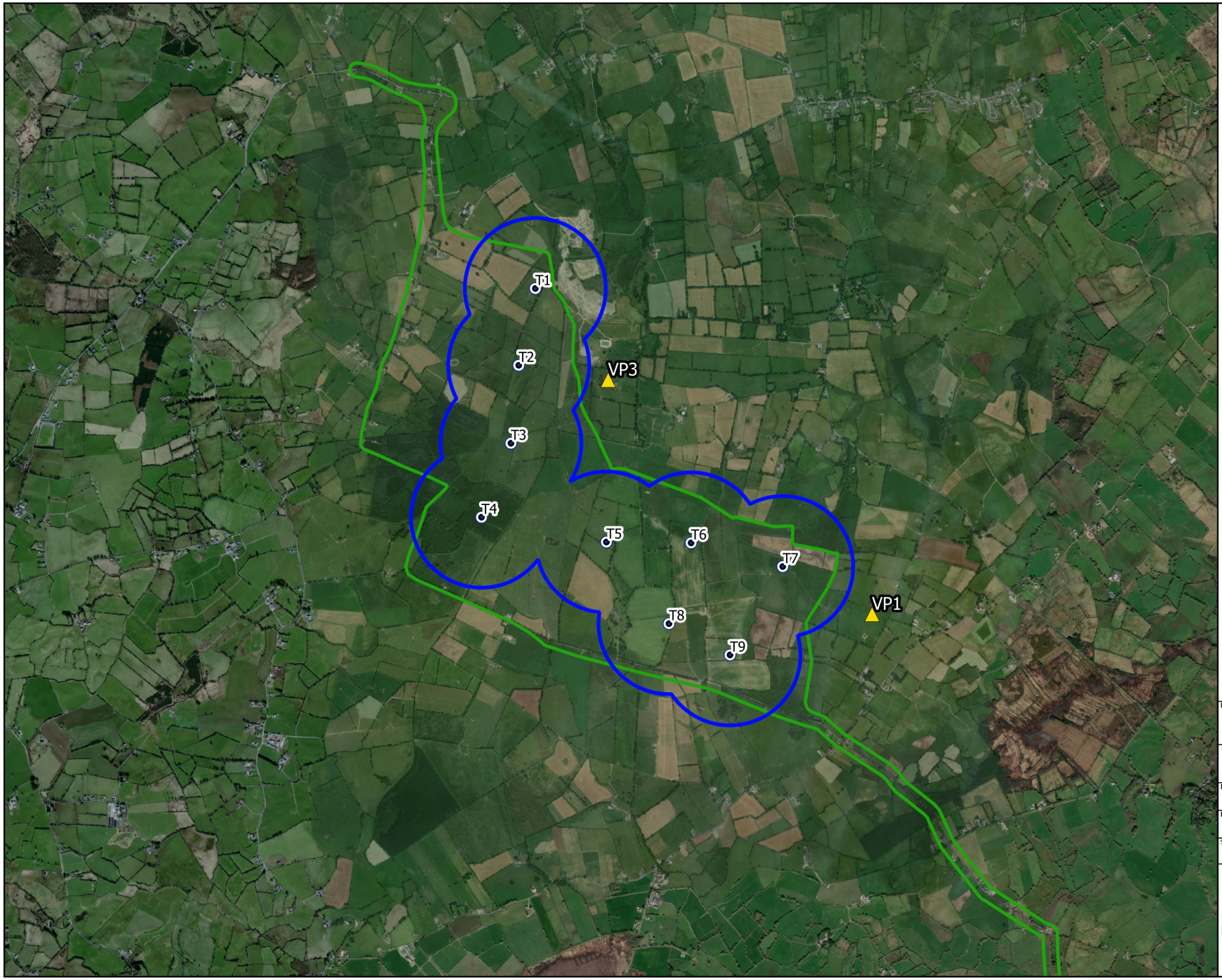
7.2.4.5 Waterbird Distribution Surveys

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 5km of the Wind Farm Site were surveyed for waterbirds during the 2019/2020 and 2020/2021 winter and passage seasons (August to May inclusive). However, due to COVID-19 restrictions, a visit was not conducted in April 2020. The area surveyed exceeds the 500m for foraging waterbirds and 1km for roosting waterbirds requirements of SNH (2017) and follows the recommendations of SNH (2016).

Survey methodology follows Gilbert *et al.* (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021), as recommended by SNH (2017). Surveys were undertaken during daylight hours from suitable vantage points at wetlands and waterbodies. Target waterbird species observed were mapped. Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2. Figure 7-7 shows the surveyed area.

7.2.4.6 Multidisciplinary Walkover Survey

The Grid Connection underground electrical cabling route was surveyed in February and March 2022 through a multidisciplinary walkover survey. The route was systematically walked, while the surveyor recorded a range of protected species, including birds. Further details on this survey are available in the Biodiversity Chapter (Chapter 6 of this EIAR).



Map Legend

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

N

Drawing Title

Vantage Point Locations

Project Title: Umma More Renewable Energy Development	
Drawn By: D. Woods	Checked By: P. Cregg
Project No.: 201050	Drawing No.: Fig. 7-1
Scale: 1:35000	Date: 31.01.23

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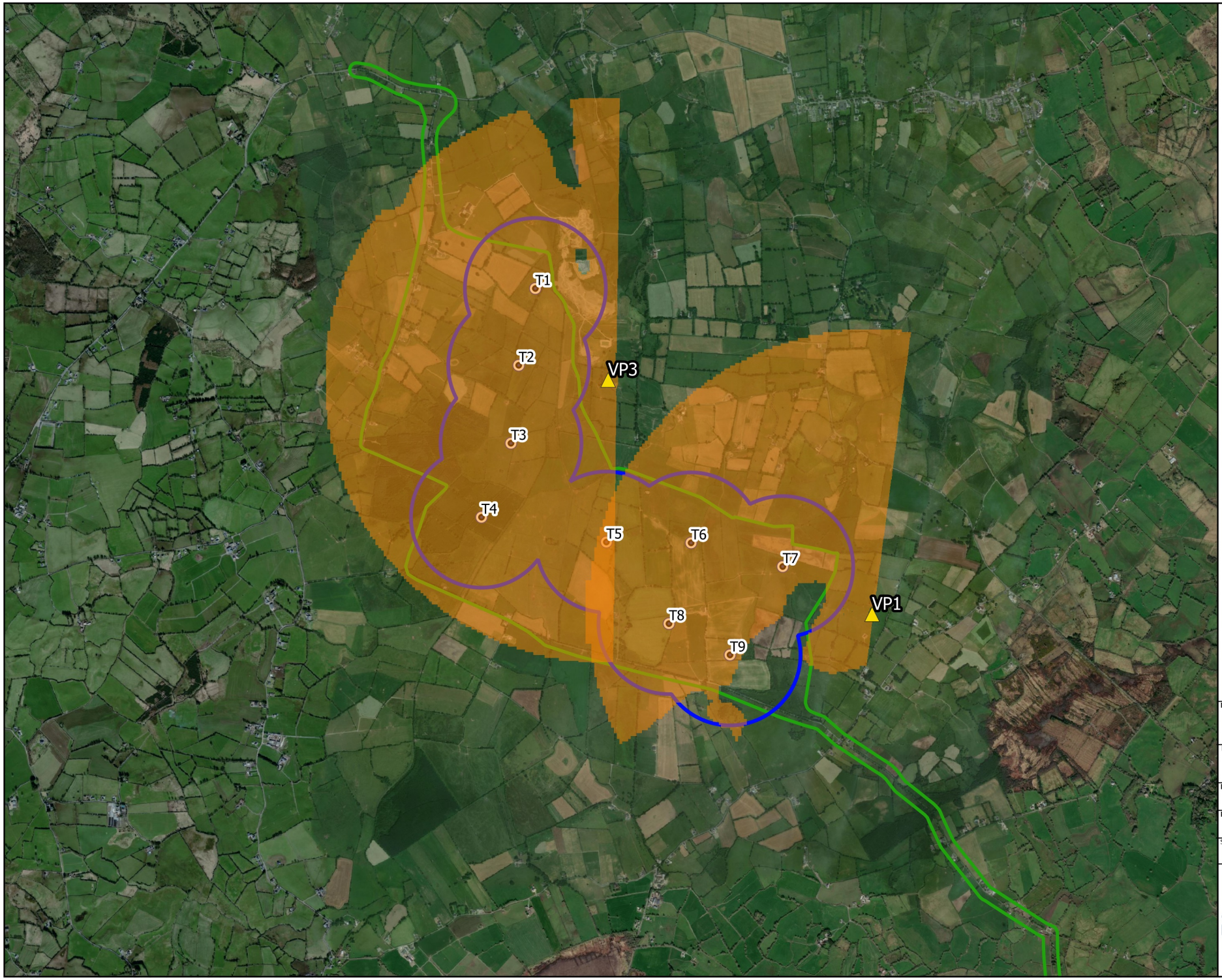

Map Legend

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

N

Drawing Title: Viewshed Coverage

Project Title: Umma More Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
201050	Fig. 7-2
Scale	Date
1:35000	31.01.23

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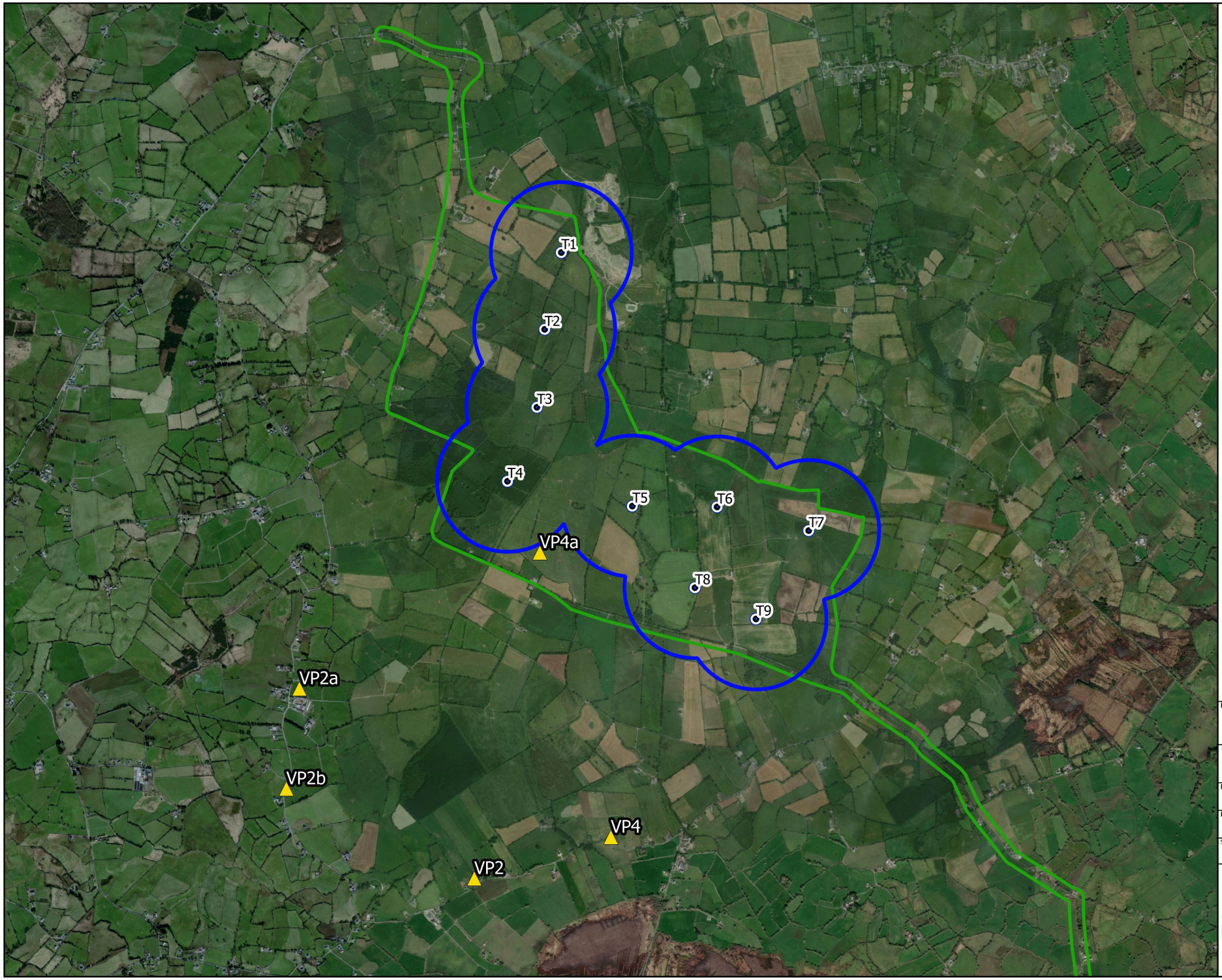

Map Legend

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

N

Drawing Title

Supplementary Vantage Points

Project Title: Umma More Renewable Energy Development	
Drawn By: D. Woods	Checked By: P. Cregg
Project No.: 201050	Drawing No.: Fig. 7-3
Scale: 1:35000	Date: 31.01.23

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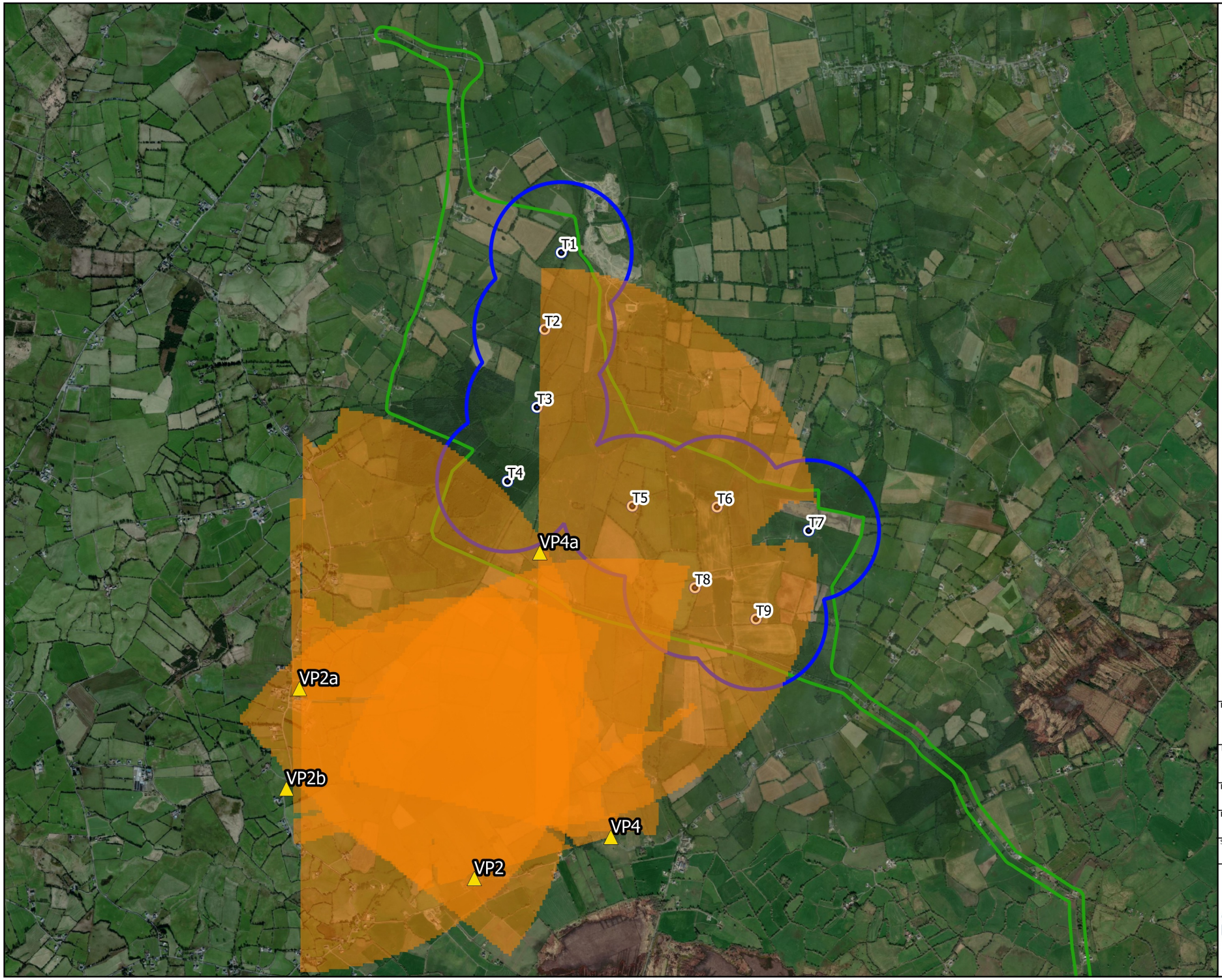

Map Legend

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

N

Drawing Title: Viewshed Coverage (Supplementary VPs)

Project Title: Umma More Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
201050	Fig. 7-4
Scale	Date
1:35000	31.01.23

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Map Legend

- EIAR Site Boundary
- Turbine Layout
- 500m Survey Radius

N

Drawing Title: Walkover Survey Area

Project Title: Umma More Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
201050	Fig. 7-5
Scale	Date
1:35000	31.01.23

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Map Legend

- EIAR Site Boundary
- Turbine Layout
- 2km Survey Radius
- RVP Locations

N

Drawing Title

Raptor Vantage Point Locations

Project Title	
Umma More Renewable Energy Development	
Drawn By: D. Woods	Checked By: P. Cregg
Project No.: 201050	Drawing No.: Fig. 7-6
Scale: 1:50000	Date: 31.01.23

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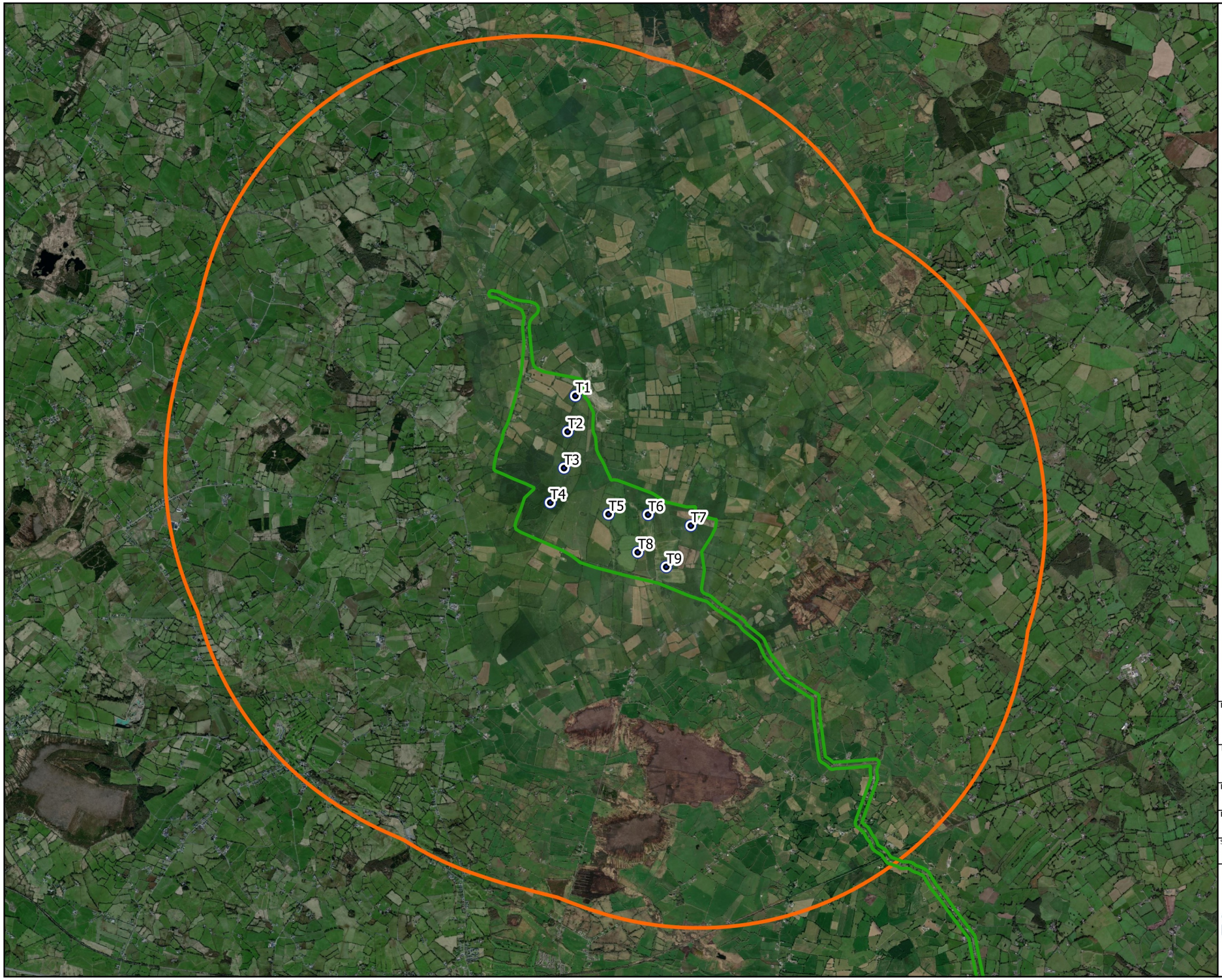

Map Legend

- EIAR Site Boundary
- Turbine Layout
- 5km Survey Radius

N

Drawing Title	Waterfowl Distribution Survey Area
Project Title	Umma More Renewable Energy Development
Drawn By: D. Woods	Checked By: P. Cregg
Project No.: 201050	Drawing No.: Fig. 7-7
Scale: 1:75000	Date: 31.01.23

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7.2.5 Receptor Evaluation and Impact Assessment

7.2.5.1 Potential Impacts Associated with Proposed Development

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

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

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

7.2.5.2 Geographical Framework

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

- International
- National
- County
- 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 comparison, 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 local avian communities resulting from the Proposed Development was quantified according to two assessment criteria: Percival (2003) and the Environmental Protection Agency (EPA). The two assessment criteria have been used to independently characterise impacts to inform a robust assessment of potential impacts. EPA impact assessment criteria has been used for consistency between the Biodiversity and Birds chapters of this EIAR, while Percival (2003) has also been followed given its specific focus on birds.

Percival (2003) criteria

The Percival (2003) methodology quantifies the sensitivity of a given species to the development type, the magnitude of the effect and the significance of the potential impact. Table 7-3 (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. Guide: < 1% population/ habitat lost

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

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

EPA (2022) Criteria

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

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

The significance of the effect is quantified as:

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

The duration of effects can be:

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

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

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

The probability of the effect may be:

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

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

7.2.5.4 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the number of individual birds of a particular species that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows the Band Model (Band *et al.,* 2007), as recommended by NatureScot guidance. The Band Model first determines the number of birds transits through the air space swept by the rotor blades of the wind turbines. Then it calculates the collision risk for the birds. The product of the transits multiplied by the collision risk provides a collision rate. An avoidance factor is applied to this to account for birds actively avoiding turbines, providing a final "real world" annual collision rate for each species. See Appendix 7-5 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 Development site between April 2019 and March 2021. Results derived from a continuous two years of surveying at the Wind Farm Site and hinterland, undertaken in line with NatureScot guidance, are analysed to inform this assessment. As such, the surveys undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Development on avian receptors.

7.2.6.2 Mitigation

The Proposed Development 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 Development 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 Development. It also prescribes mitigation as necessary and describes the predicted residual effects. Furthermore, the specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

Due to the COVID-19 outbreak and subsequent public health measures, surveys were not conducted in April 2020, at the beginning of the bird breeding season. Breeding raptor survey visits during the 2020 breeding season were completed in May, June and July 2020. While early signs of breeding (e.g. courting/display behaviour) occur in April, the comprehensive surveys conducted in May, June and July 2020 are considered sufficient to have recorded any potential breeding activity of target species within the Wind Farm Site and hinterland. Waterbird distribution surveys during winter 2019-20 (September 2019 - May 2020) were conducted every month with the exception of April. Observations from these surveys predominantly comprised small numbers of waterbirds present at Lough Sewdy and surrounding bogs, all greater than 500m distant from the Wind Farm Site, and it was possible to resume surveys in May. As such, waterbird distribution surveys in winter 2019-20 are considered sufficient to have recorded wintering waterbird populations using the Wind Farm Site and hinterland. Therefore, no significant limitations in the scope, scale or context of the assessment have been identified.

7.3 Baseline Ornithological Conditions

7.3.1 Designated Sites within the Likely ZOI of the Development

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

Sites designated for nature conservation within the potential ZOI of the Proposed Development were identified using GIS software. The ZOI is derived utilising a precautionary approach. Initially, sites within a 15km radius of the Proposed Development 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 Development 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 Development and SPAs. It considers the distances some species may travel beyond the boundary of their SPAs and outlines dispersal and foraging ranges. Potential effects on wetlands and supporting habitats associated with SPAs and potential indirect pathways in the form of surface water pollution are considered in the AASR and NIS and summarised briefly below.

Three SPAs are located within 15km of the Wind Farm Site. They are listed and summarised in Table 7-6.

Table 7-6 Designated sites in the potential Zone of Influence.

European Site	Distance from proposed works	Special Conservation Interests for which the European Site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
Lough Ree SPA (004064)	9.0km west of the Wind Farm Site 10.9km north-west of Grid Connection underground electrical cabling route	› Little Grebe (*Tachybaptus ruficollis*) [A004] › Whooper Swan (*Cygnus cygnus*) [A038] › Wigeon (*Anas penelope*) [A050] › Teal (*Anas crecca*) [A052] › Mallard (*Anas platyrhynchos*) [A053] › Shoveler (*Anas clypeata*) [A056] › Tufted Duck (*Aythya fuligula*) [A061] › Common Scoter (*Melanitta nigra*) [A065] › Goldeneye (*Bucephala clangula*) [A067] › Coot (*Fulica atra*) [A125] › Golden Plover (*Pluvialis apricaria*) [A140] › Lapwing (*Vanellus vanellus*) [A142] › Common Tern (*Sterna hirundo*) [A193] › Wetland and Waterbirds [A999]	No site-specific conservation objectives have been established for this SPA. The generic conservation objectives[1] for this site are as follow: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA." "To maintain or restore the favourable conservation condition of the wetland habitat at Lough Ree SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."	The Wind Farm Site is located entirely outside of this European Site. The SPA is located downstream within the same hydrological sub-catchment to the Site (Inny(Shannon)_SC_090); therefore, potential hydrological connectivity exists between the Proposed Development site and the SPA, as water flow from within the Proposed Development site is to the north to the SPA. This may result in potential hydrological connectivity to the SPA, therefore the works have the potential, in the absence of mitigation, potential impact exists for significant effects on supporting Wetlands and Waterbirds [A999] habitat. Taking a precautionary approach, a potential pathway for indirect effects was identified in the form of deterioration of water quality via the percolation of polluting materials through the bedrock

[1] *(NPWS (2021) Conservation objectives for Lough Ree SPA [004064]. Generic Version 8.0. Department of Housing, Local Government and Heritage.)*

European Site	Distance from proposed works	Special Conservation Interests for which the European Site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
				underlying the site during the construction and operational phases. Deterioration of water quality may result in adverse effects on the following SCI in the absence of mitigation: Wetland and Waterbirds [A999] This SCI includes the supporting wetland habitat of all SCI species. Of the thirteen SCI species of the SPA, the following were recorded within 500m of the Wind Farm Site during two years of bird surveys: whooper swan, teal, mallard, golden plover and lapwing. The distance between the SPA and the Wind Farm Site is greater than the core foraging ranges of these species (SNH, 2016; Johnson *et al.*, 2014). As such, there is no connectivity between the SCI species of the SPA and the Proposed Development. Potential hydrological connectivity was identified. **The SPA is considered to be *within* the Likely Zone of Impact in relation to hydrological connectivity and further assessment is provided in the accompanying NIS.**

European Site	Distance from proposed works	Special Conservation Interests for which the European Site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
Middle Shannon Callows SPA (004096)	14.7km south-west of the Wind Farm Site 15.3km west of Grid Connection underground electrical cabling route	› Whooper Swan (*Cygnus cygnus*) [A038] › Wigeon (*Anas penelope*) [A050] › Corncrake (*Crex crex*) [A122] › Golden Plover (*Pluvialis apricaria*) [A140] › Lapwing (*Vanellus vanellus*) [A142] › Black-tailed Godwit (*Limosa limosa*) [A156] › Black-headed Gull (*Chroicocephalus ridibundus*) [A179] › Wetland and Waterbirds [A999]	No site-specific conservation objectives have been established for this SPA. The generic conservation objectives[2] for this site are as follow: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA." "To maintain or restore the favourable conservation condition of the wetland habitat at Middle Shannon Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."	The Wind Farm Site is located entirely outside of this European Site. The site is located within a separate hydrological catchment to the SPA, however hydrological connectivity does exist. The proposed grid connection route crosses the River Brosna (ID: IE_SH_25B091000). The River Brosna ultimately flows into the Middle Shannon Callows SPA. Therefore, the works have the potential, in the absence of mitigation, to impact on water quality through pollutants including hydrocarbons, fuel and sedimentation. Due to the importance of the wetland habitat provided by this SPA to the listed SCI species, further assessment is required to determine the potential impact, if any, from this proposed development. Of the seven SCI species of the SPA, the following were recorded within 500m of the Wind Farm Site during two years of

[2] *(NPWS (2021) Conservation objectives for Lough Ennell SPA [004044]. Generic Version 8.0. Department of Housing, Local Government and Heritage.)*

European Site	Distance from proposed works	Special Conservation Interests for which the European Site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
				bird surveys: whooper swan, golden plover, lapwing and black-headed gull. The distance between the SPA and the Wind Farm Site is greater than the core foraging ranges of these species (SNH, 2016; Johnson *et al.*, 2014; Thaxter *et al.*, 2017). As such, there is no connectivity between the SCI species of the SPA and the Proposed Development **The SPA is considered to be *within* the Likely Zone of Impact in relation to hydrological connectivity and further assessment is provided in the accompanying NIS..**
Lough Ennell SPA (004044)	Beyond 16.1km east of Wind Farm Site 9.3km north-east of the Grid Connection underground electrical cabling route	› Pochard (*Aythya ferina*) [A059] › Tufted Duck (*Aythya fuligula*) [A061] › Coot (*Fulica atra*) [A125] › Wetland and Waterbirds [A999]	No site-specific conservation objectives have been established for this SPA. The generic conservation objectives[3] for this site are as follow: "To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA."	The Wind Farm Site is located entirely outside of this European Site. The site is located within a separate hydrological sub-catchment to the SPA, and no hydrological connectivity exists. There is therefore, no potential pathway for significant effects on the supporting wetland habitat of the SPA.

[3] *(NPWS (2021) Conservation objectives for Lough Ennell SPA [004044]. Generic Version 8.0. Department of Housing, Local Government and Heritage.)*

European Site	Distance from proposed works	Special Conservation Interests for which the European Site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Special Protection Area				
			"To maintain or restore the favourable conservation condition of the wetland habitat at Lough Ennell SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."	Of the three SCI species of the SPA, none were recorded within 500m of the Wind Farm Site during two years of bird surveys. There is no connectivity between the SCI species of the SPA and the Proposed Development. Consequently, the potential for direct and indirect impacts on populations of SCI species associated with the SPA can be discounted. No complete impact source-pathway receptor chain was identified between the proposed works and this SPA. **The SPA is *outside* the Likely Zone of Impact and no further assessment is required.**
Nationally Designated Sites				
Other than sites which are encompassed by the above list of SPAs, no nationally designated sites of ornithological significance occur within the potential ZOI.				

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 Wind Farm Site lies within hectads N14 and N24. Tables 7-7 and 7-8 present a list of species of conservation interest recorded from the relevant hectads, with regard to breeding and wintering respectively.

Table 7-7 Breeding Bird Atlas data. The following applies to conservation status: Section19 of the Wildlife Acts 1976-2022, Annex I of the Birds Directive, Red List species on the BoCC and Raptor species considered sensitive to wind energy developments.

Species Name	Breeding Atlas 1968-1972		Breeding Atlas 1988-1991		Breeding Atlas 2007-2011		Conservation Status
	N14	N24	N14	N24	N14	N24	
Peregrine falcon (*Falco peregrinus*)	-	-	-		-	breeding	Annex I. Raptor & Section 19
Corncrake (*Crex crex*)	probable breeding	probable breeding	-	-	-	-	Annex I, SCI of Middle Shannon Callows SPA & Section 19
Kingfisher (*Alcedo atthis*)	breeding	-	-	-	-	possible breeding	Annex I & Section 19
Tufted duck (*Aythya fuligula*)	breeding	-	-	-	-	-	SCI of Lough Ree SPA and Lough Ennell SPA & Section 19
Coot (*Fulica atra*)	breeding	breeding	-				SCI of Lough Ree SPA and Lough Ennell SPA & Section 19
Mallard (*Anas platyrhynchos*)	-	-	seen	-	probable breeding	possible breeding	SCI of Lough Ree SPA & Sectione 19
Little Grebe (*Tachybaptus ruficollis*)	-	-	-	-	possible breeding	-	SCI of Lough Ree SPA & Section 19
Red Grouse *(Lagopus lagopus)*	probable breeding	probable breeding	-	-	-	-	Red List & Section 19
Lapwing *(Vanellus vanellus)*	breeding	breeding	-	-	-	breeding	SCI of Middle Shannon Callows SPA, Red List & Section 19

Species Name	Breeding Atlas 1968-1972		Breeding Atlas 1988-1991		Breeding Atlas 2007-2011		Conservation Status
	N14	N24	N14	N24	N14	N24	
Curlew *(Numenius arquata)*	breeding	breeding	seen	-	-	-	Red List & Section 19
Snipe (*Gallinago gallinago*)	breeding	breeding	seen	-	-	-	Red List & Section 19
Kestrel (*Falco tinnunculus*)	probable breeding	probable breeding	seen	-	-	probable breeding	Red List, Raptor & Section 19
Woodcock *(Scolopax rusticola)*	probable breeding	probable breeding	-	-	-	-	Red List & Section 19
Stock Dove (*Columba oenas*)	breeding	breeding	-	-	-	-	Red List & Section 19
Meadow Pipit *(Anthus pratensis)*	breeding	breeding	-	-	breeding	breeding	Red List & Section 19
Grey Wagtail *(Motacilla cinereal)*	breeding	breeding	seen	-	-	-	Red List & Section 19
Swift (*Apus apus*)	breeding	breeding	-	-	breeding	possible breeding	Red List & Section 19
Yellowhammer *(Emberiza cintrinella)*	breeding	breeding	-	seen	-	-	Red List & Section 19
Buzzard (*Buteo buteo*)	-	-	-	-	possible breeding	possible breeding	Raptor & Section 19
Sparrowhawk (*Accipiter nisus*)	probable breeding	probable breeding	seen	-	probable breeding	-	Raptor & Section 19

Table 7-8 Wintering Bird Atlas data. The following applies to conservation status: Section19 of the Wildlife Acts 1976-2022, Annex I of the Birds Directive, Red List species on the BoCCI and Raptor species considered sensitive to wind energy developments.

Species Name	Wintering Atlas 1981-1984		Wintering Atlas 2007-2011		Conservation Status
	N14	N24	N14	N24	
Whooper Swan *(Cygnus cygnus)*	present	-	-	-	Annex I & Section 19
Golden Plover (*Pluvialis apricaria*)	-	present	-	-	Annex I & Section 19
Kingfisher (*Alcedo atthis*)	-	present	-	-	Annex I & Section 19
Merlin (*Falco columbarius*)	-	present	present	-	Annex I, Raptor & Section 19
Teal (*Anas crecca*)	present	present	present	present	SCI of Lough Ree SPA & Section 19

Species Name	Wintering Atlas 1981-1984		Wintering Atlas 2007-2011		Conservation Status
	N14	N24	N14	N24	
Coot (*Fulica atra*)	present	present	present	present	SCI of Lough Ree SPA and Lough Ennell SPA & Section 19
Shoveler (*Anas clypeata*)	-	-	present	-	SCI of Lough Ree SPA & Section 19
Mallard (*Anas platyrhynchos*)	present	present	present	present	SCI of Lough Ree SPA & Section 19
Little Grebe	present	present	present	-	SCI of Lough Ree SPA & Section 19
Wigeon *(Anas penelope)*	-	present	present	-	SCI of Lough Ree SPA and Middle Shannon Callows SPA, Red List & Section 19
Tufted Duck *(Aythya fuligula)*	present	-	present	-	SCI of Lough Ree SPA and Lough Ennell SPA & Section 19
Pochard (*Aythya farina*)	present	present	-	-	SCI of Ennell SPA, Red List & Section 19
Lapwing *(Vanellus vanellus)*	present	present	present	present	SCI of Middle Shannon Callows SPA, Red List & Section 19
Curlew *(Numenius arquata)*	present	present	-	-	Red List & Section 19
Woodcock (*Scolopax rusticola*)	-	present	-	present	Red List & Section 19
Snipe (*Gallinago gallinago*)	present	present	present	present	Red List & Section 19
Kestrel (*Falco tinnunculus*)	present	present	present	present	Red List & Section 19
Stock Dove (*Columba oenas*)	-	present	-	present	Red List & Section 19
Meadow Pipit (*Anthus pratensis*)	present	present	present	present	Red List & Section 19
Grey Wagtail *(Motacilla cinereal)*	present	-	present	-	Red List & Section 19
Redwing (*Turdus iliacus*)	present	present	present	present	Red List & Section 19
Yellowhammer *(Emberiza cintrinella)*	present	-	-	present	Red List & Section 19
Buzzard (*Buteo buteo*)	-	-	present	-	Raptor & Section 19
Sparrowhawk (*Accipiter nisus*)	present	-	present	present	Raptor & Section 19

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 Wind Farm Site is located within areas of **low** bird sensitivity to wind energy developments. The Wind Farm Site boundary is 14km from the nearest area of high sensitivity. The Grid Connection is also within areas of low sensitivity and is 17km from the nearest area of high sensitivity.

7.3.4 National Biodiversity Data Centre Records

The National Biodiversity Data Centre (NBDC) Biodiversity Maps provide records of flora and fauna within 10km hectads across Ireland. Data is available from the map viewer on the NBDC website (https://maps.biodiversityireland.ie/Map). The Wind Farm Site lies within hectads N14 and N24. Table 7-9 lists the bird species have been recorded in these 10km Grids.

Table 7-9 National Biodiversity Data Centre records

Common Name	Scientific Names	NBDC Dataset
Barn Owl	*Tyto alba*	Birds of Ireland
Black-headed Gull	*Larus ridibundus*	Bird Atlas 2007 - 2011
Coot	*Fulica atra*	Bird Atlas 2007 - 2011
Kestrel	*Falco tinnunculus*	Bird Atlas 2007 - 2011
Kingfisher	*Alcedo atthis*	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Pochard	*Aythya ferina*	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Redshank	*Tringa totanus*	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Snipe	*Gallinago gallinago*	Bird Atlas 2007 - 2011
Starling	*Sturnus vulgaris*	Bird Atlas 2007 - 2011
Swift	*Apus apus*	Bird Atlas 2007 - 2011
Corn Crake	*Crex crex*	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Curlew	*Numenius arquata*	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Teal	*Anas crecca*	Bird Atlas 2007 - 2011
Wigeon	*Anas penelope*	Bird Atlas 2007 - 2011
Woodcock	*Scolopax rusticola*	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Golden Plover	*Pluvialis apricaria*	Bird Atlas 2007 - 2011
Cormorant	*Phalacrocorax carbo*	Bird Atlas 2007 - 2011

Common Name	Scientific Names	NBDC Dataset
Great Crested Grebe	*Podiceps cristatus*	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Hen Harrier	*Circus cyaneus*	Birds of Ireland
Herring Gull	*Larus argentatus*	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
House Martin	*Delichon urbicum*	Bird Atlas 2007 - 2011
House Sparrow	*Passer domesticus*	Bird Atlas 2007 - 2011
Jack Snipe	*Lymnocryptes minimus*	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Little Grebe	*Tachybaptus ruficollis*	Bird Atlas 2007 - 2011
Mallard	*Anas platyrhynchos*	Bird Atlas 2007 - 2011
Merlin	*Falco columbarius*	Bird Atlas 2007 - 2011
Mute Swan	*Cygnus olor*	Bird Atlas 2007 - 2011
Lapwing	*Vanellus vanellus*	Bird Atlas 2007 - 2011
Shoveler	*Anas clypeata*	Bird Atlas 2007 - 2011
Wheatear	*Oenanthe oenanthe*	Birds of Ireland
Peregrine Falcon	*Falco peregrinus*	Bird Atlas 2007 - 2011
Red Grouse	*Lagopus lagopus*	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Ringed Plover	*Charadrius hiaticula*	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Rock Pigeon	*Columba livia*	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Sand Martin	*Riparia riparia*	Bird Atlas 2007 - 2011
Short-eared Owl	*Asio flammeus*	Birds of Ireland
Sky Lark	*Alauda arvensis*	Bird Atlas 2007 - 2011
Spotted Flycatcher	*Muscicapa striata*	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Tufted Duck	*Aythya fuligula*	Bird Atlas 2007 - 2011
Water Rail	*Rallus aquaticus*	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Whooper Swan	*Cygnus cygnus*	Birds of Ireland
Yellowhammer	*Emberiza citrinella*	Birds of Ireland

7.3.5 Irish Wetland Bird Survey Records

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 nearest I-WeBS subsite to the Wind Farm Site is Tang River (OW300), situated approximately 4km north-west. Data from I-WeBS sites in County Westmeath have been used to estimate county populations of wintering waterbirds identified as KORs. Datasets for the following sites were downloaded from www.birdwatchireland.ie and reviewed:

- Ballinlough (Westmeath)
- Crowinstown Lough
- Glen Lough
- Lough Derravaragh
- Lough Drin
- Lough Ennell
- Lough Glore
- Lough Iron
- Lough Lene
- Lough Owel
- Lough Ree[4]
- Lough Sheever
- Plunkett's Quarry, Castletown
- Royal Canal
- Shannon Callows[5]
- Slevin's Lake
- Tang River
- Walshestown South Turlough
- White/Annagh Lough

7.3.6 Rare and Protected Species Dataset

An information request was sent to NPWS requesting records from the Rare and Protected Species Database. The following records were obtained from the NPWS on the 31st August 2022:

Peregrine Falcon

An occupied peregrine nest was recorded in hectad N15 during the 2017 National Peregrine Survey. Two further nest sites (one occupied, one unoccupied) were recorded in hectad N24. The Wind Farm Site lies outside of hectad N15, and partially within hectad N24.

Hen Harrier

A confirmed hen harrier breeding site was recorded in hectad N25 during the 2015 National Hen Harrier Survey. The Wind Farm Site lies outside of hectad N15.

[4] Within counties Roscommon, Longford and Westmeath. Count data from this site has therefore been divided in three for inclusion in the Co. Westmeath population of relevant waterbirds.
[5] Within counties Offaly and Westmeath. Count data from this site has therefore been halved for inclusion in the Co. Westmeath population of relevant waterbirds.

7.3.7 Irish Hen Harrier Winter Survey Records

The Irish Hen Harrier Winter Survey (IHHWS) is a national volunteer survey that aims to record and monitor non-breeding roost locations for hen harrier in Ireland. The results of surveys undertaken between 2004 and 2020 have been published, detailing the number of confirmed roosts across each of the national 20km grid squares (O'Donoghue, 2020).

The Wind Farm Site is situated between two 20km national grid squares (OS2224 and OS2222) and the Grid Connection underground electrical cabling route extends into the 20km grid square OS2024. Results show one confirmed hen harrier non-breeding roost location in each of these 20km grid squares. The average annual maximum number of hen harrier recorded at each of these sites between 2004 and 2020 was one bird (O'Donoghue, 2020).

7.3.8 Field Survey Results

A list of all bird species recorded during surveys is provided in Appendix 7-1. The target species listed in Table 7-10 below were recorded within the potential ZOI of the Proposed Development during field surveys. The list is ordered in accordance with conservation significance: Annex I species, SCIs of SPAs within 15km, Red listed BoCCI species and Raptor species.

Table 7-10 Target species recorded in the Potential ZOI of the Proposed Development

Species	Conservation Significance
Whooper Swan	Annex I of Birds Directive, SCI of Lough Ree SPA and Middle Shannon Callows SPA and Red List with respect to wintering population
Golden Plover	Annex I of Birds Directive, SCI of Lough Ree SPA and Middle Shannon Callows SPA and Red List with respect to breeding and wintering populations
Peregrine Falcon	Annex I of Birds Directive and Raptor of Wildlife Acts
Merlin	Annex I of Birds Directive and Raptor of Wildlife Acts
Lapwing	SCI of Lough Ree SPA and Middle Shannon Callows SPA and Red List with respect to breeding and wintering populations
Tufted Duck	SCI of Lough Ree SPA and Lough Ennell SPA
Black-headed Gull	SCI of Middle Shannon Callows SPA
Little Grebe	SCI of Lough Ree SPA
Mallard	SCI of Lough Ree SPA
Teal	SCI of Lough Ree SPA
Snipe	Red List with respect to breeding and wintering populations
Kestrel	Red List with respect to breeding population
Buzzard	Raptor of Wildlife Acts
Sparrowhawk	Raptor of Wildlife Acts
Grey Wagtail	Red List with respect to breeding population
Meadow Pipit	Red List with respect to breeding population
Redwing	Red List with respect to wintering population
Stock Dove	Red List with respect to breeding population
Swift	Red List with respect to breeding population

Species	Conservation Significance
Whinchat	Red List with respect to breeding population

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

- Summary of monthly distribution of flight activity for the target species recorded during vantage point surveys.
- Summary of monthly distribution of observations of target species during breeding walkover surveys.
- Summary of monthly distribution of observations target species during winter walkover surveys.
- Summary of monthly distribution of observations for target species during breeding raptor surveys.
- Summary of monthly distribution of observations for target species during waterbird distribution surveys.
- Summary of monthly distribution of non-target and non-KOR species.

7.3.8.1 Whooper Swan

Whooper swan were observed in the passage[6] and winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Whooper swan were recorded on four occasions during vantage point surveys. These observations comprised small groups of 2-5 birds in flight over the Wind Farm Site on two days in November 2020, and a flock of 21 birds recorded in late March 2021.

Winter Walkover Survey

Whooper swan were recorded once during winter walkover surveys in October 2020. This observation comprised nine birds travelling south away from the Wind Farm Site.

Waterbird Distribution Survey

Whooper swan were recorded on one occasion during waterbird distribution surveys. This recording comprised seven birds travelling north-east over Lough Swedy (located over 3km from the Wind Farm Site), potentially having arisen from the lake.

7.3.8.2 Golden Plover

Golden plover was recorded during the passage and winter season. Raw survey data and maps are provided in Appendix 7-4.

[6] *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.*

Vantage Point Survey

Golden plover were recorded on 10 occasions during vantage point surveys. These observations comprised flocks of between 4 - 60 birds travelling and circling in the vicinity of the Wind Farm Site. Seven of the observations are from a 2 hour window on one day in October 2019 (likely comprising repeat observations of the same birds), with the remaining observations being from days in September and October 2020.

Winter Walkover Survey

There was one observation of golden plover during winter walkover surveys, comprising 20 birds travelling to the south of the Wind Farm Site in October 2020.

7.3.8.3 Peregrine Falcon

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

Vantage Point Survey

Peregrine falcon was recorded on ten occasions during vantage point surveys. These observations largely comprised individual birds hunting and travelling within the vicinity of the Wind Farm Site. Three of these observations were of juvenile birds in October 2019 and August 2020. These birds were unlikely to have been associated with a local nest as there was no peregrine nest site located during breeding season surveys throughout the summer of 2019 and 2020, including at a nearby quarry. This quarry fell partially within the viewshed of VP3, but surveyors could not secure access to gain entry. The likely suitability of this quarry for nesting peregrine is discussed in the next paragraph.

Subsequently in winter 2020-21, a pair were recorded together in display flight on one occasion over the quarry directly north-east of the Wind Farm Site boundary in March 2021(quarry situated at closest point approximately 20m from the Wind Farm Site boundary and 160m from nearest proposed turbine [T1], and 550m from next nearest proposed turbine [T2]). While peregrine often breeds in quarries that offer suitable nesting habitats (ie. cliff faces), this quarry is a sand and gravel quarry that is unlikely to contain suitable cliffs[7].

Winter Walkover Survey

Peregrine was observed once during winter walkover surveys, comprising an individual bird perching and then travelling towards the quarry in January 2021.

7.3.8.4 Merlin

Merlin was recorded during the breeding season. Raw survey data and maps are provided in Confidential Appendix 7-7.

Breeding Walkover Survey

Merlin was observed once during breeding walkover surveys, comprising and individual carrying prey away from the Wind Farm Site in May 2020, confirming breeding in the wider area.

[7] *Planning ref. no. for quarry: 064413: https://www.eplanning.ie/WestmeathCC/AppFileRefDetails/064413/0. Quarry register number: QS1193.*

Breeding Raptor Survey

There was one observation of merlin during breeding raptor surveys, comprising an individual hunting in May 2020 in suitable breeding habitat approximately 2.5km from the Wind Farm Site. This area is in the direction that the bird seen carrying prey during walkover survey was observed. An additional calling observation was also recorded at this location in July 2020 which was suspected to be merlin.

7.3.8.5 Lapwing

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

Vantage Point Survey

Lapwing was observed 17 times during vantage point surveys in the months of October, November, December, January and February over the 2 year survey period. These observations comprised flocks of between 1-150 birds travelling and circling within, or partially within, the Wind Farm Site. There were seven observations of flocks landing in fields, of which four were within the Wind Farm Site and three were within 500m of the Wind Farm Site boundary. Four of these observations were from the same day in January 2020.

Breeding Walkover Survey

Lapwing was observed 3 times during breeding walkover surveys. A single bird was heard calling in May 2020 within 500m of the Wind Farm Site boundary. A flock of 20 birds was observed foraging within a field within the Wind Farm Site in June 2020, and a flock of 18 birds was observed roosting in the same field in July 2020.

Winter Walkover Survey

Lapwing was recorded twice during winter walkover surveys in December 2019 and January 2021. Both observations were of birds foraging in fields within the Wind Farm Site. Flock size was between 6-24 birds.

Waterbird Distribution Survey

Lapwing was recorded five times during waterbird distribution surveys, in the months of October, November, January and February. All observations were at Lough Sewdy approximately 3.5km from the Wind Farm Site, and comprised birds in flight over the lake and surrounding farmland with flock sizes between 1-67 birds.

Incidental Records

There was one incidental record of lapwing during a vantage point survey in February 2021, comprising a flock of approximately 100 birds travelling outside of the viewshed area, approximately 1km from the Wind Farm Site.

7.3.8.6 Tufted Duck

Tufted duck was recorded during the winter season. Raw survey data and maps are provided in Appendix 7-4.

Waterbird Distribution Survey

Tufted duck was recorded three times during waterbird distribution surveys in the months of February and March. All observations were at Lough Sewdy, approximately 3.5km from the Wind Farm Site, and comprised a flock size of two birds.

7.3.8.7 Black-headed Gull

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

Vantage Point Surveys

Black-headed gull were recorded 22 times during vantage point surveys during the months of January, February, April, June, July and August. All observations were within, or partially within, the Wind Farm Site. Flock sizes were between 1-210 birds and included flights at PCH. Birds were recorded circling, travelling and landing. There were five observations of flocks landing in fields, all of which were within the Wind Farm Site, comprising flocks of 21-75 birds. Of the seven observations of this species during the wintering season, five were from a 3 hour period on one survey day.

Breeding Walkover Surveys

Black-headed gull was recorded once during breeding walkover surveys, comprising a single bird landing and foraging within 500m of the Wind Farm Site in June 2020.

Waterbird Distribution Surveys

There was one observation of black-headed gull from waterbird distribution surveys, comprising a flock of 14 birds travelling over Lough Sewdy, approximately 3.5km from the Wind Farm Site, in February 2021.

Incidental Records

There was one incidental record of black-headed gull, comprising a single bird travelling beyond 500m east of the Wind Farm Site during a breeding raptor survey in June 2020.

Supplementary Data

There are two records of black-headed gull in the supplementary data, both from vantage point surveys in June 2019. The observations comprise flocks of four and eight birds soaring and travelling beyond 500m south of the Wind Farm Site.

7.3.8.8 Little Grebe

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

Waterbird Distribution Surveys

Little grebe was recorded six times during waterbird distribution surveys in the months of November, January, February, March and May. All observations were from Lough Sewdy, 3.5km from the Wind Farm Site, and comprised of single birds calling and foraging.

7.3.8.9 Mallard

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

Vantage Point Surveys

Mallard was recorded 15 times during vantage point surveys, during the months of March, April, June July, August and November. Of these observations, 13 were within, or partially within, the Wind Farm Site. Flock sizes were between 1-6 birds and included flights at PCH. There was one observation of two mallard landing within the Wind Farm Site.

Winter Walkover Surveys

Mallard was recorded three times during winter walkover surveys, from the months of October, January and March. Observations comprised birds travelling over the Wind Farm Site, and of birds being flushed from river within the Wind Farm Site. Flock sizes were between 2-3 birds.

Breeding Walkover Surveys

Mallard was recorded three times during breeding walkover surveys, all within the month of May. Birds were recorded travelling over the Wind Farm Site with flock sizes of 1-2 birds, and an adult was recorded with ten young on Dungolman River within the Wind Farm Site.

Waterbird Distribution Surveys

Mallard were recorded 23 times during waterbird distribution surveys, from the months of September, October, November, December, January, February, March and May. The majority of observations were from Lough Sewdy, 3.5km from the Wind Farm Site and comprised birds on water and travelling over. Mallard was also recorded at Ballinderry bog and along the Dungolman River. Flock sizes were from 1-12 birds.

Incidental Records

There were two incidental records of mallard. These comprised three birds observed travelling over 500m east of the Wind Farm Site during a breeding raptor survey in April 2019, and a mallard heard calling near Dungolman River within the Wind Farm Site during a vantage point survey in November 2020.

7.3.8.10 Teal

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

Vantage Point Surveys

There was one observation of teal during vantage point surveys, comprising a flock of four birds travelling within the north of the Wind Farm Site in March 2021 at PCH.

Winter Walkover Surveys

Teal were recorded four times during winter walkover surveys, in the months of December and January. All observations were of birds flushed from watercourses within the Wind Farm Site. Flock sizes were between 2-8 birds.

Waterbird Distribution Surveys

Teal were recorded four times during waterbird distribution surveys, in the months of December, January and March. Observations comprised individual birds at Lough Sewdy, 3.5km from the Wind Farm Site, a flock of five birds feeding in flooded agricultural fields approximately 300m south-east of the Wind Farm Site, and a flock of 32 birds on a small lake in Calliaghstown, approximately 2km north of the Wind Farm Site.

7.3.8.11 Snipe

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

Vantage Point Surveys

Snipe was recorded 11 times during vantage point surveys, in the months of October, November, December and January. Of these observations, five were within, or partially within, the Wind Farm Site. The remaining six observations were within 500m of the Wind Farm Site. All observations were of single birds travelling and included flights at PCH.

Winter Walkover Surveys

Snipe was recorded 18 times during winter walkover surveys. Of these observations, 14 were within, or partially within, the Wind Farm Site. The remaining four observations were within 500m of the Wind Farm Site. All observations were of birds flushed and flock sizes were between 1-8 birds.

Waterbird Distribution Surveys

Snipe was recorded 18 times during waterbird distribution surveys, in the months of September, November, December, January, February, March and May. The majority of observations were from Lough Sewdy, 3.5km from the Wind Farm Site, where flock sizes were between 1-30 birds. Single birds were also recorded at Moyvoughly, Ballinderry and Gortnadoofa bogs.

7.3.8.12 Kestrel

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

Vantage Point Surveys

Kestrel was recorded 44 times during vantage point surveys. All observations were within, or partially within, 500m of the Wind Farm Site.

Observations of kestrel during vantage point surveys comprised single birds travelling and hunting, with one observation of two birds, and included flights at PCH. There were also some observations of display behaviour in April 2020, and there were three observations of juvenile kestrel from September 2020 and August 2019. A concentration of observations were from the vicinity of the quarry directly

beyond the north-east boundary of the Wind Farm Site. Kestrel are very adaptable in the use of their nest sites, so there may be suitable nesting habitat within the quarry. While no breeding was confirmed here, adopting the precautionary principle, it is possible that a breeding territory has been present within the quarry beyond the north-east boundary of the Wind Farm Site.

Winter Walkover Surveys

Kestrel was recorded three times during winter walkover surveys, in the months of October and March. Observations comprised individual birds hunting and travelling over agricultural grassland.

Breeding Walkover Surveys

There was one observation of kestrel during breeding walkover surveys, comprising a single bird hunting over agricultural grassland within the Wind Farm Site in June 2020.

Breeding Raptor Surveys

Kestrel was recorded five times during breeding raptor surveys, in the months of April, May and June. All observations were of single birds hunting and travelling. No breeding activity was recorded.

Incidental Records

There were nine incidental records of kestrel from waterbird distribution surveys. Observations comprised 1-2 birds travelling and hunting over agricultural grassland and bogs. The majority of observations were over 500m from the Wind Farm Site.

Supplementary Data

There are seven records of kestrel in the supplementary data from vantage point surveys in July and August 2019. All observations were of single birds hunting and travelling over agricultural grassland and forestry.

7.3.8.13 Buzzard

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

Vantage Point Surveys

Buzzard was recorded 107 times during vantage point surveys across all months, with most observations within or within 500m of the Wind Farm Site. The majority of observations were of single birds soaring, travelling and hunting, with observations of between 2-5 birds also recorded, and included flights at PCH. There were ten non-flight observations, comprising birds perching, foraging on-ground and heard calling. There were also three flight observations of birds landing in fields.

Winter Walkover Surveys

Buzzard was recorded 17 times during winter walkover surveys, in the months of October, December, January, February and March. The majority of observations were of single birds soaring, travelling and hunting, with observations of between 2-3 birds also recorded. Of the 17 observations, 12 were within, or partially within, the Wind Farm Site, 4 were within 500m of the Wind Farm Site, and one was beyond 500m from the Wind Farm Site.

Breeding Walkover Surveys

Buzzard was recorded ten times during breeding walkover surveys, in the months of April, May, June and July. Of these observations, nine were within, or partially within, the Wind Farm Site. Agitated behaviour was recorded in the north of the Wind Farm Site in May 2019, followed by a sighting of recently fledged buzzards in the same area in June 2019. This indicates one probable breeding territory within the Wind Farm Site, located approximately 400m from the nearest proposed turbine (T2), and 330m from nearest development footprint (road).

Breeding Raptor Surveys

Buzzard was recorded 29 times during breeding raptor surveys. Of these observations, three were within the Wind Farm Site. The majority of observations were of single birds hunting and travelling. A juvenile buzzard was seen in the vicinity of Drumraney graveyard (1km distant from the Wind Farm Site) in July 2019 indicating breeding nearby.

Incidental Records

There were seven incidental records of buzzard from waterbird distribution surveys, in the months of October, January, February, March and May. All observations were of single birds travelling or hunting and were beyond 500m from the Wind Farm Site.

Supplementary Data

There are 30 records of buzzard in the supplementary data from vantage point surveys in May, June, July and August 2019. The majority of observations were of single birds hunting and travelling. Observations of 2-3 birds were also recorded.

7.3.8.14 Sparrowhawk

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

Vantage Point Surveys

Sparrowhawk was recorded ten times during vantage point surveys, in the months of February, March, May, July, September and November. All observations were of single birds travelling or hunting, including flights at PCH. Of the ten observations, five were within, or partially within, the Wind Farm Site.

Winter Walkover Surveys

There were two observations of sparrowhawk during winter walkover surveys in the months of October and February. Both observations were of single birds, one of a bird travelling within the Wind Farm Site, and the other of a male chasing passerines approximately 700m east of the Wind Farm Site.

Breeding Raptor Surveys

Sparrowhawk was recorded 8 times during breeding raptor surveys. All observations were of single birds travelling and hunting and were beyond 500m from the Wind Farm Site. No breeding activity was recorded.

Incidental Records

There were 6 incidental records of sparrowhawk, three from vantage point surveys and three from waterbird distribution surveys. None of the observations were within the Wind Farm Site.

Supplementary Data

There are 12 records of sparrowhawk in the supplementary days, from vantage point surveys in June, July and August 2019. Observations were of single birds hunting and travelling, with one observation of a pair soaring together in July 2019. All observations were outside the Wind Farm Site.

7.3.8.15 Passerines (Red Listed)

The BoCCI Red listed species grey wagtail, meadow pipit, redwing, stock dove, swift and whinchat were recorded within the Wind Farm Site to a 500m radius during surveys. Grey wagtail were observed on two occasions, with single birds being recorded (including an active nest). Meadow pipit were observed on 29 occasions, with up to 40 birds being recorded. Redwing were observed on 19 occasions, with up to 84 birds being recorded. Stock dove were observed on three occasions. Swift and whinchat were both observed on one occasion.

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, Burke *et al.* (2018) or NPWS Article 12 Reporting (2013-2018), depending on what literature was available. Similarly, estimates for mean county population sizes were obtained from species specific surveys, a review of I-WeBS sites in County Westmeath[8] or from NPWS Article 12 Reporting, 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. For many species there are no published county population estimates, where these don't exist, county population estimates have been made with the best available information. Where assumptions have been made in this undertaking they are clearly outlined.

7.4.1.1 Whooper Swan

Whooper swan is listed on Annex I of Birds Directive. It is an SCI of Lough Ree SPA and Middle Shannon Callows SPA (located 9.0km and 14.7km from the Wind Farm Site respectively). The distance between these SPAs and the Wind Farm Site is greater than the core foraging range of whooper swan (<5km; SNH, 2016).

As per the latest national wintering estimates provided in the 2020 International Swan Census (Burke *et al.*, 2021), the national wintering population of whooper swan in the Republic of Ireland is 19,111 and the county population of Westmeath is 982. Therefore, as per NRA (2009), a regularly occurring population of 191 birds is required for classification as Nationally Important and of 9 birds for classification as County Importance.

This species was recorded six times over the survey period, with a maximum flock size of 21 (County Importance). Three of these records were from two consecutive days in November 2020. All five observations within 500m of the Wind Farm Site were of birds travelling, with no flocks were recorded on the ground. The only other observation was a flock of seven birds at Lough Sewdy (3km from the Wind Farm Site). As such, there is no regularly occurring population within 500m of the Wind Farm Site and the Proposed Development has no potential to result in direct habitat loss, displacement or barrier effects for this species. No pathways for direct or indirect effects exist. Therefore, whooper swan is not considered further in this assessment and the Wind Farm Site is not of significance to this species.

7.4.1.2 Golden Plover

Golden plover is listed on Annex I and Red Listed with respect to its breeding and wintering populations. It is an SCI of Lough Ree SPA and Middle Shannon Callows SPA (located 9.0km and 14.7km from the Wind Farm Site respectively). The distance between these SPAs and the Wind Farm Site is greater than the core foraging range of golden plover (3km; SNH, 2016).

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

As per the latest wintering estimates provided in Burke *et al.* (2018), the national wintering population of whooper swan in the Republic of Ireland is 80,707. The county population was estimated as the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Glen Lough - 11
- Lough Derravaragh – 18
- Lough Ennell - 20
- Lough Iron - 87
- Lough Lene - 2
- Lough Owel – 12
- Plunkett's Quarry, Castletown - 1
- Lough Ree - 233
- Shannon Callows[9] - 1,594
- White/Annagh Lough - 113

Therefore, as per NRA (2009), a regularly occurring population of 807 birds is required for classification as Nationally Important and of 20 birds for classification as County Importance.

This species was recorded 11 times over the survey period, with a maximum flock size of 60 birds (County Importance). Seven of these observations are from a single day in October 2019, with the remaining observations being from days in September and October 2020. No birds were recorded roosting or foraging on agricultural land within the Wind Farm Site or within the wider 5km survey area. As such, there is no regularly occurring population within 500m of the Wind Farm Site and the Proposed Development has no potential to result in direct habitat loss, displacement or barrier effects for this species. No pathways for direct or indirect effects exist. Therefore, golden plover is not considered further in this assessment and the Wind Farm Site is not of significance to this species.

7.4.1.3 Peregrine Falcon

Peregrine falcon is listed on Annex I of Birds Directive and is a raptor. It is not an SCI of an SPA within 15km of the Wind Farm Site.

As per the latest NPWS Article 12 reporting document, the estimated national 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 Westmeath population of peregrine. It is reasonable to estimate that a single pair would be considered of County Importance, because, assuming an even distribution of peregrine falcon across the 26 counties of the Republic of Ireland, the population of peregrine falcon in county Westmeath would be estimated to be 16 pairs. Therefore, based on the 1% threshold, a regularly occurring population of a single pair is required for the classification of County Importance.

This species was recorded 11 times over the survey period, with 4 observations occurring during the breeding season. No breeding territory for this species was confirmed within the 2km survey area over the survey period. However, a pair was recorded in a display flight in March 2021 beyond the north-eastern boundary of the Wind Farm Site. As such, adopting a precautionary approach, the peregrine falcon population recorded during surveys was assigned as **County Importance**.

[9] *Most recent data available for this I-WeBS site is from 2010/11 – 2012/13.*

7.4.1.4 Merlin

Merlin is listed on Annex I of Birds Directive and is a raptor. It is not an SCI of an SPA within 15km of the Wind Farm Site.

As per the latest NPWS Article 12 reporting document, the estimated population of merlin is between 200 – 400 pairs, which is based on information in Hardy *et al.* (2009). Therefore, 2-4 breeding pairs is of National Importance, as per NRA (2009) criteria.

This species was recorded twice over the survey period, both within the 2020 breeding season. There was one observation of an adult carrying prey south from the Wind Farm Site in the direction of a bog in May 2020. A second observation was recorded of a bird hunting over the same bog, with an additional observation of a possible merlin calling from this location in May 2020. This is a suspected nest location and is situated approximately 2.5km from the Wind Farm Site. Taking a precautionary approach, the population recorded was assigned **County Importance**.

7.4.1.5 Lapwing

Lapwing is Red Listed with respect to its breeding and wintering populations. It is an SCI of Lough Ree SPA and Middle Shannon Callows SPA (located 9.0km and 14.7km from the Wind Farm Site respectively).

As per the latest wintering estimates provided in Burke *et al.* (2018), the national wintering population of lapwing in the Republic of Ireland is 69,823. The county population was estimated as the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Glen Lough – 104
- Lough Derravaragh - 148
- Lough Ennell - 83
- Lough Glore - 2
- Lough Iron - 51
- Lough Owel – 122
- Lough Ree - 282
- Shannon Callows - 1,870
- Lough Sheever - 40
- Plunkett's Quarry, Castletown - 57
- Walshestown South Turlough - 23
- White/Annagh Lough - 90

Therefore, as per NRA (2009), a regularly occurring wintering population of 698 birds is required for classification as Nationally Important and of 28 birds for classification as County Importance.

The population of breeding lapwing in Ireland is estimated at approximately 620 pairs (NPWS, 2019). Therefore a total of six breeding pairs is required for classification as Nationally Important. Assuming an even distribution of lapwing across the 26 counties of the Republic of Ireland, the population of lapwing in Westmeath is estimated to be 24 pairs. A single breeding pair is therefore taken as being of County importance.

Lapwing was recorded a total of 22 times within, or partially within, the Wind Farm Site over the survey period. The majority of observations comprised birds travelling and circling, with a maximum flock size of 150 birds (County Importance) recorded. There were a total of 11 observations of lapwing foraging on fields, 8 of which were within the Wind Farm Site and 3 were within 500m of the Wind Farm Site, with a max flock size of 103 birds (County Importance) recorded. These observations were predominantly within the winter season, in addition to two observations of flocks of 18-20 birds recorded in June and July 2020. No breeding activity was recorded, and this species is therefore not

dependant on the Wind Farm Site for breeding. Thus, lapwing recorded during surveys in the winter and passage season are considered to be a population of **County Importance**.

7.4.1.6 Tufted Duck

Tufted duck is an SCI of Lough Ree SPA and Lough Ennell SPA (located 9.0km and 16.1km from the Wind Farm Site respectively).

As per the latest wintering estimates provided in Burke *et al.* (2018), the national wintering population of tufted duck in the Republic of Ireland is 16,927. The county population was estimated as the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Lough Derravaragh - 169
- Lough Ennell - 124
- Lough Iron - 186
- Lough Lene - 4
- Lough Owel – 181
- Lough Ree - 286
- Shannon Callows - 10

Therefore, as per NRA (2009), a regularly occurring wintering population of 169 birds is required for classification as Nationally Important and of 10 birds for classification as County Importance.

Tufted duck was recorded on three occasions over the 2-year survey period All observations comprised two birds at Lough Sewdy, located over 3km from the Wind Farm Site. There were no observations of tufted duck within 500m of the Wind Farm Site. As such, there is no regularly occurring population within 500m of the Wind Farm Site and the Proposed Development has no potential to result in direct habitat loss, displacement or barrier effects for this species. No pathways for direct or indirect effects exist. Therefore, tufted duck is not considered further in this assessment and the Wind Farm Site is not of significance to this species.

7.4.1.7 Black-headed Gull

Black-headed gull is an SCI of Middle Shannon Callows SPA (located 14.7km from the Wind Farm Site). The distance between this SPA and the Wind Farm Site is greater than the core foraging range of black-headed gull (mean 11.4km; Thaxter *et al.,* 2012).

Wintering Population

As per NPWS Article 12 Reporting, the national population of wintering black-headed gull is estimated at 48,821. The wintering county population was estimated as 551 birds from the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Lough Derravaragh – 30
- Lough Ennell – 161
- Lough Iron – 47
- Lough Owel – 131
- Lough Ree – 47
- Shannon Callows – 97
- Walshestown South Turlough – 38

Thus, as per NRA (2009), a regularly occurring wintering population of 488 birds is required for classification as Nationally Important and of 5 birds for classification as County Importance. However, it is worth noting that these reported population sizes are highly likely to be underestimated as the counting of gulls is optional under I-WeBS survey methodology, and gulls often occur outside of

wetland areas which are not covered by this survey. Furthermore, NPWS Article 12 reporting states the following concerning black-headed gull: "*this species along with other gull species that overwinter in Ireland is currently only poorly covered by the Irish Wetland Bird Survey (I-WeBS) programme. This [Article 12] reported population size...is an underestimate of the true population size*". Black-headed gull population numbers outlined above are therefore highly likely to be a considerable underestimate of the actual wintering national population and county population.

Breeding Population

The population of breeding black-headed gull in Ireland is estimated at approximately 7,810 pairs (Cummins *et al.*, 2019), based on census results for the period 2013-2018. The census was completed with respect to the number of occupied nests (i.e. breeding pairs). Taking a highly conservative approach it has been assumed that the number of birds was double the number of occupied nests, although it is likely that there were also non-breeding or juvenile birds in the area which were not accounted for in the census. Therefore, a regularly occurring breeding season population of 156 birds is required for classification as Nationally Important.

There are no published figures for the County Westmeath breeding population of black-headed gull. Assuming an even distribution of breeding black-headed gull across the 15 counties of the Republic of Ireland where breeding was recorded (including Co. Westmeath), the population of breeding black-headed gull in Co. Westmeath is estimated to be 1,041 birds. Therefore, a regularly occurring population of 10 birds is required for classification of County Importance.

Determination

This species was recorded 27 times over the survey period during winter, passage and breeding seasons. A maximum flock size of 210 birds (County Importance) was recorded within the Wind Farm Site. Both the wintering and breeding season populations of black-headed gull recorded in the Wind Farm Site during surveys are therefore considered to be of **County Importance**.

7.4.1.8 Little Grebe

Little grebe is an SCI of Lough Ree SPA (located 9.0km from the Wind Farm Site).

As per the latest wintering estimates provided in Burke *et al.* (2018), the national wintering population of little grebe in the Republic of Ireland is 1,594. The county population was estimated as the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Lough Derravaragh - 57
- Lough Ennell - 108
- Lough Glore - 23
- Lough Iron - 3
- Lough Lene - 19
- Lough Owel – 13
- Lough Ree - 26
- Lough Sheever - 1
- Slevin's Lake - 3
- White/Annagh Lough - 12

Therefore, as per NRA (2009), a regularly occurring wintering population of 15 birds is required for classification as Nationally Important and of 2 birds for classification as County Importance.

Little grebe was recorded on six occasions over the 2-year survey period. All observations comprised single birds at Lough Sewdy, located over 3km from the Wind Farm Site. There were no observations of little grebe within 500m of the Wind Farm Site. As such, there is no regularly occurring population within 500m of the Wind Farm Site and the Proposed Development has no potential to result in direct

habitat loss, displacement or barrier effects for this species. No pathways for direct or indirect effects exist. Therefore, little grebe is not considered further in this assessment and the Wind Farm Site is not of significance to this species.

7.4.1.9 Mallard

Mallard is an SCI of Lough Ree SPA (located 9.0km from the Wind Farm Site). The distance between the SPA and the Wind Farm Site is greater than the mean foraging range for mallard (2.5km; Johnson *et al.*, 2014).

As per the latest wintering estimates provided in Burke *et al.* (2018), the national wintering population of mallard in the Republic of Ireland is 18,810. The county population was estimated as the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Ballinlough (Westmeath) - 48
- Crowinstown Lough - 3
- Glen Lough - 14
- Lough Derravaragh - 14
- Lough Ennell - 49
- Lough Glore - 16
- Lough Iron - 12
- Lough Lene - 7
- Lough Owel - 41
- Lough Ree - 72
- Shannon Callows - 63
- Lough Sheever - 11
- Slevin's Lake - 2
- Walshestown South Turlough - 1
- White/Annagh Lough - 14

Therefore, as per NRA (2009), a regularly occurring wintering population of 188 birds is required for classification as Nationally Important and of 3 birds for classification as County Importance.

This species was recorded 46 times over the survey period. Flocks up to six birds (County Importance) were observed within the Wind Farm Site to a radius of 500m and the species was confirmed breeding. Thus, mallard recorded during surveys in winter and passage season are considered to be a population of **County Importance**.

7.4.1.10 Teal

Teal is an SCI of Lough Ree SPA (located 9.0km from the Wind Farm Site). The distance between the SPA and the Wind Farm Site is greater than the mean foraging range for teal (8.4km; Johnson *et al.*, 2014).

As per the latest wintering estimates provided in Burke *et al.* (2018), the national wintering population of teal in the Republic of Ireland is 27,644. The county population was estimated as the most recent 5-year mean count at the Co. Westmeath I-WeBS sites (2015/16 to 2019/20):

- Ballinlough (Westmeath) - 1
- Glen Lough - 54
- Lough Derravaragh - 17
- Lough Ennell - 6
- Lough Glore - 1
- Lough Iron - 86
- Lough Owel - 1

- Lough Sheever - 7
- Lough Ree - 56
- Shannon Callows - 282
- Plunkett's Quarry, Castletown - 1
- Walshestown South Turlough - 30
- White/Annagh Lough - 17

Therefore, as per NRA (2009), a regularly occurring wintering population of 276 birds is required for classification as Nationally Important and of 5 birds for classification as County Importance.

This species was recorded nine times over the survey period. Flocks up to eight birds (County Importance) were observed along watercourses within the Wind Farm Site to a radius of 500m. Thus, teal recorded during surveys in winter and passage season are considered to be a population of **County Importance.**

7.4.1.11 Snipe

Snipe is Red Listed with respect to breeding and wintering populations. It is not an SCI of an SPA within 15km of the Wind Farm Site.

It is important to note that snipe is an elusive species with a secretive nature, therefore national and county populations are difficult to estimate. As per the latest NPWS Article 12 reporting document, the national breeding population of snipe is estimated at 4,275 pairs. Assuming a uniform distribution throughout the Republic of Ireland, a rough population of 164 pairs per county is estimated. Therefore, as per NRA (2009), a regularly occurring population of 43 pairs is required for classification as National Importance and of 2 pairs for classification as County Importance.

This species was recorded 47 times during the survey period during winter and passage seasons. Up to eight snipe were recorded within the Wind Farm Site. As such, snipe recorded during surveys are considered to be of **County Importance**.

7.4.1.12 Kestrel

Kestrel is Red Listed with respect to breeding populations and is a raptor. It is not an SCI of an SPA within 15km of the Wind Farm Site.

As per Lewis *et al.* (2019), the national population of kestrel is estimated at 13,500 birds. Assuming a uniform distribution throughout the Republic of Ireland for this widespread species that frequents commonly occurring habitats, a rough estimate of 519 birds per county can be estimated. Therefore, as per NRA (2009), a regularly occurring population of 135 birds is required for classification as National Importance and of 5 birds is required for classification as County Importance.

Kestrel was recorded 69 times during the survey period. This species is using the Wind Farm Site for hunting, with at least two separate individuals recorded. Display behaviour was observed and sightings of juvenile birds were recorded in the vicinity of the quarry beyond the north-east boundary of the Wind Farm Site, indicating potential breeding at this location. As such, kestrel recorded during surveys are considered to be of **Local Importance (Higher Value)**.

7.4.1.13 Buzzard

Buzzard is not an SCI of an SPA within 15km of the Wind Farm Site and it is not listed on Annex I of the Birds Directive. It is Green Listed with respect to breeding and wintering populations.

As per the latest NPWS Article 12 reporting document, the national breeding population of buzzard is estimated at 1,938 pairs. Assuming a uniform distribution throughout the Republic of Ireland for this

widespread species that frequents commonly occurring habitats, a rough population of 74 pairs per county is estimated.

Buzzard was recorded 200 times during the survey period. This species is using the Wind Farm Site for hunting, with at least two separate individuals recorded. Up to five individuals were present in the wider area. Recently fledged young were recorded within the Wind Farm Site indicating probable breeding on-site. Evidence of breeding activity was also recorded within 2km of the Wind Farm Site.

However, given that buzzard is a Green Listed species and both common and widespread in Ireland, on the basis of a regularly occurring population of one pair within the Wind Farm Site assessed to be important at the local level, buzzard recorded during surveys are considered to be of **Local Importance (Higher Value)**.

7.4.1.14 Sparrowhawk

Sparrowhawk is not an SCI of an SPA within 15km of the Wind Farm Site and it is not listed on Annex I of the Birds Directive. It is Green Listed with respect to breeding and wintering populations.

As per the latest NPWS Article 12 reporting document, the national breeding population of sparrowhawk is estimated at 11,859 pairs. Assuming a uniform distribution throughout the Republic of Ireland for this widespread species that frequents commonly occurring habitats, a rough population of 456 pairs per county is estimated.

Sparrowhawk was recorded 38 times during the survey period. This species was observed in the Wind Farm Site and wider area; an individual was observed each time. No breeding activity was recorded within the Wind Farm Site. A pair was observed soaring together within 2km of the Wind Farm Site, indicating possible breeding in the wider area.

However, given that sparrowhawk is a Green Listed species and both common and widespread in Ireland, on the basis of a regularly occurring population assessed to be important at the local level, sparrowhawk recorded during surveys are considered to be of **Local Importance (Higher Value)**.

7.4.1.15 Passerines (Red Listed)

Grey wagtail, meadow pipit, redwing, stock dove, swift and whinchat are Red listed on the BoCCI. Populations recorded at the Proposed Development area were deemed to be of no greater than **Local Importance (Lower Value)**.

7.4.2 Identification of Key Ornithological Receptors

Table 7-11 outlines the rationale for including or excluding each target species recorded during field surveys as a 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
Whooper swan	Annex I Birds Directive	**Wintering** No population of ecological significance recorded	Whooper Swan was recorded infrequently and in low numbers. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the 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**
Golden plover	Annex I Birds Directive & BoCCI Red List (Breeding & Wintering Populations)	**Wintering** No population of ecological significance recorded	Golden plover was recorded infrequently and in low numbers. No birds were recorded roosting or foraging on lands within the Wind Farm Site or within the wider 5km survey area. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the 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 Birds Directive	**All seasons** County importance	This species was recorded hunting within the Wind Farm Site. The potential for direct 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
			Birds were recorded within the Wind Farm Site and were observed displaying within 500m of the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement cannot be excluded. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. The potential for collision risk cannot be excluded. **A collision risk assessment is required.**	
Merlin	Annex I Birds Directive	**Breeding** County importance	This species was recorded hunting within the Wind Farm Site on one occasion, carrying prey away. On a precautionary basis, the potential for direct habitat loss on breeding merlin cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the Wind Farm Site and a probable nest site was identified 2.5km south of the Wind Farm Site. The disturbance distance for merlin is up to 500m (Ruddock and Whitfield, 2007), therefore the separation distance between the nest site and the Wind Farm Site is such that no impact is anticipated. However, given that merlin was observed hunting within the Wind Farm Site, the potential for disturbance/displacement exists**. An assessment of disturbance/displacement is required.** This species was not recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is not required.**	**Yes**
Lapwing	BoCCI Red List (Breeding & Wintering Populations)	**Wintering** County importance **Breeding**	This species was recorded foraging within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
		No population of ecological significance recorded	Birds were recorded foraging within and travelling over the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	
Tufted Duck	BoCCI Amber List	**Wintering** No population of ecological significance recorded	Tufted duck was not recorded within the Wind Farm Site, and was only recorded infrequently and in low numbers over 3km from the 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 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**
Black-headed Gull	BoCCI Amber List	**Breeding** County importance **Wintering** County importance	This species was recorded foraging within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded foraging within and travelling over the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	**Yes**
Little Grebe	BoCCI Green List	**All Seasons**	Little grebe was not recorded within the Wind Farm Site, and was only recorded infrequently and in low numbers over 3km from the Wind Farm Site. The potential for direct habitat loss, disturbance/displacement and	**No**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
		No population of ecological significance recorded	collision risk are limited and there is no evidence to suggest that the 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.**	
Mallard	BoCCI Amber List	**All Seasons** County importance	This species was recorded using watercourses within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within and travelling over the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	**Yes**
Teal	BoCCI Amber List	**Wintering** County importance	This species was recorded using watercourses within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within and travelling over the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	**Yes**
Snipe	BoCCI Red List (Breeding & Wintering Populations)	**Wintering** County importance	This species was recorded roosting within the Wind Farm Site. The potential for direct 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
			Birds were recorded roosting within and travelling through the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	
Kestrel	BoCCI Red List (Breeding Populations)	**All Seasons** Local importance (Higher value)	This species was recorded hunting within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded using the Wind Farm Site. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	**Yes**
Buzzard	BoCCI Green List	**All Seasons** Local importance (Higher value)	This species was recorded hunting within the Wind Farm Site and one probable breeding territory was recorded. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Probable breeding birds were recorded within the Wind Farm Site. As such, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Sparrowhawk	BoCCI Amber List	**All Seasons** Local Importance (Higher value)	This species was recorded hunting within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded using the Wind Farm Site for hunting. Taking a precautionary approach, the potential for disturbance/displacement exists. **An assessment of disturbance/displacement is required.** This species was recorded flying over the Wind Farm Site within potential collision risk height. **A collision risk assessment is required.**	**Yes**
Passerines (Red Listed)	BoCCI Red List	**All Seasons** Local importance (Lower value)	As per SNH guidance, it is generally considered that passerine species are not significantly impacted by wind farms due primarily to their large population sizes.	**No**

7.4.3 Key Ornithological Receptor Sensitivity Determination

Criteria developed by Percival (2003) for assessing bird sensitivity within the 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 are:

- Merlin (Annex I EU Birds Directive);
- Peregrine (Annex I EU Birds Directive);
- Lapwing (BoCCI Red Listed);
- Black-headed Gull (regionally/county important population);
- Mallard (regionally/county important population);
- Teal (regionally/county important population);
- Snipe (BoCCI Red Listed); and
- Kestrel (BoCCI Red Listed).

Low Sensitivity KORs are:

- Buzzard (lower conservation concern); and
- Sparrowhawk (lower conservation concern).

7.5 Potential Impacts

All elements of the Proposed Development 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
- Assessment of impacts in relation to KORs during decommissioning
- Assessment of impacts associated with the Grid Connection underground electrical cabling route
- Assessment of impacts on designated areas

7.5.1 Do-Nothing Effect

If the Proposed Development 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 improved agricultural grassland utilised for livestock grazing and some commercial forestry plantation. It is assumed 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 describes potential effects on KORs that may occur during the construction and operation of the Wind Farm Site. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022) criteria.

7.5.2.1 Peregrine Falcon (All seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded 11 times over the survey period, with four observations occurring within the breeding season. It was occasionally observed hunting within, or partially within, 500m of the proposed turbine layout. The hunting habitat lost to the development footprint is small (i.e. <8.2ha/0.9% of the EIAR Site Boundary) relative to the total area within the Wind Farm Site. This species is unlikely to be dependent on the onsite habitats for hunting, given the low number of observations, the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (e.g. agricultural grassland/coniferous plantation). Significant effects of direct habitat loss are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Likely Long-term Constant **Slight** Negative Effect
Disturbance	There were 11 observations of this species hunting within 500m of the Wind Farm Site. No breeding territory for this species was confirmed within the 2km survey area over the survey period. However, a pair was recorded in display flight in March 2021 over a quarry outside the north-eastern boundary of the Wind Farm Site. While this species does breed in quarries, in this instance, as previously outlined, the quarry in question is a sand and gravel quarry which is less likely to offer the cliff faces peregrine require for nesting. For this reason, peregrine occupancy is considered unlikely.	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.	Likely Short-term Frequent **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	Disturbance during construction is unlikely to discourage continued flight or foraging activity in the vicinity of the Wind Farm Site, particularly given peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock *et al.,* 2007). However, on a precautionary basis, it is assumed that some temporary disturbance may occur in the immediate area bordering the wind farm. Significant disturbance effects are not anticipated at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was occasionally observed hunting within 500m of the Wind Farm Site. No breeding territory for this species was confirmed within the 2km survey area over the survey period. A pair was recorded in a display flight in March 2021 over a quarry outside the north-eastern boundary of the Wind Farm Site. This was the only observation of peregrine breeding behaviour over the two years of surveys. However, as previously outlined this quarry is unlikely to offer suitable nesting habitat for peregrine and the evidence from surveys does not indicate occupancy of the quarry. On a precautionary basis, it is assumed that some temporary displacement may occur in the immediate area of the wind farm following commissioning. However, peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock *et al.,* 2007). It is, therefore, reasonable to conclude that following a period of habituation, hunting and potential breeding birds will become accustomed to the wind farm in the landscape.	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.	Likely Long-term Constant **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	Significant displacement effects are not predicted at the county, national or international scale.		
Collision Risk	This species was recorded flying within the potential collision risk height during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a ratio of 0.144 collisions per year or one bird every 7 years. Annual mortality of adult peregrine has been calculated at 19% per annum (Craig *et al.*, 2004). If 0.144 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. estimated at *c.*32 birds [please see Section 7.4.1 for further details]) by 2.4%. The predicted collision risk is therefore low. No significant effects are anticipated at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Likely Long-term Constant **Slight** Negative Effect

7.5.2.2 Merlin (Breeding)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded hunting on one occasion within 500m of the proposed turbine layout. Given the low levels of activity recorded within the Wind Farm Site and that extensive areas of suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area, significant effects of direct habitat loss are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Disturbance	Merlin was only observed hunting within the Wind Farm Site on one occasion over the survey period. A breeding territory is suspected approximately 2.5km from the Wind Farm Site. Significant effects are not anticipated particularly given the low levels of activity recorded within the Wind Farm Site. Moreover, there is an abundance of suitable habitat analogous to the Wind Farm Site in the wider area (i.e. agricultural grassland and conifer plantation). The probable breeding territory is located over 2.5km distant from the Wind Farm Site. This is significantly beyond the disturbance buffer of up to 500m for breeding merlin outlined by Ruddock and Whitfield (2007). Significant disturbance effects are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Likely Short-term Frequent **Not Significant** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Merlin was only observed hunting within the Wind Farm Site on one occasion over the survey period. A breeding territory is suspected approximately 2.5km from the Wind Farm Site. Significant effects are not anticipated particularly given the low levels of activity recorded within the Wind Farm Site. Moreover, there is an abundance of suitable habitat analogous to the Wind Farm Site in the surrounding area (i.e. agricultural grassland and conifer plantation). The probable breeding territory is located over 2.5km distant from the Wind Farm Site. This is significantly beyond the disturbance buffer of up to 500m for breeding merlin outlined in Ruddock and Whitfield (2007). Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was not recorded flying at PCH during the extensive vantage point survey work undertaken. Collision related mortality is not likely to significantly impact this species, based on available data. Significant effects are not predicted.	**No Effect**	**No Effect**

7.5.2.3 Lapwing (Wintering)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Lapwing was recorded a total of 22 times within, or partially within, the Wind Farm Site over the survey period, 19 of which were during the winter season. Lapwing were observed utilising agricultural land within the Wind Farm Site for foraging on eight occasions. This is a low rate of occurrence and demonstrates a lack of dependence of lapwing on the habitats of the Wind Farm Site. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of the EIAR Site Boundary) relative to the total area within the Wind Farm Site. This species is unlikely to be dependent on the onsite habitats, given the low number of foraging observations, the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (i.e. agricultural grassland). Significant habitat loss effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Likely Long-term Constant **Slight** Negative Effect
Disturbance	Lapwing were regularly recorded travelling and circling within, or partially within the Wind Farm Site and surrounds during surveys. They were also occasionally observed at Lough Sewdy, which is 3.5km from the Wind Farm Site. There was no evidence to suggest that wintering lapwing were utilising the Wind Farm Site and immediate surroundings for foraging or roosting with any	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low*	Likely Short-term Frequent **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	regularity. The majority of observations were of birds commuting over the Wind Farm Site, and these flights are unlikely to be impacted by construction works. Furthermore the availability of similar suitable habitats in the surroundings (i.e. agricultural grassland) limits the potential for significant disturbance effects. Significant disturbance effects are not anticipated at the county, national and international scale.	Impact corresponds to a **Low** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Lapwing were regularly recorded travelling and circling within, or partially within the Wind Farm Site and surrounds during surveys. They were also occasionally observed at Lough Sewdy, which is 3.5km from the wind farm. There was no evidence to suggest that wintering lapwing were utilising the Wind Farm Site and surroundings for foraging or roosting with any regularity. The majority of observations were of birds travelling/circling over the Wind Farm Site, No pattern of direction was observed from these flights and no regular commuting over the site was recorded. Furthermore the availability of alternative suitable habitat in the surroundings (i.e. agricultural grassland) limits the potential for significant displacement effects. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Likely Long-term Constant **Slight** Negative Effect
Collision Risk	This species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and	Likely Long-term Constant **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	The collision risk has been calculated at a rate of 15.27 collisions per year. Annual mortality of lapwing has been calculated at 29.5% per annum (Peach *et al*, 1994). If 15.288 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. *c.*2,872 birds [please see Section 7.4.1 for further details]) by 1.8%. The predicted collision risk is therefore low in the context of the local population. No significant effects are anticipated at the county, national or international scale.	*Low* Impact corresponds to a **Low** effect significance.	

7.5.2.4 Black-headed Gull (Breeding)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded 27 times over the survey period, with 20 observations during the breeding season. This species was occasionally observed within, or partially within, 500m of the proposed turbine layout. Black-headed gull were only observed utilising agricultural land within the Wind Farm Site for foraging on two occasions during the breeding season. This is a very low rate of occurrence and demonstrates a lack of dependence of black-headed gull on the habitats of the Wind Farm Site. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. This species is unlikely to be dependent on the onsite habitats, given the low number of observations, the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (i.e. agricultural grassland). Significant habitat loss effects are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Disturbance	This species was occasionally observed within, or partially within, 500m of the proposed turbine layout. There was no evidence to suggest that black-headed gull were utilising the Wind Farm Site and surrounds for foraging or roosting with any regularity and there is no suitable breeding habitat within the Wind Farm Site. The majority of observations were of birds travelling over the Wind Farm Site, and these flights are unlikely to be impacted by construction works. Significant disturbance effects are not anticipated at the county, national and international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Likely Short-term Frequent **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was occasionally observed within, or partially within, 500m of the proposed turbine layout. There was no evidence to suggest that black-headed gull were utilising the Wind Farm Site and surrounds for foraging or roosting with any regularity and there is no suitable breeding habitat within the Wind Farm Site. The majority of observations were of birds travelling over the Wind Farm Site. No pattern of direction was observed from these flights and no regular commuting over the site was recorded. Significant displacement effects are not predicted at the county, national or international level.	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	Likely Long-term Constant **Slight** Negative Effect
Collision Risk	This species was recorded flying within the potential collision risk zone during vantage points surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. As outlined in Section 7-4, the county population of breeding black-headed gull was determined based on a highly conservative approach and, as such, the below assessment represents a highly conservative estimate of collision rate.	The magnitude of the effect is assessed as *Medium*. The cross tablature of a *Medium* sensitivity species and	Likely Long-term Constant **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	The collision risk has been calculated at a rate of 9.357 collisions per year. Annual mortality of adult black-headed gull has been calculated at 10% per annum (Prévot-Julliard *et al.*, 1998). If 9.37 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county breeding season population (i.e. 1,041 birds [please see Section 7.4.1 for further details]) by 8.99%. The predicted collision risk is therefore of medium magnitude as per Percival (2003). As previously outlined the black-headed gull population is likely an underestimate (as the population census was not a total count but rather focused on active nests), and this has inflated the predicted increase in annual mortality beyond what is actually likely.	*Medium* Impact corresponds to a **Low** effect significance	

7.5.2.5 Black-headed Gull (Wintering)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded 27 times over the survey period, with 7 observations occurring during wintering season. This species was occasionally observed within, or partially within, 500m of the proposed turbine layout. The majority of observations comprised birds travelling and circling. Black-headed gull were also observed utilising agricultural land within the Wind Farm Site for foraging. Of the seven observations of this species during the wintering season, five were from a 3 hour period on one survey day. This is a low rate of occurrence and demonstrates a lack of dependence of black-headed gull on the habitats of the Wind Farm Site. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. This	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	Likely Long-term Constant **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	species is unlikely to be dependent on the onsite habitats, given the low number of observations, the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (i.e. agricultural grassland). Significant effects of habitat loss are not predicted at the county, national or international scale.		
Disturbance	This species was occasionally observed within, or partially within, 500m of the proposed turbine layout. There was no evidence to suggest that black-headed gull were utilising the Wind Farm Site for foraging or roosting with any regularity. The majority of observations were of birds travelling/circling over the Wind Farm Site, and these flights are unlikely to be impacted by construction works. Significant displacement effects are not anticipated at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Short-term Frequent **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was occasionally observed within, or partially within, 500m of the proposed turbine layout. There was no evidence to suggest that black-headed gull were utilising the Wind Farm Site for foraging or roosting with any regularity. The majority of observations were of birds travelling/circling over the Wind Farm Site. No pattern of direction was observed from these flights and no regular commuting over the site was recorded. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. It is of note that, of the total seven observations of this species during the wintering season, five were from a 3 hour period on one survey day, comprising a flock of *c.*75 birds. In addition, as discussed in Section 7.4.1, the population numbers for wintering black-headed gull are based on IWeBS data and are highly likely to be a considerable under-estimate of the actual wintering county population. As such, the below assessment represents a highly conservative approach in respect to collision risk. The collision risk has been calculated at a rate of 0.025 collisions per year. Annual mortality of adult black-headed gull has been calculated at 10% per annum (Prévot-Julliard *et al.*, 1998). If 0.025 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 wintering population (i.e. *c.*551 birds [please see Section 7.4.1 for further details]) by 0.05%. The predicted collision risk is therefore of medium magnitude as per Percival (2003). As previously outlined the black-headed gull population is likely an underestimate (as per Article 12 reporting), and this has inflated the predicted increase in annual mortality beyond what is actually likely.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance	Likely Long-term Constant **Not Significant** Negative Effect

7.5.2.6 Mallard (All seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded 46 times over the survey period. This species was observed on 19 occasions within, or partially within, 500m of the proposed turbine layout. The majority of observations comprised birds travelling and birds present on the Dungolman River within the Wind Farm Site, including one confirmed breeding pair. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. Mallard preferentially utilise wet areas for foraging and roosting. As such, direct loss of foraging habitat relative to its availability onsite will be minimal. In addition, apart from a single clear-span bridge to facilitate a road crossing, the majority of works will be located a minimum of 50m from the Dungolman River, and as such, there will be minimal direct habitat loss within areas of suitable habitat. Furthermore, substantial areas of undisturbed similar habitat will remain in the surrounding area. Significant effects of habitat loss are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Disturbance	In total, this species was recorded on 19 occasions within 500m of the proposed turbine layout. Mallard were using the Dungolman River within the Wind Farm Site, including one confirmed breeding pair. Apart from a single clear-span bridge to facilitate a road crossing, the majority of works will be located a minimum of 50m from the Dungolman River, and as such, there is minimal potential for disturbance within this habitat. The availability of alternative suitable habitat in the surroundings also limits the potential for significant disturbance effects. During surveys of the wider area, mallard were regularly recorded in Lough Sewdy, which is 3.5km from the	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	Likely Short-term Frequent **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	wind farm and unlikely to be impacted by the construction works given this separation distance. Significant disturbance effects are not predicted at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	In total, this species was recorded on 19 occasions within 500m of the proposed turbine layout. Mallard were using the Dungolman River within the Wind Farm Site, including one confirmed breeding pair. The majority of turbine infrastructure will be sited a minimum of 50m from the Dungolman River and, as such, there is minimal potential for displacement effects in these areas of suitable habitat. The availability of alternative suitable habitat in the surroundings limit the potential for significant displacement effects. During surveys of the wider area, mallard were regularly recorded in Lough Sewdy, which is 3.5km from the wind farm and unlikely to be impacted by the Proposed Development given this separation distance. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Collision Risk	This species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a rate of 0.172 collisions per year or one bird every 6 years. Annual mortality of adult mallard has been calculated at an average 32% per annum (range 54%-10%; Gunnarsson *et al.*, 2008). If 0.172	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. *c.*367 birds [please see Section 7.4.1 for further details]) by 0.15%. The predicted collision risk is therefore negligible in the context of the local population.	to a **Very Low** effect significance	

7.5.2.7 Teal (Wintering)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded nine times over the survey period. Of these, teal were observed on five occasions within, or partially within, the Wind Farm Site. The majority of observations comprised birds flushed from Dungolman River within the Wind Farm Site. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. Teal preferentially utilise wet areas for foraging and roosting. As such, direct loss of foraging habitat relative to its availability onsite will be minimal. In addition, apart from a single clear-span bridge to facilitate a road crossing, the majority of works will be located a minimum of 50m from the Dungolman River, and as such, there will be minimal direct habitat loss within areas of suitable habitat. Furthermore, substantial areas of similar habitat will remain in the surrounding area. Significant effects of habitat loss are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Disturbance	In total, this species was recorded on five occasions within 500m of the proposed turbine layout. Teal were using the Dungolman River within the Wind Farm Site.	The magnitude of the effect is assessed as *Low*.	Likely Short-term Frequent **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	Apart from a single clear-span bridge to facilitate a road crossing, the majority of works will be located a minimum of 50m from the Dungolman River, and as such, there is minimal potential for disturbance within this habitat. The availability of alternative suitable habitat in the surroundings also limits the potential for significant displacement effects. During surveys of the wider area, teal were occasionally recorded in Lough Sewdy, which is 3.5km from the wind farm and unlikely to be impacted by construction works given this separation distance. Significant disturbance effects are not predicted at the county, national or international scale.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	In total, this species was recorded on five occasions within 500m of the proposed turbine layout. Teal were using the Dungolman River within the Wind Farm Site. The majority of turbine infrastructure will be sited a minimum of 50m from the Dungolman River and, as such, there is minimal potential for displacement effects in these areas of suitable habitat. The availability of alternative suitable habitat in the surroundings also limits the potential for significant displacement effects. During surveys of the wider area, teal were occasionally recorded in Lough Sewdy, which is 3.5km from the wind farm and unlikely to be impacted by the Proposed Development given this separation distance. Significant displacement effects are not predicted at the county, national and international level.	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	Likely Long-term Constant **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a rate of 0.009 collisions per year or one bird every 114 years. The predicted collision risk is therefore negligible in the context of the local, county and national population.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance	Likely Long-term **Not Significant** Constant Negative Effect

7.5.2.8 Snipe (Wintering)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded 37 times over the survey period. This species was observed on 23 occasions within, or partially within, the Wind Farm Site. The majority of observations comprised birds flushed from agricultural fields within vicinity of the Dungolman River within the Wind Farm Site. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. Snipe preferentially utilise wet areas for foraging and roosting. As such, direct loss of foraging habitat relative to its availability onsite will be minimal. Furthermore, substantial areas of undisturbed agricultural grassland habitat will remain in the surrounding area. Significant effects of habitat loss are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Disturbance	In total, this species was recorded on 19 occasions within 500m of the proposed turbine layout. Snipe were flushed in small numbers from agricultural fields. The availability of alternative suitable habitat in the	The magnitude of the effect is assessed as *Low*.	Likely Short-term Frequent **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	surroundings limits the potential for significant disturbance effects. During surveys of the wider area, snipe were regularly recorded in Lough Sewdy, which is 3.5km from the wind farm and unlikely to be impacted by the construction works given this separation distance. Significant disturbance effects are not predicted at the county, national or international scale.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	In total, this species was recorded on 19 occasions within 500m of the proposed turbine layout. Snipe were flushed in small numbers from agricultural fields. The availability of alternative suitable habitat in the surroundings limits the potential for significant displacement effects. During surveys of the wider area, snipe were regularly recorded in Lough Sewdy, which is 3.5km from the wind farm and unlikely to be impacted by the Proposed Development given this separation distance. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Collision Risk	This species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a rate of 0.047 collisions per year or one bird every 21 years. Annual mortality of adult snipe has been calculated at 37.5% (Spence, 1988). If 0.047 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. *c.*328 birds [please see Section 7.4.1 for further	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

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	details]) by 0.038%. The predicted collision risk is therefore negligible in the context of the county and national population.		

7.5.2.9 Kestrel (All seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded 69 times over the survey period. This species utilises the Wind Farm Site for hunting. The land lost to the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. As such, direct loss of hunting habitat relative to its availability onsite will be minimal. Furthermore, this species is unlikely to be dependent on the onsite habitats, given the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (e.g. agricultural grassland/coniferous plantation). Significant effects of habitat loss are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Disturbance	This species utilises the Wind Farm Site for hunting. No breeding territory for this species was confirmed within the 2km survey area over the survey period. However, possible breeding was identified at the quarry beyond the north-eastern boundary of the Wind Farm Site. On a precautionary basis, it is assumed that some temporary disturbance may occur in the immediate area of the wind farm. However, the Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local kestrel population.	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	Likely Short-term Frequent **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	Given that extensive areas of suitable foraging/breeding habitat exist and will remain in the wider area and that onsite habitats are not considered unique to the Wind Farm Site, significant displacement effects are not predicted at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	In total, this species was recorded on 49 occasions within 500m of the proposed turbine layout. This species utilises the Wind Farm Site for hunting. No breeding territory for this species was confirmed within the 2km survey area over the survey period. However, possible breeding was identified at the quarry beyond the north-eastern boundary of the Wind Farm Site. Raptor studies have generally found only low levels of turbine avoidance (Hötker *et al.,* 2006; Madders and Whitfield 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins *et al.*, 2009). Moreover, extensive areas of suitable foraging habitat exist and will remain in the wider area post-commissioning. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance	Likely Long-term Constant **Slight** Negative Effect
Collision Risk	This species was recorded flying within the potential collision height during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a ratio of 1.11 collisions per year. Annual mortality of adult kestrel has been calculated at 31% per annum (Village, 1990). If 1.112 collisions were to occur per year, it would mean that	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* Impact corresponds	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. estimated at *c.*519 birds [please see Section 7.4.1 for further details]) by 0.7%. The predicted collision risk is therefore negligible in the context of the county and national population. Significant effects are not predicted.	to a **Very Low** effect significance	

7.5.2.10 Buzzard (All seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded hunting within the Wind Farm Site during the breeding and winter seasons. There was one probable breeding territory within the Wind Farm Site during the 2019 breeding season. The construction of the Wind Farm Site will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. Also, given the lack of suitable breeding habitat within the Wind Farm Site (i.e. a minimal amount of mature woodland/treelines), significant loss of breeding habitat is not anticipated. This species is unlikely to be dependent on the onsite habitats, given the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (e.g. agricultural grassland/coniferous plantation). Significant effects of habitat loss are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance	Likely Long-term Constant **Not Significant** Negative Effect
Disturbance	This species was regularly recorded hunting within the Wind Farm Site and wider 2km survey radius during the breeding and wintering season. There	The magnitude of the effect is assessed as *Medium*.	Likely Short-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	was one probable breeding territory within the Wind Farm Site during the 2019 breeding season. On a precautionary basis, it is assumed that some temporary disturbance may occur in the immediate area of the wind farm. However, the Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local buzzard population. Given that extensive areas of suitable foraging/breeding habitat exist and will remain in the wider area and that onsite habitats are not considered unique to the Wind Farm Site, 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 or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was frequently recorded hunting within the Wind Farm Site during the breeding and winter season, with one probably breeding territory recorded on-site during the 2019 breeding season. Pearce-Higgins (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. There was only one probable breeding territory identified within 500m of the proposed turbine layout. Buzzard is a widespread species and the breeding population in Ireland is BoCCI Green Listed. The Wind Farm Site does not contain habitats that are scarce locally or unique to the area. Moreover, extensive areas of suitable foraging and breeding habitat exist and will remain in the wider area (i.e. outside 500m from the proposed turbine layout post-commissioning). Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance	Likely Long-term **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a rate of 1.559 collisions per year. Annual mortality of adult buzzard has been calculated at 10% per annum (Kenward *et al.*, 2000). If 1.559 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. estimated at *c.*519 birds [please see Section 7.4.1 for further details]) by 3%. The predicted collision risk is therefore low in the context of the county and national population. No significant effects are anticipated at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance	Likely Long-term **Not Significant** Negative Effect

7.5.2.11 Sparrowhawk (All seasons)

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded hunting within the Wind Farm Site during the breeding and winter seasons. No breeding territories were recorded within the Wind Farm Site. The Proposed Development will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e. 8.2ha/0.9% of EIAR Site Boundary) relative to the total area within the Wind Farm Site. Furthermore, sparrowhawk are unlikely to be dependent on the onsite habitats (e.g. hedgerows and conifer forestry) given that these are not considered unique to the Wind Farm Site or rare in the wider surroundings.	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	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	Significant effects of habitat loss are not predicted at the county, national or international scale.		
Disturbance	This species was regularly recorded hunting within the Wind Farm Site and wider 2km survey radius during the breeding and wintering season. On a precautionary basis, it is assumed that some temporary disturbance may occur in the immediate area of the wind farm during construction works. However, the Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were displacement to occur it would not result in the loss of a scarce resource for the local sparrowhawk population. Given that extensive areas of suitable foraging/breeding habitat exist and will remain in the wider area and that onsite habitats are not considered unique to the Wind Farm Site, significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance	Likely Short-term Frequent **Not Significant** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was regularly recorded hunting within the Wind Farm Site and wider 2km survey radius during the breeding and wintering season. Displacement from turbines is not reported for sparrowhawk, however, it is assumed for the purposes of the assessment that sparrowhawk show avoidance to a distance of 500m from turbines as with other raptors (Pearce-Higgins *et al.*, 2009). Sparrowhawk is a widespread species and the population in Ireland is BoCCI Green Listed. Moreover, extensive areas of suitable foraging and	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	Likely Long-term Constant **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Development		Significance (Percival, 2003)	Significance (EPA, 2022)
	breeding habitat exist and will remain in the wider area (i.e. outside 500m from the proposed turbine layout post-commissioning). Significant displacement effects are not predicted at the county, national or international scale.		
Collision Risk	This species was recorded flying within the potential collision risk zone during VP surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7.5. The collision risk has been calculated at a rate of 0.05 collisions per year. Annual mortality of adult sparrowhawk has been calculated at 31% per annum (Newton, 1986). If 0.05 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase the annual mortality of the county population (i.e. estimated at 456 birds [please see Section 7.4.1 for further details] by 0.03%. The predicted collision risk is therefore negligible in the context of the county and national population. No significant effects are anticipated.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Low* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance	Likely Long-term Constant **No Significant** Negative Effect

7.5.3 Effects on Key Ornithological Receptors during Decommissioning

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

Potential impacts during the decommissioning phase of the Proposed Development		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Displacement	As above for construction phase for each species listed as a KOR.	As above for the construction phase for each KOR	As above for the construction phase for each KOR

7.5.4 Effect Associated with the Grid Connection and Turbine Delivery Route

The proposed Grid Connection underground electrical cabling route will commence from the Grid Connection onsite substation and will run along existing roads to the existing 110 kV Thornsberry substation in Co. Offaly. Required works are minor and are predominantly located within the existing road corridor (full details in Chapter 4 of this EIAR). The proposed turbine delivery route will require temporary junction accommodation for abnormal loads, therefore required works are also minor and are located within the existing road corridor (full details in Chapter 4 and Chapter 14 of this EIAR). Upon completion of the turbine delivery phase, the delivery route temporary accommodation works locations will revert back to existing condition.

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

7.5.5 Effects on Designated Areas

The Wind Farm Site is not located within the boundaries of any European or Nationally designated sites (see Chapter 6 of this EIAR). In relation to nationally designated sites, no proposed National Heritage Area (pNHA) or National Heritage Area (NHA) within the ZOI were considered as ecological receptors in their own right due to the separation distance from the Proposed Development and the absence of connectivity, and due to the nature of the conservation sites (terrestrial habitats).

In relation to European sites, an AASR was prepared to provide the information necessary to complete an Appropriate Assessment for the Proposed Development. The AASR concludes as follows:

"Following an examination, analysis and evaluation of the relevant data and information set out within this Screening Report, it cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Development, individually or in combination with other plans and projects, would be likely to have a significant effect on the following sites: Lough Ree SAC and Lough Ree SPA".

The screening identifies the following European sites as being within the Likely Zone of Impact:

- Lough Ree SAC
- Lough Ree SPA

As a result, an Appropriate Assessment of the Proposed Development is required, and a NIS has been prepared in respect of the Proposed Development. The NIS concludes as follows:

"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation and decommissioning of the Proposed Development does not adversely affect the integrity of European sites. Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.".

7.6 Mitigation and Best Practice Measures

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

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

7.6.1 Mitigation by Design

The Proposed Development design has followed 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 turbine model that is selected.

- The Grid Connection underground electrical cabling 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 by Management of the Proposed Development Phases

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

7.6.2.1 Construction Phase

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

- Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by pre-construction bird surveys.
- The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Acts 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use.
- Silt fences will be installed as an additional water protection measure around existing watercourses.

- If bird breeding activity of species of conservation concern are identified during the works, the nest sites will be located, and no works shall be undertaken within 500m buffer in line with industry best practice.
- 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 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.

7.6.2.2 Operational Phase

No significant operational phase impacts requiring mitigation were identified.

7.6.2.3 Decommissioning Phase

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

7.7 Monitoring

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

7.7.1 Pre-Construction

Pre-construction surveys will be undertaken prior to the initiation of works at the Wind Farm Site. The survey will include a thorough walkover survey to a 500m radius of the Proposed Development 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). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.7.2 Post-Construction

A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development (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 operational phase of the Proposed Development. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. Monitoring measures are broadly based on guidelines issued by SNH (2009). The following individual components are proposed:

- Vantage point surveys to monitor flight activity in the vicinity of the turbines;
- Breeding walkover surveys to monitor breeding bird activity at the 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.

7.7.3 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 Development 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) 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.

7.8 Residual Effects

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

- Peregrine (all seasons)
- Merlin (breeding)
- Lapwing (wintering)
- Black-headed Gull (breeding and wintering)
- Mallard (all seasons)
- Teal (wintering)
- Snipe (wintering)
- Kestrel (all seasons)
- Buzzard (all seasons)
- Sparrowhawk (all seasons)

Following the enhancement measures described in Section 7.6.3, 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, displacement or collision mortality are not anticipated.

7.9 Cumulative Effects

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

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

7.9.1 Other Plans and Projects

Assessment material was compiled for relevant developments within the vicinity of the Wind Farm Site as detailed in Section 2.7 in Chapter 2 of this EIAR. 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 Development. All plans and projects reviewed are outlined below.

7.9.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Westmeath County Development Plan 2021-2027
- Offaly County Development Plan 2021-2027
- Regional Planning Guidelines for the Midland Region 2010-2022
- National Biodiversity Action Plan 2017-2021

7.9.1.2 Projects Considered in the Cumulative Impact Assessment

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

To conduct the cumulative impact assessment, as detailed in Section 2.7 in Chapter 2 of this EIAR, relevant online planning registers, relevant EIAR (or historical EIS) documents, planning application details and planning drawings in the vicinity of the Proposed Development site 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.

Forestry and Agricultural Practices

The wider surroundings of the Proposed Development primarily consist of land managed for agriculture in the form of livestock grazing and commercial conifer plantations, both of low ecological value. These landuses have been taken into account in this cumulative assessment.

Other Developments

The review of the County Council's planning registers identified relevant general development planning applications in the vicinity of the Proposed Development. 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.

Other Wind Farm Developments

Wind farm projects within 25km of the Proposed Development turbines are provided in Table 7-12 and are presented in terms of their proximity to the Wind Farm Site and whether the project is permitted/operational or pending/under appeal. There are no existing wind farms within 25km of the Proposed Development turbines, however three early stage proposals have been identified. These are outlined in Table 7-12 and discussed in detail below.

Table 7-12 Wind farms within 25km of the Proposed Development turbines

Wind Farm	Status	No. of Turbines	Separation Distance (turbine to turbine)	Nearest Turbine
Kepak (Kilbeggan) Single Wind Turbine	Further Information requested (WCC ref: 22537)	1	18.3km south-east	not constructed
Lemanaghan Wind Farm	Pending (Pre-Application Phase)	13 – 17	16.3 km south	not constructed
Derryadd Wind Farm	Pending (Pre-Application Phase)	25	18.6 km north-west	not constructed

- Kepak (Kilbeggan) Single Wind Turbine

The potential for the Proposed Development to result in significant cumulative or in-combination effects when assessed alongside Kepak Single Wind Turbine, which is c.18.3km from the nearest proposed turbine location, was considered. The planning files were searched and the Ecology Report Appropriate Assessment was reviewed. The assessment concluded that the Kepak turbine is unlikely to have any significant impact on SPAs. A list of bird species recorded during field visits was also reviewed and the KOR buzzard had been recorded in the late breeding season in an area of limited suitable breeding habitat: the main habitats within the site were buildings, roads and wet grassland. Given the location of the Kepak turbine, the habitat composition, the scale of the development and the lack of significant residual impacts on bird species, including buzzard, associated with the Proposed Development when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, disturbance/displacement or collision mortality are not anticipated.

- Lemanaghan Wind Farm

The potential for the Proposed Development to result in significant cumulative or in-combination effects when assessed alongside Lemanaghan Wind Farm, which is c.16.3km from the nearest proposed turbine location, was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. However, given the location of the Lemanaghan Wind Farm, the nature of the habitats (cutover bog, which is noted to be very different from the agricultural grassland of the Proposed Development) onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the proposed Umma More Wind Farm when considered on its own, significant cumulative or in-combination effects on KORs with regard to direct habitat loss, disturbance/displacement or collision mortality are not anticipated.

- Derryadd Wind Farm

The potential for the Proposed Development to result in significant cumulative or in-combination effects when assessed alongside Derryadd Wind Farm, which is c.18.6km from the nearest proposed turbine location, was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. However, a previous application was made for a 24no. turbine wind farm at this location, which was granted planning permission, the decision of which was subsequently quashed by the High Court (ABP 303592). On the assumption that the current potential application will be broadly similar in nature to the previous application, the EIAR for Derryadd Wind Farm was consulted in relation to potential cumulative effects. Derryadd Wind Farm shared the following key ornithological receptors with Umma More Wind Farm: peregrine, merlin, lapwing, black-headed gull, mallard, snipe, kestrel, buzzard and sparrowhawk. The previous Derryadd Wind Farm EIAR assessed collision risk and displacement for the operational phase of that development. The collision risk was assessed to be Low (as per Percival, 2003) for lapwing and mallard, and Very Low (as per Percival, 2003) for peregrine, black-headed gull, kestrel, sparrowhawk and buzzard. Merlin and snipe were not recorded at potential collision height. Disturbance/displacement and barrier effect was assessed to be Medium[10] (as per Percival, 2003) for lapwing and mallard, Low (as per Percival, 2003) for peregrine, merlin, black-headed gull, and Very Low (as per Percival, 2003) for snipe, kestrel, buzzard and sparrowhawk.

The cumulative assessment for the proposed Derryadd Wind Farm assessed the cumulative collision risk, disturbance/displacement and habitat loss when considered in combination with wind farms within a 20km radius. It was concluded that cumulative collision mortality in combination with other wind farms is of low concern. The disturbance and displacement and habitat loss were also deemed to be of low concern. The barrier effect of the Derryadd Wind Farm in combination with other windfarms was deemed to be of low significance.

Based on the information available in the previous Derryadd Wind Farm EIAR and the lack of significant residual impacts on bird species associated with the Proposed Development when considered on its own, significant cumulative impacts on KORs with regard to direct habitat loss, disturbance/displacement or collision mortality are not anticipated.

7.9.2 Assessment of Cumulative Effects

There were ten KORs identified at the Proposed Development: peregrine, merlin, lapwing, black-headed gull, mallard, teal, snipe, kestrel, buzzard and sparrowhawk. 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 (peregrine, merlin, lapwing, black-headed gull, mallard, teal and snipe); and Local Importance Higher Value (kestrel, buzzard and sparrowhawk). Note that for the purposes of the cumulative assessment, the local scale is considered to be a 5km radius of the Wind Farm Site. A key consideration in the assessment of the potential for cumulative impacts to result in significant effects is proximity. There are no existing wind farms within 25km of the Wind Farm Site, and the one single wind turbine (Kepak), and two proposed wind farms (Lemanaghan & Derryadd) are greater than 16km distant.

The assessment of cumulative effects on KORs is provided in Table 7-13 below. In particular, cumulative habitat loss and displacement associated with operational turbines is assessed. Short-term impacts (e.g. construction disturbance) are highly unlikely to give rise to significant cumulative impacts, therefore it is not considered further.

[10] *Disturbance/displacement and barrier effect was assessed to be of low concern for all species. Both lapwing and mallard were assessed as being of 'Very High' sensitivity based on being special conservation interest (SCI) species of Lough Ree SPA, which is in proximity to Derryadd Wind Farm. As per Percival (2003), the cross tablature of Very High sensitivity species and Low Impact corresponds to a Medium effect significance.*

Table 7-13 Assessment of cumulative effects on KORs

KOR	Evaluation of Cumulative Impacts	Determination
Peregrine (County Importance)	Peregrine are potentially resident in the surroundings of the Wind Farm Site. Based on observations to date, it is likely that peregrine will continue to utilise the Wind Farm Site area and the impacts of displacement and barrier effects as a result of the Proposed Development are classed as of low significance. No significant effects of collision risk are anticipated at the county, national or international level. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Peregrine were recorded hunting within the proposed Derryadd Wind Farm Site, however no significant negative effect of the wind farm on peregrine populations within the area was identified. Taking into consideration the above reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	Significant cumulative impacts are not predicted.
Merlin (County Importance)	A probable merlin nest site was identified approximately 2.5km from the Wind Farm Site. However, there was only one observation of merlin 500m of the Wind Farm Site. Merlin were not recorded at PCH. Given the lack of observations and limited suitable habitat within the Wind Farm Site itself, significant impacts of displacement and barrier effects are low. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Merlin were recorded infrequently at the Derryadd Wind Farm Site, primarily in winter. No significant negative effect of the wind farm on merlin was identified.	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	Taking into consideration the above reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	
Lapwing (County Importance)	Lapwing were regularly recorded travelling and foraging within the Wind Farm Site during the winter season, with very few observations during the breeding season. The impacts of displacement and barrier effects as a result of the Proposed Development are classed as of low significance. No significant effects of collision risk are anticipated at the county, national or international level. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Lapwing were recorded at Derryadd Wind Farm foraging during winter months. No evidence of breeding was noted. No significant negative effect of the wind farm on lapwing was identified. Taking into consideration the abovereported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	Significant cumulative impacts are not predicted.
Black-headed Gull (County Importance)	Black-headed gull were recorded travelling and foraging within the Wind Farm Site during both breeding and winter seasons. The impacts of displacement and barrier effects as a result of the Proposed Development are classed as of low significance. No significant effects of collision risk are anticipated at the county, national or international level. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Black-headed gull were recorded at Derryadd Wind Farm during both breeding and winter seasons, with the majority of observations made during the breeding season. Birds were mostly observed commuting over the site.	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	Disturbance/displacement and collision risk impacts on black-headed gull were assessed to be of low significance. Taking into consideration the above-reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	
Mallard (County Importance)	Mallard resident within the Wind Farm Site, with breeding confirmed on the Dungolman River. The impacts of displacement and barrier effects and collision risk as a result of the Proposed Development are classed as of low/very low significance. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Mallard were frequently recorded at Derryadd Wind Farm, primarily commuting in the surrounding area of the site. No significant negative effect of the wind farm on mallard was identified. Taking into consideration the above-reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	Significant cumulative impacts are not predicted.
Teal (County Importance)	Teal were infrequently recorded within the Wind Farm Site, with observations relating to birds in vicinity of Dungolman River during winter season. The impacts of displacement and barrier effects and collision risk as a result of the Proposed Development are classed as of low/very low significance. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Teal were not an identified KOR at Derryadd Wind Farm.	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	Taking into consideration the above reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	
Snipe (County Importance)	Snipe were regularly recorded within the Wind Farm Site during the winter. No observations of snipe were recorded within the Wind Farm Site in the breeding season. The impacts of displacement and barrier effects and collision risk as a result of the Proposed Development are classed as of low/very low significance. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Snipe were regularly recorded at Derryadd Wind Farm during winter season and some breeding behaviour was also recorded. No significant negative effect of the wind farm on snipe was identified. Taking into consideration the above-reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	Significant cumulative impacts are not predicted.
Kestrel (Local Importance)	Kestrel were recorded regularly hunting within the Wind Farm Site. No evidence of breeding was recorded within the Wind Farm Site or surrounding 2km. The impacts of displacement and barrier effects and collision risk as a result of the Proposed Development are classed as of low/very low significance. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Kestrel were regularly recorded hunting within Derryadd Wind Farm. Disturbance/displacement and collision risk impacts on kestrel were assessed to be of very low significance.	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	Taking into consideration the above-reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	
Buzzard (Local Importance)	Buzzard were recorded regularly hunting within the Wind Farm Site and one probable breeding territory was identified. The impacts of displacement and barrier effects and collision risk as a result of the Proposed Development are classed as of very low significance. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Buzzard were regularly recorded hunting within Derryadd Wind Farm and probable breeding was identified. Disturbance/displacement and collision risk impacts on buzzard were assessed to be of very low significance. Buzzard was also present at Kepak in the late breeding season, but in an area with limited suitable breeding habitat. Taking into consideration the above reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	Significant cumulative impacts are not predicted.
Sparrowhawk (Local Importance)	Sparrowhawk was frequently recorded hunting within the Wind Farm Site during the breeding and winter seasons. No breeding territories were recorded within the Wind Farm Site. The impacts of displacement and barrier effects and collision risk as a result of the Proposed Development are classed as of very low significance. The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Development was considered. There are no existing wind farms within 25km of the Proposed Development. One single wind turbine (Kepak), and two potential wind farms (Lemanaghan and Derryadd) within 25km were assessed for cumulative impacts. Sparrowhawk were regularly recorded hunting within Derryadd Wind Farm and probable breeding was identified.	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	Disturbance/displacement and collision risk impacts on sparrowhawk were assessed to be of very low significance. Taking into consideration the above reported effects and the predicted effects of the Proposed Development, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.	

7.10 Conclusion

Following consideration of the residual effects (post-mitigation), it is concluded that the Proposed Development 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 Development is constructed, operated and decommissioned in accordance with the design, best practice mitigation and enhancement measures that are described within this application, significant individual or cumulative effects on the identified KORs are not anticipated.