8.0 ORNITHOLOGY

This Chapter presents the findings of an assessment of the likely significant effects on birds from the proposed Derryadd Wind Farm and associated supporting infrastructure including all works required along the proposed transportation route to be used for the delivery of wind turbine components to the wind farm.

8.1 INTRODUCTION

The proposed Derryadd Wind Farm is located at lands at the Derryaroge, Derryadd, and Lough Bannow bogs in County Longford. These bogs form part of the Mountdillon Bog Group. The lands at the bogs encompassing the proposed Derryadd Wind Farm and associated infrastructure are collectively referred to herein as the "proposed wind farm site". The layout and infrastructure at the proposed wind farm site is shown in Figure 8.1.

The proposed transportation route, including any lands required along the route for modifications/ upgrade are collectively referred to herein as the Turbine Delivery Route (TDR). The road network of the TDR extends from the N6 Junction 12 to the proposed wind farm site. The locations along the TDR where works are proposed are referred to herein as points of interest (POIs). All works at the proposed wind farm site and at POIs are collectively referred to herein as the "proposed development".

This Chapter provides an examination of effects and impacts of the proposed development on bird receptors, while Chapter 7 (Biodiversity) presents the findings of an assessment of effects and impacts of the proposed development on terrestrial and aquatic flora, habitats, and fauna, including both volant and non-volant mammals.

The application for the proposed development is also supported by an Appropriate Assessment Screening Report (AASR) and a Natura Impact Statement (NIS) that considers potential impacts of the proposed development on European sites including Special Protection Areas (SPAs) designated under the Birds Directive and Special Areas of Conservation (SACs) designated under Habitat Directive.

Specifically, the purpose of this Chapter is to:

- describe the ornithological baseline environment of the proposed wind farm site (i.e. lands encompassing the Derryadd Wind Farm and associated supporting infrastructure) and at POIs of the TDR through desktop data review, scoping and consultation, and a suite of directed ecological field survey.
- determine the ecological value and sensitivity of the identified ornithological receptors at the proposed wind farm site and at POIs.
- evaluate the potential direct, indirect, and secondary effects on ornithological receptors and assess the significance of these effects, which may arise from the proposed development during the construction, operation, and decommissioning phases of the proposed development.
- describe mitigation measures to avoid and/or reduce the identified effects and identify any residual effects after implementation of mitigation.
- evaluate residual effect remaining after implementation of mitigation measures.

The remainder of this Chapter is structured as follows:

- **Section 8.2 Proposed Development -** provides an overview of the key elements of the construction, operational, and decommissioning phases of the proposed development.
- **Section 8.3 Statement of Authority** – provides an overview of the credentials, qualifications, and authority of the team responsible for preparing this Chapter. This statement also serves to confirm that the assessments and surveys have been conducted by competent professionals in compliance with relevant legal and regulatory standards.
- **Section 8.4 Scoping and Consultation –** highlights the ornithology related scoping and consultation responses used to inform this Chapter.
- **Section 8.5 Legislation, Policy and Guidance** – provides an overview of the legislation, guidance and policy applicable. The section serves to highlight key elements that provide the framework for assessments undertaken in this Chapter, ensuring adherence to current best practices for the assessment of impacts and effects on biodiversity.
- **Section 8.6 Desk Study and Field Studies** – provides an overview of desk and field studies undertaken to establish baseline ecological conditions and inform the impact assessment.
- **Section 8.7 Ornithological Likely Significant Effects Assessment –** outlines the methodologies used to evaluate the potential effects of the proposed development on bird species. The assessment considers potential risks such as habitat loss, disturbance/displacement, and collision mortality.
- **Section 8.8 Existing Environment** - details the findings of the desk study and multidisciplinary walkover field surveys used to establish the ecological baseline against which the assessment of effects and impacts is conducted.
- **Section 8.9 Potential Effects -** presents an assessment of likely significant effects on birds during the construction, operation and decommissioning phases of the proposed development. This section also presents an assessment of the projected environmental conditions if the proposed development was not carried out (i.e. the 'Do-Nothing' scenario).
- **Section 8.10 Cumulative Effects** - examines potential cumulative effects, evaluating how the proposed development may interact with other ongoing or planned developments in the area, potentially compounding or mitigating effects to birds.
- **Section 8.11 Mitigation Measures** - outlines both general and specific mitigation measures aimed at reducing or, where possible, eliminating the risk of significant effects on bird receptors. This section also describes a bird monitoring programme that will be implemented to avoid impacts on birds, assess bird activity and turbine interactions, evaluate short- and long-term effects on sensitive bird populations, undertake fatality monitoring, and report findings at key intervals throughout the operation of the proposed wind farm.
- **Section 8.12 Residual Effects** – present an assessment of effects that persist after mitigation measures proposed have been implemented.
- **Section 8.13 Conclusion** – summarises the main findings of the assessment.

Table 8.1 below defines some terms commonly used in this Chapter.

Table 8.1: Terms and definitions

Term	Definition
Proposed Wind Farm Site	The lands at Derryaroge, Derryadd, and Lough Bannow bogs encompassing the wind farm and associated infrastructure.
Turbine Delivery Route (TDR)	The designated transportation route, including any lands required along the route for modification/ upgrade of the route.
Points of Interest (POIs)	Locations along the TDR where modification/upgrade works are proposed.
Proposed Development	All works at the proposed wind farm site and at POIs.
Key Avian Receptors (KARs)	Birds of significant ecological importance that may be affected by likely significant effects from the proposed development and are therefore selected for detailed evaluation.

8.2 PROPOSED DEVELOPMENT

The proposed development, including its construction, operation, and decommissioning phases is described in detail in Chapter 3 (Description of the Proposed Development. The key elements of the phases are:

Construction Phase

- **Wind Turbines:** The construction of wind turbine foundations will involve excavation, soil replacement with granular fill, and pouring of concrete for pile/gravity/bored. Additionally, hardstands will be levelled, and compacted hardcore will be used;
- **Meteorological Masts**: Two permanent meteorological masts are proposed as part of the proposed development: one within Derryaroge bog; and another within Lough Bannow bog. The met masts will be equipped with wind monitoring equipment at various heights. Each mast will be a slender, free- standing lattice structure, each 120 metres in height, constructed on a hardstanding area, sufficiently large to accommodate the crane that will be used to erect the mast, adjacent to the proposed internal site access road.
- **Access Roads:** Internal site access roads (6m wide, 27.5 km long) will be constructed with excavation and granular fill, including drainage and geogrid/geotextile applications. Floating roads and amenity access tracks (3m wide, 7.5 km long) will be built for site access;
- **Borrow Pits:** Four borrow pits will be excavated to extract usable material for construction purposes, with reprofiling and reseeding upon completion;
- **Battery Storage and Substation:** Battery storage areas (5,000m²) will house 20 containers. A substation will be constructed with soil stripping, excavation for foundations, and installation of infrastructure such as telecommunication masts and fencing;
- **Underground Cabling and Grid Connection:** Trenches for 28 km of underground cabling will be dug, and horizontal directional drilling will be used to connect the substation to the masts;

- **Construction Compound and Security Cabins:** Temporary construction compounds and security cabins will be set up, providing storage for construction material, welfare facilities, and hazardous materials;
- **Turbine Delivery Route**: Proposed works at POIs along the delivery route will involve the removal of road signs, trees, and utility posts, as well as the provision of load-bearing surfaces. These areas include POI 1 to POI 6, with each having specific requirements for vegetation clearance, road sign removal, and infrastructure adjustments. The location of the POIs are shown in Figure 7.2 in Chapter 7 Biodiversity.

Operation Phase:

- **Maintenance:** The operation phase will involve periodic visits with four-wheel drive vehicles or vans for routine checks and consumable changes (e.g., oil changes) to ensure the wind turbines are functioning properly. In addition to wind turbine maintenance, regular inspections and maintenance of the met masts will also be conducted to ensure accurate data collection. Similarly, the substation and BESS will undergo scheduled checks and servicing to maintain optimal performance and efficiency throughout the operational period.

Decommissioning Phase:

- **Wind Turbines and Foundations:** Upon decommissioning, wind turbines will be disassembled, and the parts will be sent offsite. Foundations will be covered with earth and reseeded.
- **Internal Site Roads and Amenity Tracks:** Access roads and amenity tracks will remain in place for future use,
- **Substation:** substation and all associated transmission infrastructure i.e. underground cables and overhead lines will not be removed at the end of the useful life of the wind farm development as it will form part of the national electricity network and will be managed by EirGrid/ESB. Therefore, the substation will be retained as a permanent structure and will not be decommissioned.

8.3 STATEMENT OF AUTHORITY

This section provides an overview of the credentials, qualifications, and authority of the team responsible for preparing this Chapter. This statement serves to confirm that the assessments and surveys have been conducted by competent professionals in compliance with relevant legal and regulatory standards.

This Chapter was co-authored by TOBIN Senior Ecologist Joao Martins (B.E. (Hons), M.Sc.) and TOBIN Ornithologist/Ecologist John Sherry B.Sc (Hons). The Chapter was senior reviewed by Dr. James Forde (B.Sc. (Hons), M.Sc., Ph.D., MCIEEM) and Áine Sands (B.Sc. (Hons), MCIEEM).

Joao Martins (B.E. (Hons), M.Sc.)

Joao Martins is Senior Ecologist in TOBIN. He has over 15 years' experience in freshwater ecology, associated with monitoring for the EU Water Framework Directive (e.g., macroinvertebrates, habitat/hydromorphology) and projects of scientific nature, in Germany,

Portugal and Ireland. He has worked for over 7 years in environmental consultancy, developing his expertise in Appropriate Assessment (AA), Ecological Impact Assessments (EcIA) and EIAR. Joao has also conducted and coordinated bird surveys (e.g. I-WeBS, Vantage Point (VP), Countryside Bird Survey (CBS), Woodcock), botanical and habitat surveys, mammal surveys (bats and non-volant) and inland fisheries (electrofishing).

John Sherry B.Sc (Hons)

John is an Ornithologist/Ecologist within TOBIN's Environment and Planning section. John has over six years of practical experience and has mainly been involved in the surveying and reporting of large-scale renewable infrastructure projects, where he has carried out AA reports, EIARs and Ecological Management Plans. John has also conducted and coordinated numerous breeding and winter bird surveys (e.g. I-WeBS, VP, CBS, Hen Harrier roost, breeding raptor and waders and Woodcock surveys), botanical and habitat surveys and mammal surveys (bats and non-volant).

Dr. James Forde (B.Sc. (Hons), M.Sc., Ph.D., MCIEEM)

James is a Senior Ecologist and Technical Director of the TOBIN E&P division. James holds a B.Sc. (hons) and M.Sc. degrees in marine ecology, and a Ph.D. in ecology. James is also a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). James has almost 20 years' academic and environmental consultancy experience. He has an extensive understanding of ecology and appreciation of the objectives and mechanisms of national and international environmental legislation and policy. He has significant experience in preparing and reviewing ecological reports including Screenings for AA, NIS and EcIA reporting, and EIAR. James has provided strategic technical and environmental advice for developments across a wide range of sectors, including onshore and offshore renewables, telecommunications, flood relief schemes, port and harbour developments, energy generation and transmission.

Áine Sands (B.Sc. (Hons), MCIEEM)

Áine is Senior Ecologist in TOBIN's E&P division. She holds an Honours Degree in Applied Ecology and has over 10 years post-graduate experience in ecology and environmental consultancy and also holds a full CIEEM Membership. Áine has predominantly been involved in large public and private infrastructure projects which she has prepared numerous Screenings for AA, NIS and EcIA reports. Áine has a strong understanding of National and European legislation and is cognisant of relevant rulings by the Court of Justice of the European Union (CJEU) associated with biodiversity and AA. She also has experience in undertaking ecological surveys for protected habitats and species and is confidently able to analyse the data to inform ecological assessments.

Ornithological Surveys

Survey data collection was carried out by ornithologists from Fehily Timoney (FT), TOBIN, and ornithological consultants Michael Whelan, and Tony Kenneally. It included surveys during the breeding season of 2021 and 2022, and during the winter seasons of 2021/2022 and 2022/23.

Data processing and analysis has been carried out by a team of TOBIN ecologists Joao Martins, Kit Lawson, Ciara Byrne and Jaroslaw Majkusiak.

Kit Lawson B.Sc (Hons) M.Sc

Kit is a Graduate Ecologist with TOBIN. Kit is experienced in conducting ornithological surveys (e.g. VP, I-WeBS, CBS), and processing and analysing ecological data (e.g. ornithological, botanical), often managing large datasets. Kit has also experience working in both scientific survey teams, as well as individual studies.

Ciara Byrne B.Sc (Hons)

Ciara is a Graduate Ecologist with TOBIN. Ciara is responsible for producing ecological reports on topics such as winter and breeding bird surveys, Invasive Species Management Plans (ISMP) and assisting with of AA Screening Reports, NIS and EIAR.

Jaroslaw Majkusiak B.Sc (Hons) M.Sc

Jarek is an Ornithologist/Ecologist within TOBIN. Jarek is responsible for producing ecological reports on topics such as bird monitoring and habitat management, while having extensive experience conducting high-level research and surveying. He is proficient in managing, planning, and executing surveys, with experience in data management, data modelling and report writing.

Tony Kenneally BSc (Hons)

Tony Kenneally is an ornithological consultant, with acquired expertise as a bird surveyor, experienced in surveying for a wide range of target species. Recent bird survey work includes a range of bird surveys on proposed onshore wind farm developments carried out to SNH standards, including VP surveys, breeding raptor, breeding and wintering wader and wildfowl surveys, Hen Harrier roost watches.

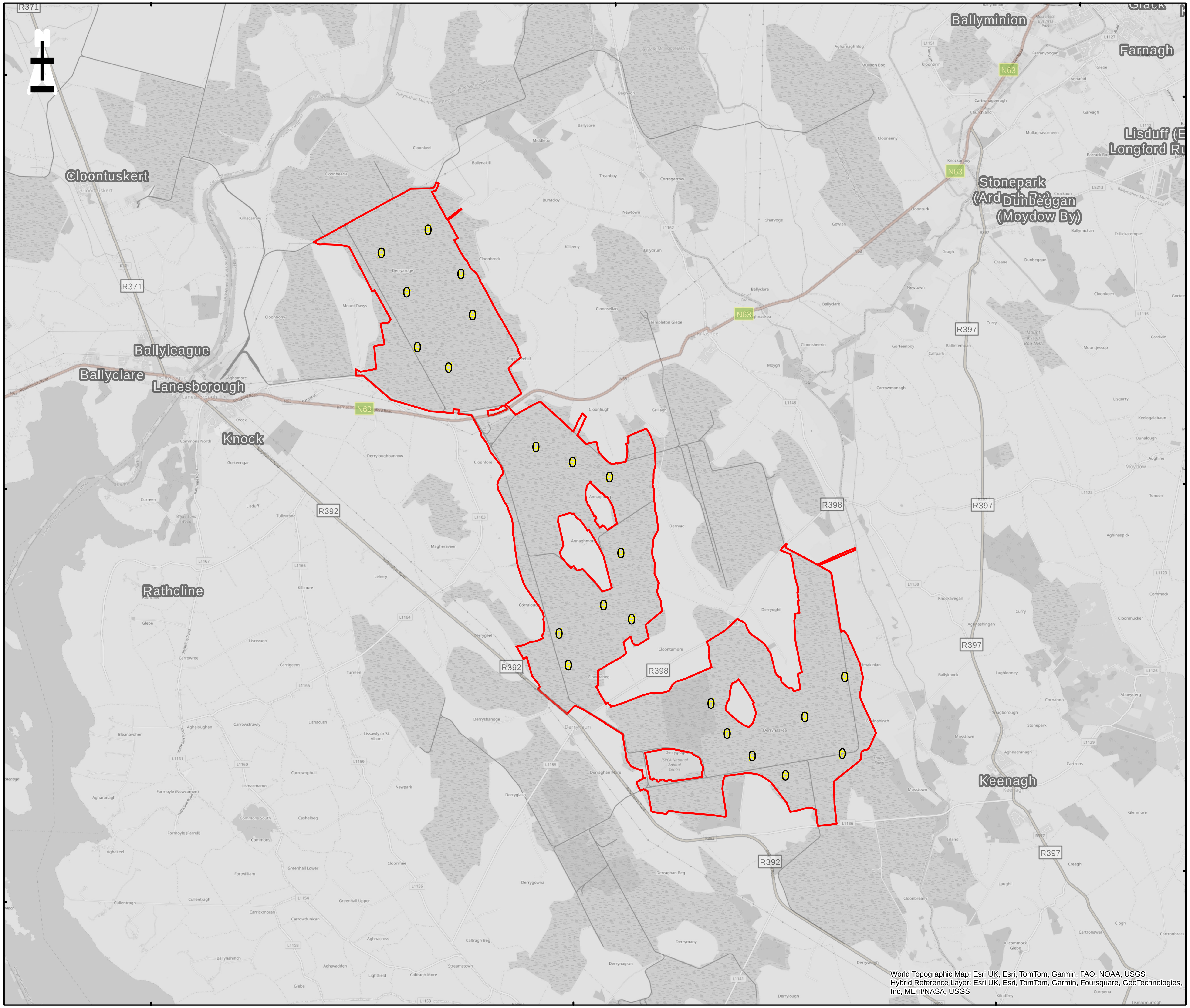
Michael Whelan

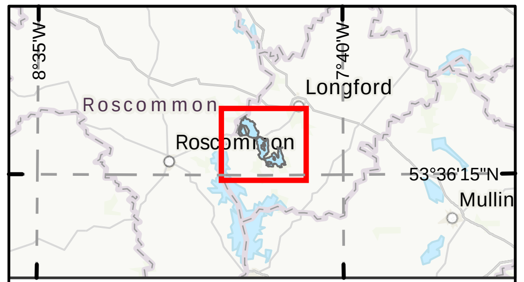
Michael Whelan is an ornithological consultant, with over 10 years of experience. Beyond Michael's bird general surveying proficiency (e.g. VP, CBS, I-WeBS, Raptors), he is also an expert conducting specific surveys, such as for a wide range of protected species. Additionally, Michael is a nest recorder and bird ringer (holding NPWS licenses), while also being experienced caring out protected mammals and Lepidoptera's surveys.

Collision Risk Assessment

Dr. Tom Gittings B.Sc (Hons), Ph.D

The Collision Risk Assessment for the proposed wind farm was undertaken by ecological consultant Dr. Tom Gittings. Tom is an independent ecological consultant with 28 years' experience in professional ecological consultancy work and research. He has specific expertise in ornithological assessments for wind energy projects. A major focus of his work is collision risk modelling. He sees the large datasets that are collected during vantage point surveys as providing a variety of opportunities for sophisticated data analyses and has been developing collision risk modelling techniques that extend the standard model used for onshore wind energy projects.





Legend

Proposed wind farm site boundary

Final Turbine Layout BnM 20230124

0 1 2

Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	02/04/2024	First issue	S.P	J.M
Rev	Date	Description	By	Chkd.

Client:

Bord na Móna

Project:

Derryadd Wind Farm

Title:

Figure 8.1:
Proposed Derryadd Wind Farm Site

Scale @ A3: 1:50,000

Prepared by: S.Pezzetta

Checked by: J.Martins

Date: April 2024

TOBIN

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www.tobin.ie

Map Ref: 11399-043-WF.Site-OSM-TOB-D01

Draft: A

8.4 SCOPING AND CONSULTATION

TOBIN undertook a scoping and consultation exercise during preparation of this EIAR, as described in Chapter 1 - EIA Methodology of the EIAR, to identify key environmental issues, engage relevant stakeholders, and ensure full compliance with regulations. The full set of scoping and consultation responses is provided in Appendix 1-5. The ornithology related scoping and consultation responses received are summarised in Table 8.2. The responses received helped identify sensitive ornithological receptors of note to be considered. The responses also played a role in informing the design of the field surveys required to inform the assessment of the potential impact of the proposed development potential impact on bird species and associated habitats.

Table 8.2: Relevant Ornithological Scoping and Consultation Responses

Ref used in Chapter 1	Consultee	Response
5	BirdWatch Ireland	I-WeBS data informing the desk study (Section 8.8.1.5) was received in March 2024.
12	Development Applications Unit - Department of Housing, Local Government and Heritage	*Ecological assessment is a scientific process that is underpinned by scientific data and surveys should be designed to collect data that will answer the pertinent questions. Within this context, ornithological surveys should not consider the SNH guidelines as definitive, rather they are a useful steer. Specifically, field surveys should be designed so as to collect data that enable informed decision making regarding potential impacts, risks and pressures arising from the proposed development to European sites, biodiversity, the wider environment and other nature conservation interests. This may require the adoption of additional survey methods, development of new survey methods and or the use of technologies not specified in the SNH guidance. This is because an important question that must be addressed in the NIS is the level and nature of the connection between birds using the proposed development site and European sites. Furthermore, the type of use should be determined to assess the importance of the site in supporting birds that are listed as SCI species for European sites within the zone of influence (e.g. Lough Ree SPA (site code: 004064) located <0.5 km distant). In this regard, breeding, roosting and foraging behaviour should be distinguished in survey data and flight lines should be linked with an associated behaviour and/or time of day or season (i.e. breeding, roosting, foraging, resident or migrating). Moreover, consideration should be given to undertaking mark- recapture (e.g. neck and leg collars or rings) and sample tracking studies using telemetry techniques (e.g. satellite based location transmitters) to determine the level of dependency and connectivity between birds foraging within and transiting through the development site and relevant SCI listed populations for SPA sites within the zone of influence. Finally, quantities of birds and level of site use recorded should be put in the context of adjacent European sites, Ireland's, European and wider international populations.* *Field survey data and specifically ornithological survey data should be presented in easily understood map form with associated raw data in clearly linked tables. The tables should indicate visibility throughout the walk over survey or VP watch and contemporaneous weather records from the proposed development site should be included in the*

Ref used in Chapter 1	Consultee	Response
		table. Walk over ecological surveys and VP watches should cover the full range of times (e.g. late evenings, early mornings, and day time) as well as the full range of seasons and relevant species specific periods such as migration and breeding phases).
33	Irish Raptor Study Group	None received
34	Irish Red Grouse Association	None received
36	Irish Wildlife Trust	*The biodiversity impact should look at the connectivity of the lands to surrounding areas, in particular the River Shannon and Lough Ree SAC. It should examine future trends in the area, in particular the likely colonisation of the area by white-tailed eagles, changes to the number and distribution of whooper swans, potential recovery of breeding waders such as curlew and redshank, and under a variety of time frames.*
39	Longford County Council Environment Department	None received
40	Longford County Council Heritage Office	None received
45	National Parks and Wildlife Service	None received
49	Roscommon Heritage Officer	None received
50	Roscommon County Council Environment Department	None received
56	The Heritage Council	None received

8.5 LEGISLATION, POLICY AND GUIDANCE

This chapter has been prepared having regard to the following legislation, plans and policy documents in addition to the general guidance referred in Chapter 1 (Introduction):

- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), as amended;
- The EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU;
- Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- European Union (EU) (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2015 (S.I. No. 320/2015);
- Environmental Liabilities Directive (2004/35/EC);
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, herein referred to as the Habitats Directive;
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, herein referred to as the Birds Directive;
- Convention on Wetlands of International Importance (especially as Waterfowl Habitat), Ramsar, 1971;
- The Wildlife Acts 1976 to 2023 (as amended), herein referred to as the Wildlife Acts;
- Relevant policies in Ireland's 3rd National Biodiversity Action Plan, 2017 – 2021 (DoCHG, 2017) and in the draft for public consultation for the Ireland's 4th National Biodiversity Action Plan (NPWS, 2024); and
- Objectives relevant to ornithology in the Longford County Development Plan 2021-2027 (LCC, 2021).
- Wind Farms and Birds: Calculating a Theoretical Collision Risk Assuming No Avoiding Action (SNH, 2000).

The potential impacts of the proposed development on bird species were evaluated based on the nature of the effects and the characteristics of the affected receptors. The assessment was guided by the following key reference documents:

- Recommended Bird Survey Methods To Inform Impact Assessment Of Onshore Wind Farms (Scottish Natural Heritage - SNH, 2017);
- Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model (SNH, 2018c);
- Using a collision risk model to assess bird collision risks for onshore wind farms (Band, 2024);
- Assessing Significance of Impacts from Onshore Wind Farms Out with Designated Areas (SNH, 2018a);
- Assessing the Cumulative Impacts of Onshore Wind Farms on Birds (SNH, 2018b);
- Assessing Connectivity with Special Protection Areas (SPAs) (SNH, 2016);
- Monitoring the Impact of Onshore Wind Farms on Birds (SNH, 2009);
- Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland (Mc Guinness *et al.*, 2015);
- Environmental Protection Agency (EPA, 2022) - Guidelines on the information to be contained in Environmental Impact Assessment Reports;
- Raptors: A Field Guide for Surveys and Monitoring (Hardey *et al.*, 2013);
- Bird Census Techniques (Bibby *et al.*, 2000);

- Bird Monitoring Methods: A Manual of Techniques for Key UK Species (Gilbert *et al.*, 2011);
- Breeding Woodcock Monitoring Survey Instructions (British Trust for Ornithology, 2013);
- I-WeBS Counter Manual: Guidelines for Irish Wetland Bird Survey counters (BirdWatch Ireland, 2008);
- CBS Manual: Guidelines for Countryside Bird Survey Participants (CBS, 2012);
- Birds of Conservation Concern in Ireland (BoCCI): 2020–2026 (Gilbert *et al.*, 2021);
- Birds and Wind Farms in Ireland: a Review of Potential Issues and Impact Assessment (Percival, 2003);
- Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) - Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine; and
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).

8.6 DESK STUDY AND FIELD STUDIES

The following sections provide a summary overview of the desk studies and field surveys conducted to establish the ecological conditions of the existing environment at the proposed wind farm site, which were used to form the basis of the impact assessment.

8.6.1 Desk Study

As part of the desk study, data and records were consulted from a wide range of authoritative and reputable sources. These included the NPWS, BirdWatch Ireland, and the NBDC, all of which provide critical datasets on protected habitats, species distributions, and ecological sensitivities. The desk study also incorporated data from available mapping resources, aerial imagery, and spatial datasets to assess landscape features and habitat connectivity.

In addition to these primary sources, the desk study drew on previously published ecological assessments, scientific literature, and publicly available environmental impact reports from nearby developments, where applicable. Online mapping tools such as the NPWS Protected Sites Viewer, were used to identify and map the locations of designated conservation sites, including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Natural Heritage Areas (NHAs). The presence of legally protected species, Annex-listed habitats, and red- or amber-listed bird species was also considered, along with any historical records of rare or notable flora and fauna in the vicinity of the proposed development.

The information gathered during the desk study was instrumental in identifying potential avian receptors and ecological features of conservation interest within and surrounding the proposed development site. It played a key role in shaping the design and scope of the field surveys by helping to prioritise key species, highlight potential ecological constraints, and inform the overall assessment strategy. The data collated ensured that the field surveys were appropriately targeted, methodologically sound, and scientifically robust. This comprehensive baseline formed the foundation of the ecological impact assessment presented in this Chapter.

8.6.2 Field Study

A robust field study of the avian activity within the proposed wind farm site and defined survey buffer areas were undertaken from April 2021 to September 2024, inclusive (Table 8.3). It was designed to provide accurate information of target species presence (and others) within the area, and cover the information highlighted in the consultation responses (Section 8.4). Despite some survey techniques recommended in the consultation responses (e.g. 'mark-recapture'/tracking - Table 8.2) were not adopted, the survey design assures compliance with recommended standard methodologies (e.g. BirdWatch Ireland, 2008; Gilbert *et al.*, 2011; CBS, 2012; Hardey *et al.*, 2013; SNH, 2017) and allow for a comprehensive assessment of likely significant effects from the proposed development on birds.

Appendix 8.1 through Appendix 8.3 include preliminary reports, survey results and survey locations for all surveys listed in Table 8.3 below.

Table 8.3: Ornithological Survey Design for the Characterisation of the Proposed Development Baseline

Season	Survey	Study area (Distance from Proposed Wind Farm Site)	Period	Appendix
Breeding 2021	Vantage Point (VP)	0m (Within Proposed Wind Farm Site)	April 2021 – September 2021	(Appendix 8.1)*
	Breeding Waders	2 km	May 2021 - September 2021	
	Raptors	2 km		
	Transect Surveys	1 km	May and June 2021	
	Barn Owl	2 km	April 2021 – September 2021	
Non-breeding 2021/2022	VP	0m (Within Proposed Wind Farm Site)	October 2021 – March 2022	(Appendix 8.2)*
	I-WeBS	10 km	September 2021 – March 2022	
	Raptors	2 km		
	Transects	1 km	March 2022	
Breeding 2022	VP	0m (Within Proposed Wind Farm Site)	April 2022 – September 2022	(Appendix 8.3)*
	Breeding Waders	2 km		
	Breeding Raptors	2 km		
	Transect Surveys	1 km		
	Breeding Woodcock	1 km	May and June 2022	
Non-breeding 2022/2023	VP	0m (Within Proposed Wind Farm Site)	October 2022 – March 2023	
	I-WeBS	10 km		
	Hen Harrier Roost Watch/Raptors	2 km		
	Transect Surveys	1 km		
Breeding 2023	VP	0m (Within Proposed Wind Farm Site)	April 2023 – September 2023	
	Breeding Waders	2 km		
	Breeding Raptors	2 km		

Season	Survey	Study area (Distance from Proposed Wind Farm Site)	Period	Appendix
	Transect Surveys	1 km		
	Breeding Woodcock	1 km	May and June 2023	
Non-breeding 2023/2024	VP	0m (Within Proposed Wind Farm Site)	October 2023 – March 2024	
	I-WeBS	10 km		
	Hen Harrier Roost Watch/Raptors	2 km		
	Transects Surveys	1 km		
Breeding 2024	VP	0m (Within Proposed Wind Farm Site)	April 2024 – September 2024	
	Breeding Waders	2 km		
	Breeding Raptors	2 km		
	Transect Surveys	1 km		
	Breeding Woodcock	1 km	May and June 2024	

* Appendix 8.1 and Appendix 8.2 include individual reports for Breeding Season 2021 and Non-breeding Season 2021/22, respectively while Appendix 8.3 includes the combined survey results from both Fehily Timoney and TOBIN, i.e. from Breeding Season 2021 until Breeding Season 2024.

8.6.2.1 Vantage Point Survey

As defined by the SNH (2017), a Vantage Point (VP) survey is used to quantify the flight activity and distribution over an area. Its results are used for the CRM, which estimates the birds' collision risk with the turbines and consequent mortality (Section 8.7.5). VP surveys were carried out from April 2021 to September 2024, covering three Non-breeding Seasons and four Breeding Seasons (Table 8.3).

The VP surveys were conducted by two separate survey teams: Fehily Timoney between April 2021 and March 2022 (see Appendices 8.1 and 8.2), and TOBIN between April 2022 and September 2024. Together, these surveys covered seven seasons in total—four breeding seasons and three non-breeding seasons. A standardised effort of 36 hours per vantage point was completed during each survey period, across all VP locations. To define the best locations of the VPs, viewshed analyses were carried out to inform the VP surveys in the Breeding Season 2021 and Non-breeding Season 2021/22, and repeated in 2022 to inform the surveys for the Breeding Season 2022, Non-breeding Season 2022/23, Breeding Season 2023, Non-breeding Season 2023/24, and Breeding Season 2024. The output of these viewshed analyses are contained within Figure 8.3 and Figure 8.4.

Although both survey teams used eleven VPs, their locations (and corresponding viewsheds - i.e. visible areas) were relatively different. These viewsheds were analysed within the collision risk model report (Appendix 8.5), which verified that the viewsheds used in the VP survey design for the Breeding Season 2021 and Non-breeding Season 2021/22 covered 15 of the 22 turbine locations, and 80% of the 500 m buffer around the turbine locations. The viewsheds that informed the VP surveys from the Breeding Season 2022 until the Breeding Season 2024

covered 18 of the 22 turbine locations, and 82% of the 500 m buffer around the turbine locations (Figure 8.3 and Figure 8.4). Despite this theoretical incomplete coverage of the turbine locations and the 500 m buffer around the turbine locations, the analysis in Appendix 8.5 concludes that the modelled gaps in coverage are small, and the differences in areas covered were not significant, and did not affect the reliability of the collision risk model results. It should also be noted that the viewshed analysis informing these surveys was based on a model (Digital Surface Model – DSM) that accounts for ground elevation, and natural (e.g. tree cover) and built (e.g. buildings), with a resolution of 25cm. Although this high resolution provides a much higher accuracy in estimating the visibility from a given VP location, it also means that areas with projected hindered visibility from the viewshed analysis could be observed in the field with a small adjustment in the VP positioning (as small as 25cm in either direction). These adjustments were made in the field, through ground-truthing the positions of the VPs to allow full visibility of the 22 turbines and of each of the 500m buffers around each turbine.

The VPs and viewsheds used between April 2021 and March 2022 are described in Appendix 8.2, while the VPs layout used between April 2022 to September 2024 is displayed in Figure 8.2.

As mentioned, although from different locations in each period, eleven VPs were selected as to provide full coverage of all the landscape under consideration, as well as following viewshed analysis[1] and compliance with SNH (2017) guidance, i.e. the viewshed of a given VP should not extend beyond a distance of 2 km, with an arc of maximum 180 degrees. Each VP was surveyed for six hours per month (72 hours per VP per Season), in which the following parameters were recorded for each observation (Appendix 8.3):

- Vantage Point;
- Date of watch;
- Watch period;
- Weather conditions (e.g. visibility, wind-force, wind direction, precipitation);
- Time of sighting;
- Sex, if applicable;
- Approximate height of flight (in meters);
- Habitat type over which bird was flying;
- Bird activity;
- The duration of the flight/activity; and
- Any relevant notes.

During the Breeding seasons, the observations on birds breeding activity on-site was classified as per Table 8.4. This classification followed the British Trust for Ornithology (BTO) methods on breeding evidence for the Bird Atlas 2007-11[2], which, although using different a survey methodology than used in this field study (i.e. it involved surveying 2x2km grid squares), was used herein to identify and group relevant breeding activity. Also, the number of pairs

[1] For viewshed analysis, the SNH (2017) highlights that "*where the key purpose is to estimate the risk of collision with turbines, it is the visibility of the airspace to be occupied by the turbine rotors (the collision risk volume) that is of prime importance. Therefore, it is recommended that visibility be calculated using the least visible part of this airspace, i.e. an imaginary layer suspended at the lowermost height passed through by the rotor blade tips*".
2 Available at https://www.bto.org/our-science/projects/birdatlas/methods. Accessed in January 2025

associated with 'Probable' and/or 'Confirmed' behaviour was counted/estimated in the field, where possible.

Table 8.4: BTO Breeding Evidence Codes[3]

Breeding Status	Activity	Code
Non-breeding	Flying over	F
	Species observed but suspected to be still on migration	M
	Species observed but suspected to be summering non-breeder	U
Possible breeder	Species observed in breeding season in suitable nesting habitat	H
	Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat	S
Probable breeding	Pair observed in suitable nesting habitat in breeding season	P
	Permanent territory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more part at the same place or many individuals on one day	T
	Courtship and display (judged to be in or near potential breeding habitat; be cautious with wildfowl)	D
	Visiting probable nest site	N
	Agitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby	A
	Brood patch on adult examined in the hand, suggesting incubation	I
	Nest building or excavating nest-hole	B
Confirmed breeding	Distraction-display or injury feigning	DD
	Used nest or eggshells found (occupied or laid within period of survey)	UN
	Recently fledged young (nidicolous species) or downy young (nidifugous species). Careful consideration should be given to the likely provenance of any fledged juvenile capable of significant geographical movement. Evidence of dependency on adults (e.g. feeding) is helpful.	FL
	Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nests or nest holes, the contents of which cannot be seen) or adults seen incubating	ON
	Adult carrying faecal sac or food for young	FF
	Nest containing eggs	NE
	Nest with young seen or heard	NY

8.6.2.2 Waterbirds

8.6.2.2.1 Breeding Waders

During the Breeding Season 2021, the breeding wader population using the proposed wind farm site was characterised with specific breeding waders' surveys using transects. Methods were adapted from published literature, including Bibby *et al.* (2000), Gilbert *et al.* (2011), O'Brien and Wilson (2011), and SNH (2017), to estimate the number of breeding individuals of target species. The survey was conducted in two visits, in May and June 2021, where all species

3 Available at https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence. Accessed in January 2025

encountered (seen or heard) were recorded and their abundance, behaviour, sex/age and breeding status noted. The complete methodology is described in Appendix 8.1.

For the Breeding Season 2022, 2023, and 2024, the survey for breeding wader species was adapted from Gilbert *et al.* (2011), whereas, instead of two (as suggested by Brown and Shepherd, 1993), or three visits (as suggested by O'Brien and Smith, 1992), monthly counts (April to September) were carried out during visits to breeding waders preferred habitats (e.g. damp grassland, peatland, floodplains) at the proposed wind farm site and within a 2 km buffer (Figure 8.5).

8.6.2.2.2 Irish Wetland Bird Survey (I-WeBS)

To characterise the local non-breeding waterbird community using the proposed wind farm site and wider environs, monthly counts of waterbirds were made at wetlands within 10 km from the proposed wind farm site (Figure 8.5). Waterbird counts followed an adapted methodology based on BirdWatch Ireland (2008), but not restricted to the Irish Wetland Bird Survey (I-WeBS) sites, delineated by the I-WeBS office, but included all wetlands (permanent and temporary) within 10 km of the proposed wind farm site. These wetlands were visited monthly, and each location was surveyed for the duration necessary to identify and obtain a count for all waterbirds, target species, birds of prey, and other supplementary species of relevance.

8.6.2.3 Breeding/Winter Transect Survey

During the Breeding Season 2021, general breeding birds at the proposed wind farm site were surveyed with a methodology based on BTO (2018) and Bibby *et al.* (2000), where 21 transects, representative of the existing habitats, were delineated across the site (Figure 8.4). These transects were walked and birds were counted over two visits: the first one coinciding with the beginning of the breeding season (12th-14th of May 2021); and the second covering its later part (11th-13th of June 2021). Full description of the methods employed for surveying general breeding birds during the Breeding Season 2021 is included in Appendix 8.1. During the Winter Season 2021/2022, the 21 transects were also surveyed for the characterisation of general birds using the proposed wind farm site, using the same methodology. The transects were walked and birds were counted over two visits: from the 3rd to the 15th of February 2022; from the 3rd to the 12th of March 2022 (Appendix 8.2).

As described above in Section 8.6.2, the survey design was slightly adjusted from the Breeding Season 2022 on. Thus, the same transects were surveyed based on, and adapted from, CBS (2012) but, instead of two visits per season as it was done during the Breeding Season 2021 and Wintering Season 2021/2022, the transects were walked and any birds seen or heard were identified, and counted (irrespective of distances from the transect), over monthly visits (April to September), from 2022 to 2024, inclusive.

8.6.2.4 Hen Harrier Roost Watch

The Hen Harrier Roost Watch Survey methods followed those set out by Gilbert *et al.* (2011). Surveyors were in place an hour and a half before sunset and recorded all observations of Hen Harrier until last visible light. Information recorded by surveyors from the vantage points included the number of Hen Harrier entering or exiting a roost, the time, age, and sex, where it was possible to discern. These surveys were conducted during the non-breeding seasons

2022/2023 and 2023/2024 from vantage points overseeing suitable roosting habitat within the proposed wind farm site (Figure 8.7). Suitable roosting habitat is typically restricted to dense vegetation, such as heather or young commercially planted conifers. Although this species breeds in upland areas, wintering birds disperse widely and can frequently be found in lowland areas.

8.6.2.5 Breeding Raptors Survey

The local breeding activity by raptor species was surveyed having regard to general habitat requirements of these species during the Breeding Seasons 2022, 2023 and 2024. Thus, the locations used for the Hen Harrier roost watches were used (Figure 8.7) when habitat conditions were assessed as being suitable for breeding raptors. However, considering the dynamic intra-annual habitat profile at the proposed wind farm site, the area formed by proposed wind farm site plus a 2 km buffer was searched for favoured habitats for locally representative raptor species (from results in Section 8.8.1), following Hardey *et al.* (2013) and Gilbert *et al.* (2011) guidelines, such as:

- Hen Harrier, Merlin (*Falco columbarius*): primarily, dry areas with rank vegetation (~0.5m high), preferably heather. The hedges of young woodlands, even of young conifers, with near-by open hunting habitats were also surveyed;
- Peregrine Falcon (*Falco peregrinus*), Common Kestrel (*Falco tinnunculus*), Merlin, Common Buzzard (*Buteo buteo*): with the absence of cliffs or steep slopes in the local area, trees (with old corvid nests) and tall man-made structures (e.g. bridges, towers, pylons) were surveyed. Of particular interest were the tall structures at the Lough Ree Power Station, where the species has been observed (local testimony);
- Western Barn Owl (*Tyto alba*): derelict buildings and structures (within 2km of the proposed wind farm).

The breeding raptors activity in the proposed wind fam site and hinterland was interpreted following the breeding classification of 'Probable' and/or 'Confirmed' breeding status (Table 8.4).

8.6.2.6 Breeding Eurasian Woodcock Survey

As part of the survey design introduced in the Breeding Season 2022, a targeted survey for breeding Woodcock was carried out from that Season until the Breeding Season 2024.

Eurasian Woodcock males display by roding (flying) through suitable woodland habitats whilst calling at dusk (Heward *et al.*, 2015). This crepuscular activity means that Eurasian Woodcock are typically under-recorded by conventional surveying (e.g. for the Bird Atlas 2007-11 - Balmer *et al.*, 2013), and the determination of the presence of breeding Eurasian Woodcock requires targeted dusk surveys at likely habitats (woodland) where they will be displaying (Hoodless *et al.*, 2009). The standardized methodology for surveying Eurasian Woodcock (Hoodless *et al.*, 2009; Gilbert *et al.*, 2011; Heward *et al.*, 2015) was used in the present study, with three evening visits between May and June of 2022, 2023 and 2024, starting one hour before sunset and lasting until one hour after sunset. To this effect, three transects were delineated to cover

potential breeding habitats (i.e. woodland habitats) within the proposed wind farm site (Figure 8.8), and the following information was noted:

- Date;
- Weather conditions;
- Time at beginning of survey;
- Number of birds seen and/or heard;
- Time at the end of the survey; and

The highest density of roding Woodcock males across the three visits provides an index of the peak density of breeding pairs (Gilbert *et al.*, 2011).

8.6.2.7 Assumptions and Limitations

There are a number of limitations inherent to field-based surveying, in particular for bird surveys. These may relate to the availability of suitable weather conditions for completing surveys, with good visibility and limited wind or rain conditions of paramount importance. As such, when undertaking and completing fieldwork, careful consideration and planning was made to ensure optimal weather conditions during survey periods.

It is acknowledged that due to unforeseen circumstances, some surveys during the 2021 breeding season, could not commence until the month of May and there is potential that some early signs of breeding bird activity may have been excluded. However, in the following months detailed breeding bird data was collected and following the 2021 season, the full 2022, 2023 2024 season were robustly surveyed.

To this effect, it is considered that there were no significant constraints, and the survey data presented herein provides sufficient certainty and accuracy for the description of the baseline ornithology on the site and environs.

Legend

- Proposed wind farm site boundary
- Vantage Points

0 1 2
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	02/04/2024	First issue	S.P	J.M

Client: Bord na Móna

Project: Derryadd Wind Farm

Title:
Figure 8.2:
VP locations for Breeding Season 2022 and Non-breeding Season 2022/2023

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	April 2024

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Map Ref: 11399-044-VP-BS.2022..nBS..22.23-TOB-A

Draft: A

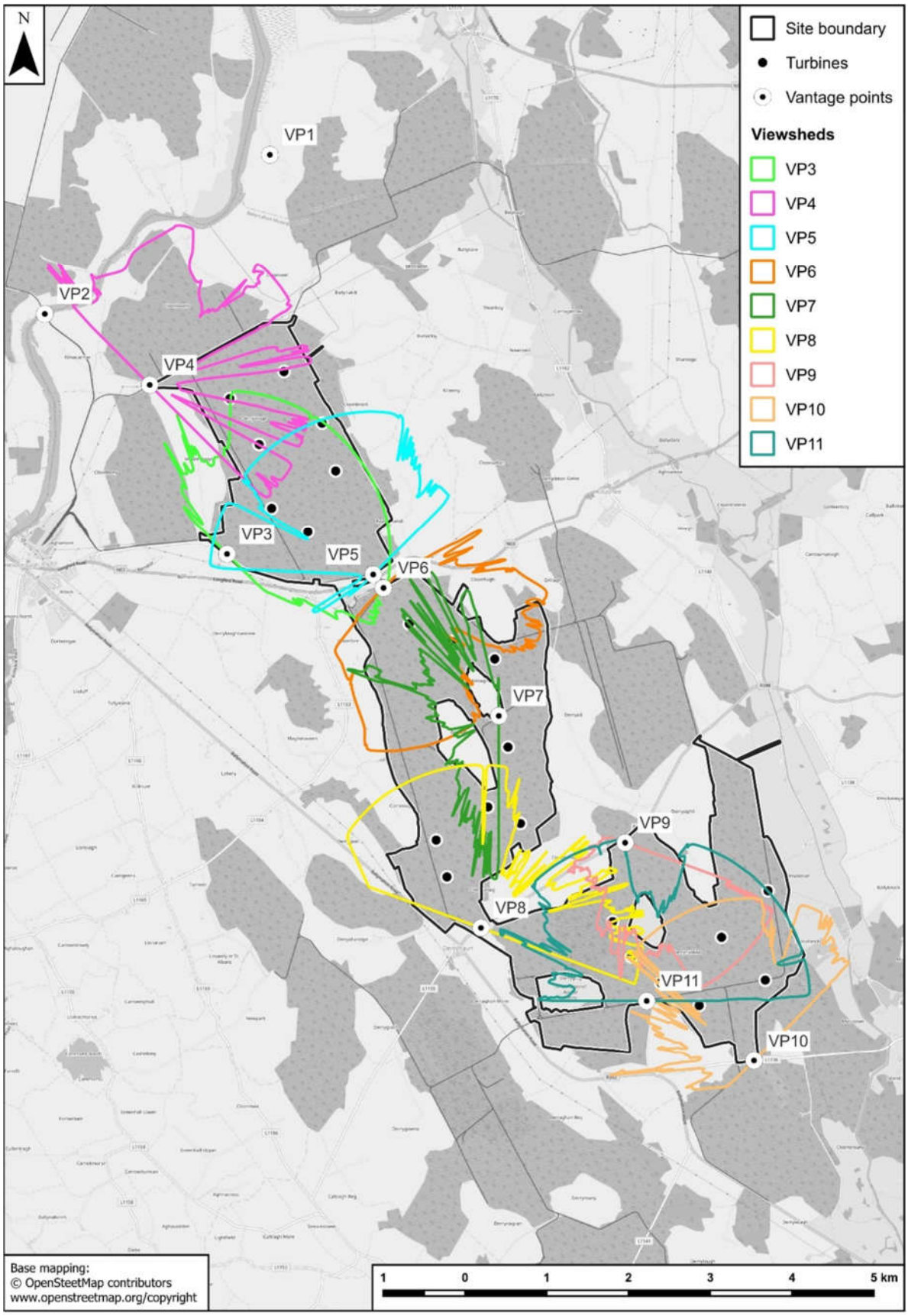


Figure 8.3: Vantage points and viewsheds used by the Fehily Timoney survey team. Taken from CRM report (Appendix 8.5)

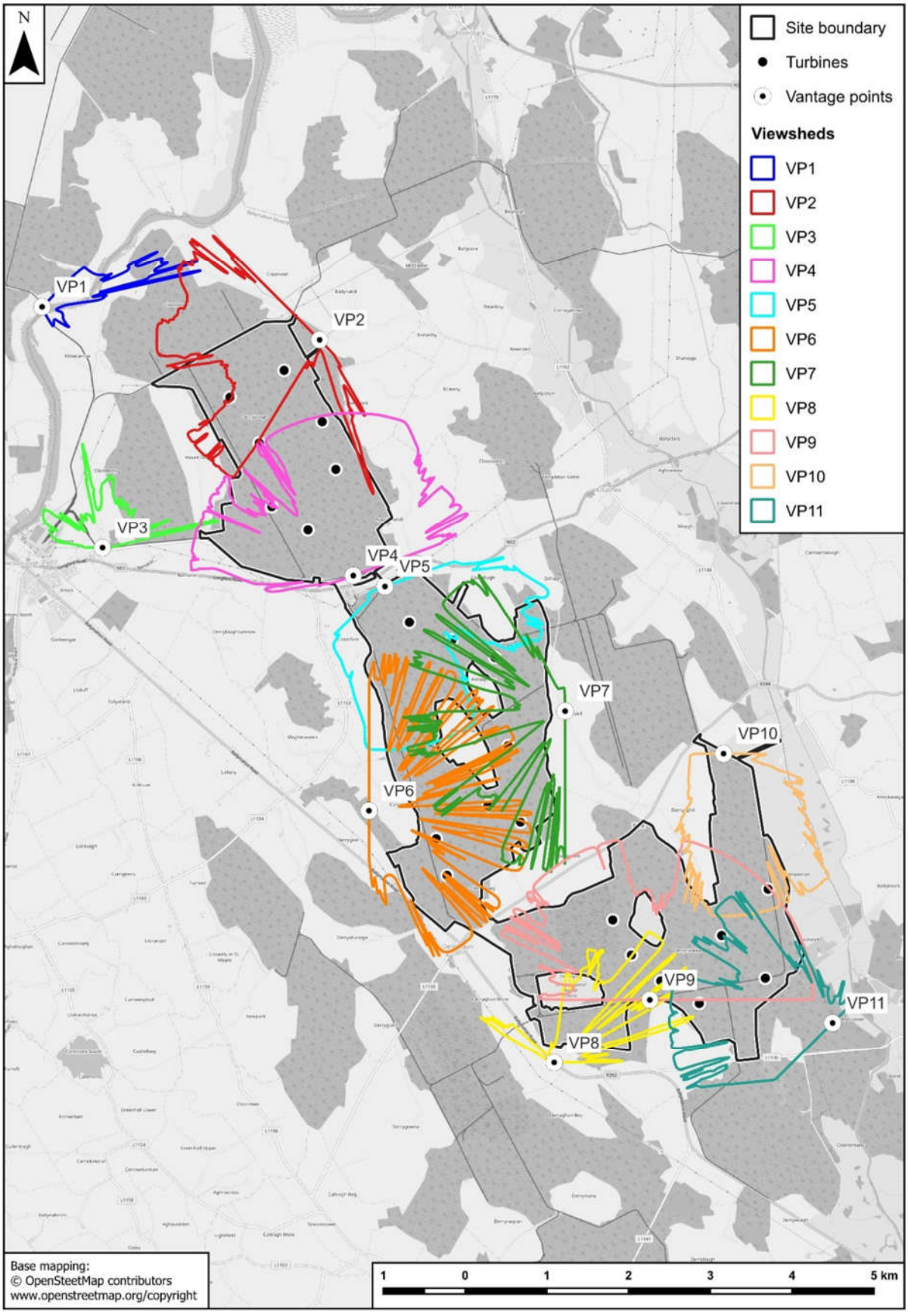
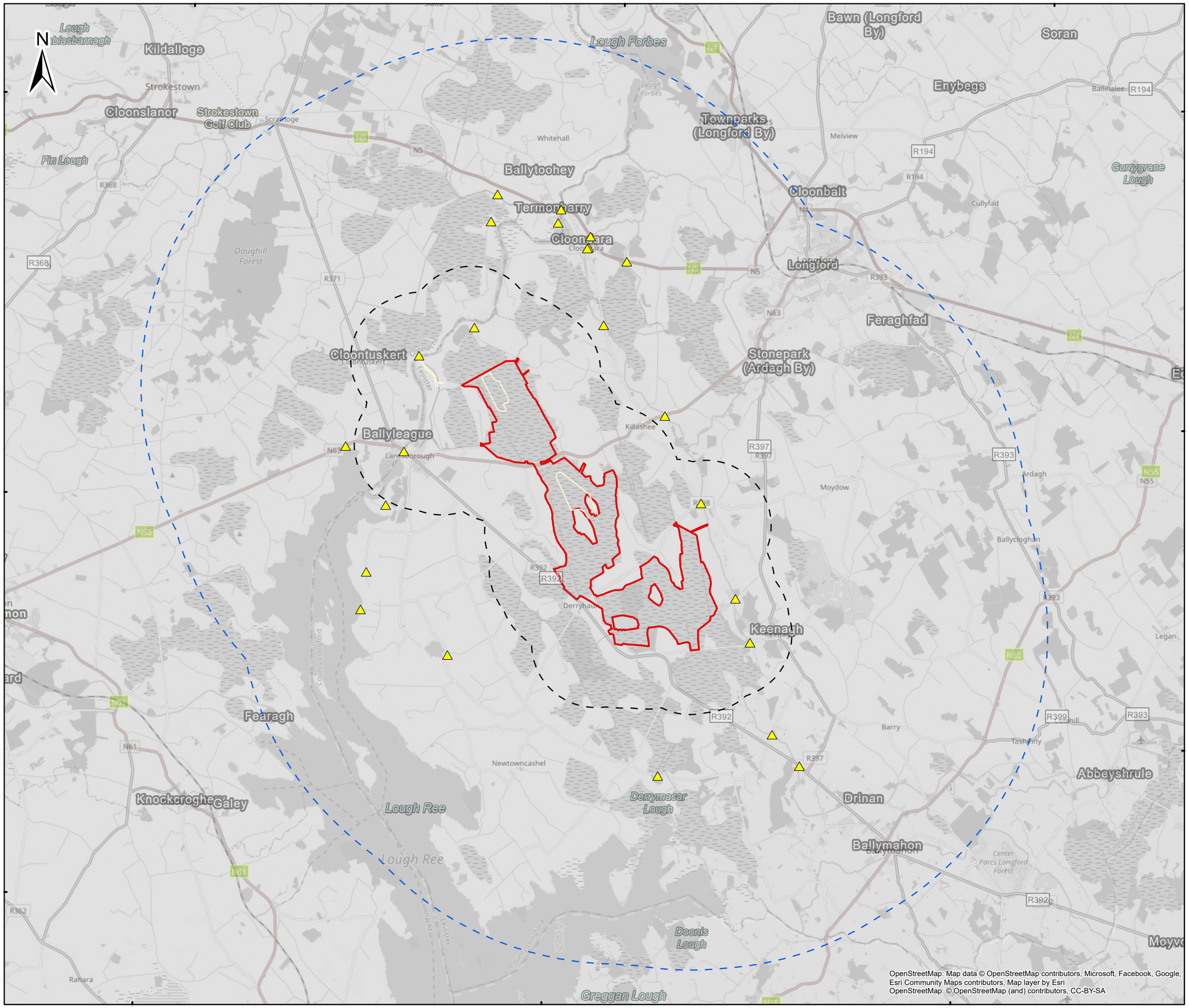


Figure 8.4: Vantage points and viewsheds used by the TOBIN survey team. Taken from CRM report (Appendix 8.5)



Legend

- Proposed wind farm site boundary
- 10km buffer from the proposed wind farm site boundary
- 2km buffer from the proposed wind farm site boundary
- Surveyed wetlands

0 2.5 5
Kilometres

NOTES

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3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	17/04/2025	First issue	S.P	J.M

Client: Bord na Móna

Project: Derryadd Wind Farm

Title: Figure 8.5: Study Areas for Waterbirds Surveys

Scale @ A3:	1:110,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	April 2025

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Map Ref: 11399-045-WtB.SUR-WF.Site-TOB-A

Draft: A

8°0'0"W
7°54'0"W
7°48'0"W
53°42'50"N
53°39'40"N
53°36'30"N
773500
768000
762500
600000
606000
612000

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
T19
T20
T21

World Topographic Map: Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar, Microsoft

Legend

- Proposed wind farm site boundary
- Transects

0 1 2
Kilometres

NOTES

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	02/04/2024	First issue	S.P	J.M

Client: Bord na Móna

Project: Derryadd Wind Farm

Title: Figure 8.6: Representative Transects for General Birds Characterisation

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	April 2024

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Map Ref: 11399-046-TR-WF.Site-TOB-A

Draft: A

8°0'0"W
7°54'0"W
7°48'0"W
53°42'50"N
53°39'40"N
53°36'30"N
773500
768000
762500
600000
606000
612000

Legend

- Proposed wind farm site boundary
- Hen harrier VPs
- 2km buffer from the proposed wind farm site boundary

0 1 2
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
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3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
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Rev	Date	Description	By	Chkd.
A	03/04/2024	First issue	S.P	J.M

Client: Bord na Móna

Project: Derryadd Wind Farm

Title: Figure 8.7: Specific VPs and Study Area for Raptor Surveys

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	April 2024

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Map Ref: 11399-047-RA..VPs-RA..SUR-TOB-A

Draft: A

8°0'0"W
7°54'0"W
7°48'0"W
53°42'50"N
53°39'40"N
53°36'30"N
773500
768000
762500
600000
606000
612000
N
WD1
WD2
WD3
World Topographic Map: Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar, Microsoft

Legend

- Proposed wind farm site boundary
- Transcects

0 1 2
Kilometres

NOTES

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd
A	03/04/2024	First issue	S.P	J.M

Client: Bord na Móna

Project: Derryadd Wind Farm

Title: Figure 8.8: Breeding Woodcock Transects

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	April 2024

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Map Ref: 11399-048-WK..TR-WF.Site-TOB-A

Draft: A

8.7 ORNITHOLOGICAL LIKELY SIGNIFICANT EFFECTS ASSESSMENT

8.7.1 Overview

The assessment of significant effects from the proposed development on birds adopts a Source-Pathway-Receptor (SPR) conceptual model, where:

- **Source** – the origin of a potential likely significant effect (noting that one source may have several pathways and receptors);
- **Pathway** – the means by which the effect of the activity could negatively affect a receptor; and
- **Receptor** – the element of the receiving environment that is adversely affected.

For a potential effect on a receptor to occur, all three elements of the SPR model must be present. If any one of these elements is absent or deemed insignificant, the likelihood of the effect occurring is effectively removed.

A range of potential impact sources and pathways have been identified for the construction, operation and decommissioning phases of the proposed development, presenting varying degrees of risk to bird species and their habitats. These include direct habitat loss, disturbance, displacement, and collision risk, all of which are assessed in terms of their likelihood, magnitude, and the sensitivity of the avian receptors involved. The sources, pathways and potential impact are briefly described in Section 8.7.2 below.

To ensure a robust and comprehensive evaluation of potential impacts on bird species, this assessment presented in this Chapter draws on two complementary approaches: the broad environmental impact framework provided by the EPA (2022) and the species-specific methodology developed by Percival (2003).

The EPA (2022) guidance provides a structured framework for characterising effects based on parameters such as quality, significance, extent, context, probability, duration, and type of impact. This approach ensures a broad, standardised evaluation of environmental impacts in line with national policy and regulatory expectations. A summary of the EPA (2022) framework is provided in Section 8.7.3

The Percival (2003) methodology, developed specifically for ornithological impact assessment, offers a more targeted, species-focused approach. It emphasises the assessment of three key variables:

- sensitivity of bird species,
- magnitude of the potential effect,
- significance of the impact.

A summary of the Percival (2003) methodology work is provided in Section 8.7.4.

8.7.2 Potential Impact Sources Affecting Bird Receptors

The potential effects on avian fauna from wind farm developments have been well documented in the literature, including Percival (2003) and Scottish Natural Heritage (SNH, 2017), highlighting primary risk categories associated with wind farm developments. In the context of the proposed development, a range of potential impact sources have been identified that could

impact affect bird species and their habitats. The nature and significance of these impacts are influenced by factors such as the timing and location of activities, the sensitivity of the species present, and the extent of habitat disturbance or modification.

8.7.2.1 Construction Phase

During construction, several activities may directly or indirectly impact bird populations and their habitats. These include:

- **Direct Habitat Loss due to Installation of Infrastructure:** The construction of turbine foundations, access tracks, crane hardstands, and other infrastructure may result in the temporary or permanent loss of habitats used by birds for nesting, foraging, or roosting.
- **Indirect Habitat Loss due to Water Quality Degradation and Water Abstraction:** Earthworks and site runoff may degrade aquatic or riparian habitats through sedimentation or pollution. Water abstraction could also alter wetland hydrology, impacting water-dependent bird species.
- **Disturbance and Displacement:** The presence of machinery, vehicles, and personnel, along with construction noise, may disturb birds and lead to their temporary or permanent displacement from sensitive habitats, particularly during the breeding season.
- **Direct Mortality and Destruction of Eggs/Nests:** Vegetation clearance and groundworks may inadvertently destroy nests, eggs, or fledglings if undertaken during the nesting season without mitigation.
- **Habitat Loss at POIs along the TDR):** Infrastructure intersecting key ecological features such as hedgerows or wetlands may cause localised habitat degradation or fragmentation, which can disproportionately impact specialist or territorial bird species.

8.7.2.2 Operational Phase

Following construction, the operational phase presents ongoing risks to bird populations, including:

- **Disturbance/Displacement due to Barrier Effect:** Wind turbines may disrupt flight paths or foraging behaviour, particularly for species sensitive to movement or visual disturbances. This can lead to the avoidance of formerly suitable habitats, effectively reducing their availability.
- **Collision Risk:** Birds, particularly those that fly at rotor-swept height or follow migratory paths through the site, may be at risk of colliding with turbine blades. This risk increases under poor visibility or adverse weather conditions and may result in injury or mortality for affected species. There is also the risk of collision with other built structures, such as meteorological mats, and buildings. Although stationary, these structures can present obstacles to birds in flight, especially during poor weather.

8.7.2.3 Decommissioning Phase

The Decommissioning Phase of the proposed development may involve either the replacement of turbines (subject to planning permission) or the full removal of above-ground turbine infrastructure, with retention of the substation, associated cabling, and access tracks. The

activities associated with decommissioning are expected to be similar in nature to those undertaken during construction (e.g. site access, use of machinery, removal of infrastructure), and may lead to:

- **Temporary Habitat Disturbance or Loss:** Limited and localised habitat disturbance may occur as turbine components are removed and groundworks are reinstated. However, this is expected to be significantly lower in scale and duration compared to the original construction phase.
- **Short-Term Disturbance and Displacement:** There may be periods of disturbance to bird species due to noise and human activity, but these are expected to be of low intensity and duration.

8.7.3 EPA (2022) Framework

The EPA (2022) framework provides a structured and standardised approach to identifying, describing, and evaluating potential environmental effects associated with a proposed development. The framework is designed to ensure consistency, transparency, and completeness in impact assessments, and is particularly important when determining likely significant effects in line with legal and regulatory requirements. The EPA (2022) framework classifies effects using six descriptors: Quality, Significance, Extent and Context of Effects, Probability, Duration and Frequency, and Types of Effects (Table 8.5).

Table 8.5: Description of Effects (EPA, 2022)

Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects 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).
Significance	**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 Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, 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 Effects An effect which obliterates sensitive characteristics.
Extent and Context of Effects	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
Probability of Effects	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and Frequency of Effects	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Describing the Types of Effects	**Indirect Effects** (a.k.a. Secondary or Off-site Effects) Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects

	When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

8.7.4 Percival et al (2003)

The Percival (2003) methodology is a structured framework developed specifically for assessing the potential impacts of wind farm developments on bird species. It provides a species-focused approach that allows for a nuanced evaluation of how different bird populations may respond to proposed activities.

8.7.4.1 Sensitivity of Ornithological Receptors

The BOCCI (Birds of Conservation Concern in Ireland) is a list that categorises bird species in Ireland based on their conservation status, with species classified into Red, Amber, or Green lists. The Red List includes species of highest concern due to significant declines or other serious threats, while the Amber List features species of moderate concern, and the Green List includes those with stable populations. BOCCI helps guide conservation efforts and priorities for birds in Ireland.

Similarly, Annex I of the EU Birds Directive identifies bird species across the European Union that are of special conservation concern due to their vulnerable status. Species listed in Annex I are protected through the establishment of SPAs, and EU member states must take specific measures to protect their habitats and populations. Both BOCCI and Annex I serve to prioritize species for conservation action, ensuring the long-term survival of vulnerable bird species at both national and international levels.

The assessment followed methodology defined in Percival (2003) for evaluating the effects of wind farms on birds, applying it to assess the sensitivity of species to the type of development, the magnitude of the effect, and the significance of the potential impact.

Each bird species is associated with a classification for its 'sensitivity', which is defined as its ecological importance (Percival, 2003), determined by the criteria in Table 8.6.

Table 8.6: Determination of Sensitivity (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 an SPA, but which are not cited as 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; or

Sensitivity	Determining Factor
	▪ Species present in nationally important numbers (>1% Irish population).
Medium	▪ Species listed in the Annex 1 of the Birds Directive; ▪ Species present in regionally important numbers (>1% regional (county) population); or ▪ Other species on BirdWatch Ireland's red list of Birds of Conservation Concern (Gilbert *et al.*, 2021).
Low	▪ Any other species of conservation interest, including species on BirdWatch Ireland's amber list of Birds of Conservation Concern (Gilbert *et al.*, 2021), not covered above.

8.7.4.2 Magnitude of Potential Effects

Percival *et al.* (1999; cited by Percival, 2003) defines "*the test of significance of an impact will be whether the wind farm impact is causing a significant change to the population, its range or distribution*". In the context of the proposed development, where the impact sources listed in Section 8.6.2 are appraised as likely, consideration is given to whether the proposed development could result in potential impacts to bird species (Percival, 2003). Here, if the effects listed in Section 8.6.2 are appraised as likely, consideration must be given to whether the development will result in the loss of potential for the respective location to support its current bird populations (Percival, 2003).

In this regard, and having consideration for the 'Sensitivity' of each species/population, each type of risk is associated with an area in which the consequent effect could be assessed as significant, to be defined by the ecological requirements of the important bird species that occur within a suggested zone of 5km from the proposed wind farm, to be adjusted depending on those ecological requirements (Percival, 2003).

Because one of the parameters for the determination of the magnitude of an effect is the loss of suitable/preferred habitat as a consequence of the proposed development, baseline habitat data (Chapter 7 Biodiversity) is used for its determination. However, because the proposed development site is not an isolated landscape feature to birds, landcover data of the wider environment (within 5 km from the proposed wind farm site), adapted from the Corine Land Cover 2018 dataset[4], is also used to conclude about the local distinctiveness of the habitats in the wider context, with respect to their ornithological importance. The relative combination of the two datasets is then used with the criteria for the determination of magnitude of effects (Table 8.7).

[4] **Creative Commons Attribution 4.0 License** available at https://data.gov.ie/dataset/corine-landcover-2018/resource/eead42c4-9eb2-40bc-8c91-a9f3e503d0e8?inner_span=True (Accessed in September 2024; Minimum Mapping Unit of 25 hectares and a Minimum Mapping Width of 100 m)

Table 8.7: Determination of Magnitude of Effects (Percival, 2003)

Magnitude	Determining Factor
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.

8.7.4.3 Significance of Potential Effects

The determination if a specific risk/effect from a wind farm development, is acceptable or unacceptable in terms of an impact assessment is informed by the combination of the classification of the individual parameters 'sensitivity' and 'magnitude', described in the Sections above. The combined result would indicate the 'Significance' of an impact, and should be interpreted as(Percival, 2003):

- *Very low* and *Low* – should not be of concern, under regular circumstances, although consideration on the design should be exercised for impact minimisation;
- *Medium* – could potentially be a significant impact, requiring individual assessment. Appropriate mitigation and/or design revision may suffice to reduce this impact significance; and
- *High* and *Very high* – represents a highly significant impact on avian resources, which would warrant a planning application refusal.

Table 8.8: Significance Matrix: Combining Magnitude and Sensitivity to Assess Significance (Percival, 2003)

SIGNIFICANCE		Sensitivity			
		Very high	High	Medium	Low
MAGNITUDE	VERY HIGH	Very high	Very high	High	Medium
	HIGH	Very high	Very high	Medium	Low
	MEDIUM	Very high	High	Low	Very low

SIGNIFICANCE		Sensitivity			
		Very high	High	Medium	Low
	LOW	Medium	Low	Low	Very low
	NEGLIGIBLE	Low	Very low	Very low	Very low

8.7.5 Collision Risk Assessment

A specific Collision Risk Model (CRM) for the proposed wind farm was produced (Appendix 8.4), comprising seven seasons of VP surveys (from Breeding Season 2021 until Breeding Season 2024 - Appendix 8.1, Appendix 8.2, and Appendix 8.3), following NatureScot (2024) and Band (2024) guidance. This guidance estimates the number of collisions through five stages:

- **Stage A: Flight Activity** – uses the bird survey data to establish the density of flying birds in the vicinity of the turbines, and the proportion flying at a risk height, between the lowest and highest points of the rotors;
- **Stage B: Transits** – estimates the number of bird transits through the turbine rotors under the assumption that birds will continue to make flights within the area at the same intensity as before;
- **Stage C: Single transit collision risk** - calculates the probability of a collision when a bird makes a transit through the rotor swept volume (the single transit collision risk);
- **Stage D: Non-avoidance collision risk** - multiplies the number of predicted transits from Stage B and the single transit collision risk from Stage C, to provide an estimate of the overall predicted collision risk before avoidance;

Stage E: Collision risk after avoidance - takes account of the avoidance rate, applying it to the non-avoidance collision risk to reflect the fact that most potential collisions are avoided due to birds taking evasive action (SNH, 2010).Full description of the adopted methodology for the CRM informing this chapter of the EIAR is included in Appendix 8.4.

8.7.5.1 Desk Study

An ornithological desk study was carried out to search for information on local avian populations, and their relevance in the context of this assessment. The study included a search and review of the following sources:

- National Parks and Wildlife Service (NPWS)[5];
- National Biodiversity Data Centre (NBDC)[6];
- BirdWatch Ireland Irish Wetland Bird Survey (I-WeBS)[7];
- Bird Atlas 2007-11 & European Breeding Bird Atlas 2 (Balmer *et al.*, 2013; Keller *et al.*, 2020);

[5] Publicly available data (available at https://www.npws.ie/maps-and-data; accessed in August 2022) and a *Data Request* form was filled and submitted with the National Parks and Wildlife Service on all rare and/or protected species records in December 2024 - response was obtained in January 2025

[6] Available at https://maps.biodiversityireland.ie/. Accessed in January 2025

[7] Data were supplied by the Irish Wetland Bird Survey (I-WeBS), a scheme coordinated by BirdWatch Ireland under contract to the National Parks and Wildlife Service of the Department of Housing, Local Government and Heritage

- Information on statutory and non-statutory designated sites of ornithological importance - e.g. SPAs; Natural Heritage Areas (NHA); proposed Natural Heritage Areas (pNHA); National Parks; National Reserves; Ramsar sites; Wildfowl Sanctuaries[5];
- Historical ornithological data collected at the proposed development (e.g. the Biodiversity Section of the EIAR for the Derryadd Wind Farm, submitted in 2019 (planning application reference PA14.303592)).

8.7.5.2 Classification of Target Species

The initial identification and classification of key target bird species (i.e. species most likely to be affected by the proposed development) was informed by a combination of scoping and consultation responses and the findings of the desk study. In line with guidance from SNH (2017), particular attention was given to:

- Species afforded a high level of legislative protection, such as those listed under Annex I of the EU Birds Directive; and
- Species classified as Red-listed by Gilbert *et al.* (2021), indicating a high conservation concern.

The initial field survey design was then geared towards the study of a list of key target species (Table 8.9), maintaining flexibility as to incorporate any updates from the survey results.

Table 8.9: Key Target Species and Corresponding Criteria, following SNH (2017)

Common Name	Scientific Name	BoCCI	Birds Directive	Other Criteria
Common Goldeneye	*Bucephala clangula*	Red	-	SCI of Lough Ree SPA
Common Kestrel	*Falco tinnunculus*	Red	-	Other Red listed raptors not identified during the desk study or consultation, but may occur onsite
Common Redshank	*Tringa totanus*	Red	-	Other Red listed waders and waterbirds but may occur onsite
Common Scoter	*Melanitta nigra*	Red	-	SCI of Lough Ree SPA
Common Snipe	*Gallinago gallinago*	Red	-	Other Red listed waders and waterbirds but may occur onsite
Common Tern	*Sterna hirundo*	Amber	Annex I	SCI of Lough Ree SPA
Eurasian Coot	*Fulica atra*	Amber	-	SCI of Lough Ree SPA
Eurasian Curlew	*Numenius arquata*	Red	-	Other Red listed waders and waterbirds but may occur onsite
Eurasian Teal	*Anas crecca*	Amber	-	SCI of Lough Ree SPA
Eurasian Wigeon	*Anas penelope*	Amber	-	SCI of Lough Ree SPA
Eurasian Woodcock	*Scolopax rusticola*	Red	-	Other Red listed waders and waterbirds but may occur onsite

Common Name	Scientific Name	BoCCI	Birds Directive	Other Criteria
European Golden Plover	*Pluvialis apricaria*	Red	Annex I	SCI of Lough Ree SPA
Greater White-fronded Goose	*Anser albifrons flavirostris*	Amber	Annex I	SCI of Ballykenny-Fisherstown Bog SPA
Hen Harrier	*Circus cyaneus*	Amber	Annex I	Other raptors that may occur onsite
Little Grebe	*Tachybaptus ruficollis*	Green	-	SCI of Lough Ree SPA
Mallard	*Anas platyrhynchos*	Amber	-	SCI of Lough Ree SPA
Merlin	*Falco columbarius*	Amber	Annex I	Other raptors that may occur onsite
Northern Lapwing	*Vanellus vanellus*	Red	-	SCI of Lough Ree SPA
Northern Shoveler	*Anas clypeata*	Red	-	SCI of Lough Ree SPA
Peregrine Falcon	*Falco peregrinus*	Green	Annex I	Other raptors that may occur onsite
Tufted Duck	*Aythya fuligula*	Amber	-	SCI of Lough Ree SPA
Western Barn Owl	*Tayto alba*	Red	-	Other raptors that may occur onsite
White-tailed Eagle	*Haliaeetus albicilla*	Red	-	Re-introduction programme, highlighted as a species of concern during consultation
Whooper Swan	*Cygnus cygnus*	Amber	Annex I	SCI of Lough Ree SPA
Other Waders and Waterbirds				Other Red listed waders and waterbirds, not identified during the desk study or consultation, but may occur onsite
Other Raptors				Other Red listed raptors not identified during the desk study or consultation, but may occur onsite

Beyond the key target species listed above, the field study also covered other species, classified as secondary target species. These include species with higher sensitivities towards wind farm development (e.g. some species of waterbirds - Thaxter *et al.*, 2019), some Amber listed species BoCCI (e.g. Mute Swan - Gilbert *et al.*, 2021), other species considered important on a national and/or regional level, and other sensitive species to wind farm developments recorded locally (e.g. raptors).

8.8 EXISTING ENVIRONMENT

The following sections detail the desk studies and field surveys conducted to establish the ecological conditions of the existing environment at the proposed wind farm site, which were used to form the basis of the ornithological impact assessment.

8.8.1 Desk Study

8.8.1.1 Sites of Ornithological Importance (International and National)

Of the nine sites of international conservation importance located within 15 km of the proposed wind farm site listed in Section 7.9.1.3 of Chapter 7 - Biodiversity, two sites, Lough Ree SPA [004064] and Ballykenny-Fisherstown Bog SPA [004101], are designated specifically for their ornithological value (Table 8.10).

There are 11 sites of national importance within 15 km of the proposed wind farm site whose site synopsis reports mention the site's importance for the respective bird species (Table 8.10)

Table 8.10: Sites of International and National Ornithological Importance within 15 km from the Proposed Wind Farm Site

Site Name [Code] (Conservation Objectives)	Approximate Distance from Proposed Wind Farm Site	Special Conservation Interests
Lough Ree SPA [004064] (NPWS, 2022b)	2.5 km	• 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] • Wetlands and Waterbirds [A999]
Ballykenny-Fisherstown Bog SPA [004101] (NPWS, 2022a)	4.5 km	• Greenland White-fronted Goose *Anser albifrons flavirostris* [A395]
Derrycanan Bog NHA [000605] (NPWS, 2002a)	10.6 km	• Red Grouse *Lagopus lagopus hibernicus*
Rinn River NHA [000691] (NPWS, 2002c)	11.4 km	• Greater White-fronted *Goose Anser albifrons flavirostris* • Whooper Swan *Cygnus cygnus* • Eurasian Wigeon *Mareca penelope* • Common Pochard *Aythya ferina* • Northern Lapwing *Vanellus vanellus* • Eurasian Curlew *Numenius arquata*
Mount Jessop Bog NHA [001450] (NPWS, 2002b)	3.4 km	• Red Grouse *Lagopus lagopus hibernicus*

Fortwilliam Turlough pNHA [000448] (NPWS, 2013a)	4.0 km	• Common Snipe *Gallinago gallinago* • Mallard *Anas platyrhynchos*
Lough Bannow pNHA [000449] (NPWS, 2009d)	0.09 km	• Waterbirds
Kilglass and Grange Loughs pNHA [000608] (NPWS, 2009c)	12.4 km	• Mute Swan *Cygnus olor* • Greater White-fronted Goose *Anser albifrons flavirostris* • Eurasian Wigeon *Mareca penelope* • Eurasian Teal *Anas crecca* • Tufted Duck *Aythya fuligula* • Common Goldeneye *Bucephala clangula* • European Golden Plover *Pluvialis apricaria* • Northern Lapwing *Vanellus vanellus*
Derry Lough pNHA [001444] (NPWS, 2009b)	2.6 km	• Winter wildfowl • Water Rail *Rallus aquaticus*
Lough Boderg/Lough Bofin pNHA [001642] (NPWS, 2009f)	14.8 km	• Greater White-fronted *Goose Anser albifrons flavirostris*
Lough Forbes Complex SAC [001818] (NPWS, 2013b)	0.660 km	• Great Cormorant *Phalacrocorax carbo* • Whooper Swan *Cygnus cygnus* • Eurasian Wigeon *Mareca penelope* • Eurasian Teal *Anas crecca* • Northern Shoveler *Spatula clypeata* • Tufted Duck *Aythya fuligula* • Common Goldeneye *Bucephala clangula* • Greater White-fronted Goose *Anser albifrons flavirostris* • Merlin *Falco columbarius*
Lough Bawn pNHA [001819] (NPWS, 2009e)	0 km	• Common Snipe *Gallinago gallinago* • Eurasian Curlew *Numenius Arquata* • Northern Lapwing *Vanellus vanellus*
Cordara Turlough pNHA [001821] (NPWS, 2009a)	2.8 km	• Wildfowl • Waders
Derrycanan Bog NHA [000605] (NPWS, 2002a)	10.6 km	• Red Grouse *Lagopus lagopus hibernicus*
Rinn River NHA [000691] (NPWS, 2002c)	11.4 km	• Greater White-fronted Goose *Anser albifrons flavirostris* • Whooper Swan *Cygnus cygnus* • Eurasian Wigeon *Mareca penelope* • Common Pochard *Aythya ferina* • Northern Lapwing *Vanellus vanellus* • Eurasian Curlew *Numenius arquata*

8.8.1.2 National Biodiversity Data Centre Records

A review of the National Biodiversity Data Centre was carried out for the 10 km Irish Grid Squares associated with the proposed wind farm site, i.e. N06, N07, and N16 (Table 8.11). The search retrieved a total of 65 bird species assigned with conservation status, i.e. listed in either the Annex I of the Birds Directive, or in the BoCCI (Gilbert *et al.*, 2021).

Table 8.11: Birds with Conservation Status Recorded in N06, N07 and N16 10 km Irish Grid Squares

Grid Square	Common Name	Scientific Name	Last Record	BOCCI List/ .Designation
N06; N07; N16	Western Barn Owl	*Tyto alba*	27/12/2022	Red List*
N06; N07; N17	Barn Swallow	*Hirundo rustica*	26/08/2022	Amber List*
N06	Barnacle Goose	*Branta leucopsis*	31/12/2001	Amber List*; Birds Directive - Annex I
N06	Bewick's Swan	*Cygnus columbianus*	31/12/2001	Red List*; Birds Directive - Annex I
N06; N07; N16	Black-headed Gull	*Larus ridibundus*	23/03/2022	Amber List*
N06	Black-tailed Godwit	*Limosa limosa*	31/12/2001	Red List*
N06, N16	Cattle Egret	*Bubulcus ibis*	04/12/2022	-
N06; N07; N16	Common Buzzard	*Buteo buteo*	26/02/2023	-
N06, N07	Eurasian Coot	*Fulica atra*	26/02/2023	Amber List*
N06	Common Goldeneye	*Bucephala clangula*	31/12/2011	Red List*
N06, N07; N16	Common Kestrel	*Falco tinnunculus*	31/12/2011	Red List*
N07; N16	Common Kingfisher	*Alcedo atthis*	29/08/2022	Amber List*; Birds Directive - Annex I
N06, N07; N16	Common Linnet	*Linaria cannabina*	31/12/2011	Amber List*
N06; N07; N16	Common Moorhen	*Gallinula chloropus*	08/05/2021	-
N06	Common Pochard	*Aythya ferina*	31/12/2001	Red List*
N06; N07; N16	Common Redshank	*Tringa totanus*	31/12/2011	Red List*
N06; N07; N16	Common Snipe	*Gallinago gallinago*	26/04/2023	Red List*
N06; N07; N16	Common Starling	*Sturnus vulgaris*	23/03/2022	Amber List*
N06; N07; N16	Common Swift	*Apus apus*	14/07/2022	Red List*
N06; N07	Common Tern	*Sterna hirundo*	31/07/1991	Amber List*; Birds Directive - Annex I
N06; N07; N16	Corncrake	*Crex crex*	31/07/1991	Red List*; Birds Directive - Annex I
N06	Dunlin	*Calidris alpina*	31/12/2001	Red List*

Grid Square	Common Name	Scientific Name	Last Record	BOCCI List/ .Designation
N06; N07; N16	Eurasian Curlew	*Numenius arquata*	14/08/2020	Red List*
N06; N07; N16	Eurasian Sparrowhawk	*Accipiter nisus*	31/12/2011	-
N06; N07; N16	Eurasian Teal	*Anas crecca*	22/08/2016	Amber List*
N06; N07	Eurasian Wigeon	*Mareca penelope*	09/01/2023	Amber List*
N06; N07; N16	Eurasian Woodcock	*Scolopax rusticola*	14/12/2022	Red List*
N06; N07; N16	European Golden Plover	*Pluvialis apricaria*	31/12/2011	Red List*; Birds Directive - Annex I
N06	Gadwall	*Mareca strepera*	31/12/2011	Amber List*
N06; N07; N16	Goldcrest	*Regulus regulus*	31/12/2011	Amber List*
N07	Great Black-backed Gull	*Larus marinus*	29/02/1984	-
N06; N07	Great Cormorant	*Phalacrocorax carbo*	06/08/2022	Amber List*
N06; N07	Great Crested Grebe	*Podiceps cristatus*	28/05/2022	Amber List*
N07	Greater White-fronted Goose	*Anser albifrons*	29/02/1984	Amber List*
N16	Grey Partridge	*Perdix perdix*	31/07/1972	Red List*
N06; N07; N16	Grey Wagtail	*Motacilla cinerea*	08/04/2023	Red List*
N06; N07; N16	Hen Harrier	*Circus cyaneus*	15/12/2017	Amber List*; Birds Directive - Annex I
N06; N16	European Herring Gull	*Larus argentatus*	31/12/2001	Amber List*
N06; N07; N16	Western House Martin	*Delichon urbicum*	16/04/2023	Amber List*
N06; N07; N16	House Sparrow	*Passer domesticus*	16/04/2023	Amber List*
N16	Jack Snipe	*Lymnocryptes minimus*	31/12/2011	-
N06; N07	Lesser Black-backed Gull	*Larus fuscus*	10/07/2021	Amber List*
N06	Little Egret	*Egretta garzetta*	25/11/2022	Birds Directive - Annex I
N06; N07; N16	Little Grebe	*Tachybaptus ruficollis*	31/12/2011	
N06; N16	Long-eared Owl	*Asio otus*	02/09/2014	

Grid Square	Common Name	Scientific Name	Last Record	BOCCI List/ .Designation
N06; N07; N16	Mallard	*Anas platyrhynchos*	13/04/2023	Amber List*
N06; N07; N16	Meadow Pipit	*Anthus pratensis*	18/05/2022	Red List*
N06; N16	Merlin	*Falco columbarius*	19/04/2023	Amber List*; Birds Directive - Annex I
N06; N07; N16	Common Gull	*Larus canus*	03/05/2022	Amber List*
N06; N07; N16	Mute Swan	*Cygnus olor*	13/04/2023	Amber List*
N06; N07; N16	Northern Lapwing	*Vanellus vanellus*	26/04/2023	Red List*
N06	Northern Pintail	*Anas acuta*	31/12/2001	Amber List*
N06; N07	Northern Shoveler	*Spatula clypeata*	15/02/2023	Red List*
N16	Red Kite	*Milvus milvus*	08/02/1991	Red List*; Birds Directive - Annex I
N06; N07; N16	Redwing	*Turdus iliacus*	07/12/2022	Red List*
N06	Common Ringed Plover	*Charadrius hiaticula*	27/06/2021	Amber List*
N06; N07; N16	Sand Martin	*Riparia riparia*	16/04/2023	Amber List*
N06; N07; N16	Eurasian Skylark	*Alauda arvensis*	13/04/2023	Amber List*
N06; N07; N16	Spotted Flycatcher	*Muscicapa striata*	31/12/2011	Amber List*
N06; N07; N16	Stock Dove	*Columba oenas*	31/07/1991	Red List*
N06; N07	Tufted Duck	*Aythya fuligula*	31/12/2011	Amber List*
N06	Eurasian Whimbrel	*Numenius phaeopus*	30/04/2023	-
N06; N07; N16	Whooper Swan	*Cygnus cygnus*	17/04/2023	Amber List*; Birds Directive - Annex I
N06; N07; N16	Willow Warbler	*Phylloscopus trochilus*	31/12/2011	Amber List*
N06; N07; N16	Yellowhammer	*Emberiza citrinella*	31/12/2011	Red List*
N06; N07; N16	Western Barn Owl	*Tyto alba*	27/12/2022	Red List*

* BoCCI (Gilbert *et al.*, 2021)

8.8.1.3 Breeding Birds Distribution – NPWS

Under Article 12 of the Birds Directive, every three years (every six years, since 2013), all Member States shall prepare a report on the implementation of the respective national provisions, including specific reporting on status and trends of bird species. Two datasets, corresponding to the periods 2008 to 2012, and 2013 to 2018, have been accessed[8] and filtered as to illustrate the presence of protected species listed in Annex I of the Birds Directive, as Special Conservation Interests (SCI) for the European sites considered (Section 8.8.1.1), and as BoCCI (Amber and Red listed species - Gilbert *et al.*, 2021) – species of conservation interest - within the N06, N07 and N16 10 km Irish Grid Squares, where the proposed wind farm is located[9] - Table 8.12. It is relevant to note that the reviewed datasets refer to breeding bird species, and do not include data on wintering or migratory bird species.

It is possible to confirm that N07 and N16 present similar reported diversity of breeding birds of conservation interest in each of the two periods (i.e. 28 and 30 species in 2008-2012 and 2013-2018, respectively). The Irish Grid Square N06, located at a shorter distance to Lough Ree, harboured significantly higher diversity than the previous Grid Squares, accounting for 30 breeding bird species of conservation interest in 2008-2012, and 39 in 2013-2018.

8.8.1.4 Bird Atlas Records

Data from BirdWatch Ireland, Bird Atlas 2007-2011[10] recorded within the N06, N07 and N16 10 km Irish Grid Squares was assessed for the presence of species of conservation interest, similarly to Section 8.8.1.3 above. As the dataset informing the Bird Atlas 2007-2011 covers four summers and four winters, the presence of migratory species is also included, as opposed to the NPWS dataset described above. Table 8.13 includes the resulting list of species, as well as the corresponding 2 km Irish Grid Square(s) for instances where breeding is classified as '*Confirmed*' in the dataset, when the information is available.

Thus, it is possible to confirm that there were 82 records of '*Confirmed* breeding in the dataset, with N07 accounting for 39% of the total, with 31 species of birds of conservation interest (N06: 28%, 22 species; N16: 33%, 26 species). Eurasian Coot (*Fulica atra*), Common Kingfisher (*Alcedo atthis*), Little Grebe (*Tachybaptus ruficollis*) and Mallard (*Anas platyrhynchos*) would be the confirmed species breeding at the three searched 10 km Irish Grid Squares with the highest legislative protection as they are either designated as SCI of the Lough Ree SPA, or listed in Annex I of the Birds Directive. It is also important to note that none of the '*Confirmed* breeding records in Table 8.13 is associated with the proposed wind farm site[9].

During the four winters between 2007 and 2011, the most significant Bird Atlas records were Eurasian Coot, European Golden Plover (*Pluvialis apricaria*), Common Goldeneye (*Bucephala clangula*), Hen Harrier (*Circus cyaneus*), Common Kingfisher, Northern Lapwing (*Vanellus vanellus*), Little Egret (*Egretta garzetta*), Little Grebe, Mallard, Northern Shoveler (*Spatula clypeata*), Eurasian Teal (*Anas crecca*), Tufted Duck (*Aythya fuligula*), and Whooper Swan

[8] Available at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data. Accessed in March 2024

[9] Proposed wind farm site is located within the following 2 km Irish Grid Squares: N06J, N07F, N07G, N06M, N06N, N06P, N07K, N07L, N06R, N06S, N06T, N06U, N06W, N06X, N06Y, N16B, N16C, and N16D

[10] Available at https://maps.biodiversityireland.ie/Dataset/220. Accessed in March 2024

(*Cygnus cygnus*), due to their similar legislative protection (i.e. SCI of the Lough Ree SPA or listed in Annex I of the Birds Directive).

8.8.1.5 BirdWatch Ireland I-WeBS Data Set

Results from the data request to BirdWatch Ireland for the Lough Ree I-WeBS site were analysed having in consideration the relatively short distance between this I-WeBS site and the proposed wind farm site (approximately 2.5km). The data summarised in Table 8.14 comprises species identified during monthly counts at 34 subsites within the Lough Ree I-WeBS site during for the winter 2018/19, 2019/20, 2020/2021, and 2022/23[7], relevant for the representation of the local occurrence of migratory waterbird populations.

European Golden Plover was the most abundant waterbird species of conservation interest recorded in Lough Ree, with a peak record of 1,000 individuals, which is slightly above the 1% threshold of the national population (i.e. 930 individuals - Burke *et al.*, 2018). On the other hand, Mute Swan, with a peak abundance of 101 individuals, was slightly above the 1% threshold of the national/international population (i.e. 90 individuals; Ireland is considered to have a closed Mute Swan population - Burke *et al.*, 2018). Apart from these two species, Lough Ree is also nationally important for Mallard, *Anas platyrhynchos* (1% of the national population is 280 individuals), Northern Shoveler, *Spatula clypeata*, and Little Grebe, *Tachybaptus ruficollis* (1% of the national populations of each of these two species is 20 individuals - Burke *et al.*, 2018).

8.8.1.6 Bird Sensitivity to Wind Energy Development

With the objective of providing a spatial indication for locations where protected bird species are likely to be sensitive to wind energy, BirdWatch Ireland developed a mapping tool that gathered the characteristics of 22 of the most-sensitive bird species with regards to wind energy effects on habitat loss, disturbance and obstruction, beyond the more common collision risk effect. The tool[6] calculates a *Species Sensitivity Score*, aggregates the scores of each 1x1 km square, and classifies it into four simple labels of: “No data” (0 to 14.7), “Low” (14.8 to 23.4), “Medium” (23.5 to 45.4), “High” (45.5 to 62.8) and “Highest” (62.9 to 116.9; Mc Guinness *et al.*, 2015).

The proposed wind farm site is mostly located within an area with *No Data*, for which the tool is not valid. However, a small portion to the southwest of the Derryadd bog is classified as “Low”, due to the presence of Black-headed Gull (*Chroicocephalus ridibundus*), with a Species Sensitivity Score of 16.9[6]. Outside of the proposed wind farm site, there are two areas with data available: 1) south of the site, classified as “Low” for the presence of Whooper Swan (Species Sensitivity Score of 19.8), and 2) east of the site, classified as “Low” for the presence of Red Grouse (Species Sensitivity Score of 15.1).

Table 8.12: Article 12 Birds Directive Reports 2008 to 2012, and 2013 to 2018 Spatial Data on Breeding Distributions and Ranges[9]

Common name	Scientific name	Grid Squares						Conservation Status
		N06		N07		N16		
		2008-2012	2013-2018	2008-2012	2013-2018	2008-2012	2013-2018	
Western Barn Owl	*Tyto alba*	✓	✓		✓			Red List*
Black-headed Gull	*Chroicocephalus ridibundus*	✓	✓			✓		Amber List*
Common Scoter	*Melanitta nigra*		✓					▪ SCI – Lough Ree SPA ▪ Red List*
Common Tern	*Sterna hirundo*		✓					▪ SCI – Lough Ree SPA ▪ Amber List*
Eurasian Coot	*Fulica atra*	✓	✓	✓	✓	✓	✓	Amber List*
Great Cormorant	*Phalacrocorax carbo*			✓				Amber List*
Eurasian Curlew	*Numenius arquata*	✓	✓	✓				Red List*
Gadwall	*Mareca strepera*		✓			✓	✓	Amber List*
Goldcrest	*Regulus regulus*	✓	✓	✓	✓	✓	✓	Amber List*
European Greenfinch	*Chloris chloris*	✓	✓	✓	✓	✓	✓	Amber List*
Grey Wagtail	*Motacilla cinerea*	✓	✓	✓	✓	✓	✓	Red List*
Greylag Goose	*Anser anser*		✓				✓	Amber List*
Hen Harrier	*Circus cyaneus*						✓	▪ Annex I Birds Directive ▪ Amber List*
Western House Martin	*Delichon urbicum*	✓	✓	✓	✓	✓	✓	Amber List*
House Sparrow	*Passer domesticus*	✓	✓	✓	✓	✓	✓	Amber List*
Common Kestrel	*Falco tinnunculus*	✓	✓	✓	✓	✓		Red List*
Common Kingfisher	*Alcedo atthis*	✓	✓	✓	✓	✓	✓	▪ Annex I Birds Directive ▪ Amber List*
Northern Lapwing	*Vanellus vanellus*	✓	✓	✓	✓	✓	✓	▪ SCI – Lough Ree SPA ▪ Red List*
Common Linnet	*Linaria cannabina*	✓	✓	✓	✓	✓	✓	Amber List*
Little Egret	*Egretta garzetta*		✓		✓			Annex I Birds Directive
Little Grebe	*Tachybaptus ruficollis*		✓		✓		✓	SCI – Lough Ree SPA
Mallard	*Anas platyrhynchos*	✓	✓	✓	✓	✓	✓	Amber List*
Meadow Pipit	*Anthus pratensis*	✓	✓	✓	✓	✓	✓	Red List*
Mute Swan	*Cygnus olor*	✓	✓	✓	✓	✓	✓	Amber List*

Common name	Scientific name	Grid Squares						Conservation Status
		N06		N07		N16		
		2008-2012	2013-2018	2008-2012	2013-2018	2008-2012	2013-2018	
Eurasian Oystercatcher	*Haematopus ostralegus*		✓					Red List*
Peregrine Falcon	*Falco peregrinus*		✓		✓		✓	Annex I Birds Directive
Red Grouse	*Lagopus lagopus hibernicus*	✓		✓	✓			Red List*
Red-breasted Merganser	*Mergus serrator*		✓					Amber List*
Common Redshank	*Tringa totanus*	✓	✓	✓	✓	✓		Red List*
Sand Martin	*Riparia riparia*	✓	✓	✓	✓	✓	✓	Amber List*
Northern Shoveler	*Spatula clypeata*	✓	✓			✓	✓	▪ SCI – Lough Ree SPA ▪ Red List*
Eurasian Skylark	*Alauda arvensis*	✓	✓	✓	✓	✓	✓	Amber List*
Common Snipe	*Gallinago gallinago*	✓	✓	✓	✓	✓	✓	Red List*
Spotted Flycatcher	*Muscicapa striata*	✓	✓	✓	✓	✓	✓	Amber List*
Common Starling	*Sturnus vulgaris*	✓	✓	✓	✓	✓	✓	Amber List*
Barn Swallow	*Hirundo rustica*	✓	✓	✓	✓	✓	✓	Amber List*
Common Swift	*Apus apus*	✓	✓	✓	✓	✓	✓	Red List*
Eurasian Teal	*Anas crecca*		✓					▪ SCI – Lough Ree SPA ▪ Amber List*
Eurasian Tree Sparrow	*Passer montanus*						✓	Amber List*
Tufted Duck	*Aythya fuligula*	✓	✓	✓	✓	✓	✓	▪ SCI – Lough Ree SPA ▪ Amber List*
Whinchat	*Saxicola rubetra*						✓	Red List*
Willow Warbler	*Phylloscopus trochilus*	✓	✓	✓	✓	✓	✓	Amber List*
Eurasian Woodcock	*Scolopax rusticola*	✓	✓	✓	✓	✓	✓	Red List*
Yellowhammer	*Emberiza citrinella*	✓	✓	✓	✓	✓		Red List*

* BoCCI (Gilbert *et al.*, 2021)

Table 8.13: Bird Atlas 2007-2011 Dataset for N06, N07 and N16 10 km Irish Grid Squares[6]

Common name	Scientific name	Grid Squares N06 Breeding (2km)	N06 Winter	N07 Breeding (2km)	N07 Winter	N16 Breeding (2km)	N16 Winter	Conservation Status
Western Barn Owl	*Tyto alba*	**Confirmed**	-	-	-	-	-	Red List*
Black Guillemot	*Cepphus grylle*	**Confirmed**	Present	Probable	Present	Possible	Present	Amber List*
Black-headed Gull	Larus ridibundus	Probable	Present	-	Present	-	-	Amber List*
Common Gull	*Larus canus*	Possible	Present					Amber List*
Eurasian Coot	*Fulica atra*	**Confirmed** N06E N06Z	Present	Probable				▪ SCI – Lough Ree SPA ▪ Amber List*
Great Cormorant	*Phalacrocorax carbo*		Present		Present			Amber List*
Eurasian Curlew	*Numenius arquata*		Present	Possible		**Confirmed** N16G		Red List*
Goldcrest	*Regulus regulus*	**Confirmed**	Present	**Confirmed** N07H N07R		**Confirmed** N16G	Present	Amber List*
Grey Wagtail	*Motacilla cinerea*	Possible		**Confirmed** N07W	Present	Possible	Present	Red List*
Hen Harrier	*Circus cyaneus*				Present			▪ Annex I Birds Directive ▪ Amber List*
Western House Martin	*Delichon urbicum*	**Confirmed** N06Z		Possible		Possible		Amber List*
House Sparrow	*Passer domesticus*	**Confirmed** N06Z	Present	**Confirmed** N07H N07S N07X	Present	**Confirmed** N16Y	Present	Amber List*
Common Kestrel	*Falco tinnunculus*	Probable		Possible	Present	Possible	Present	Red List*
Common Kingfisher	*Alcedo atthis*			**Confirmed** N07S		Probable	Present	▪ Annex I Birds Directive ▪ Amber List*
Northern Lapwing	*Vanellus vanellus*	Probable	Present	Possible	Present			▪ SCI – Lough Ree SPA ▪ Red List*
Lesser Black-backed Gull	*Larus fuscus*	Possible	Present					Amber List*
Common Linnet	*Linaria cannabina*	Probable	Present	Possible	Present	Possible	Present	Amber List*
Little Egret	*Egretta garzetta*	Probable	Present					Annex I Birds Directive
Little Grebe	*Tachybaptus ruficollis*	**Confirmed**	Present	**Confirmed** N07R				SCI – Lough Ree SPA
Mallard	*Anas platyrhynchos*	**Confirmed**	Present	**Confirmed** N07H	Present	Probable		▪ SCI – Lough Ree SPA ▪ Amber List*

Common name	Scientific name	Grid Squares N06 Breeding	N06 (2km)	N06 Winter	N07 Breeding	N07 (2km)	N07 Winter	N16 Breeding	N16 (2km)	N16 Winter	Conservation Status
Meadow Pipit	*Anthus pratensis*	Possible		Present	**Confirmed**	N07R	Present	**Confirmed**	N16H N16X	Present	Red List*
Mute Swan	*Cygnus olor*	**Confirmed**		Present	**Confirmed**	N07H	Present	**Confirmed**	N16A	Present	Amber List*
Redwing	*Turdus iliacus*			Present			Present			Present	Red List*
Sand Martin	*Riparia riparia*	**Confirmed**	N06E					Possible			Amber List*
Northern Shoveler	*Spatula clypeata*	Possible		Present							▪ SCI – Lough Ree SPA ▪ Red List*
Eurasian Skylark	*Alauda arvensis*	Possible			Possible			Possible			Amber List*
Common Snipe	*Gallinago gallinago*	Possible		Present			Present	Probable		Present	Red List*
Common Starling	*Sturnus vulgaris*	**Confirmed**	N06Z	Present	**Confirmed**	N07M N07Q N07R N07S N07V N07X	Present	**Confirmed**	N16H N16W N16Y	Present	Amber List*
Eurasian Teal	*Anas crecca*			Present			Present				▪ SCI – Lough Ree SPA ▪ Amber List*
Tufted Duck	*Aythya fuligula*	Probable		Present							▪ SCI – Lough Ree SPA ▪ Amber List*
Willow Warbler	*Phylloscopus trochilus*	**Confirmed**			**Confirmed**	N07Q		**Confirmed**	N16A N16B N16X N16Y		Amber List*
Eurasian Woodcock	*Saxicola torquata*			Present	**Confirmed**	N07M	Present	Probable			Red List*
Yellowhammer	*Emberiza citrinella*	Probable									Red List*

* BoCCI (Gilbert *et al.*, 2021)

Table 8.14: Summary of I-WeBS data for Lough Ree (0F002) in Winters 2018/19, 2019/20, 2020/21, 2022/23, 2023/2024[7]

Common Name	Scientific Name	Peak	Conservation Status
European Golden Plover	*Pluvialis apricaria*	1,000	▪ Annex I Birds Directive ▪ SCI – Lough Ree SPA ▪ Red List*
Northern Lapwing	*Vanellus vanellus*	402	▪ SCI – Lough Ree SPA ▪ Red List*
Eurasian Wigeon	*Mareca penelope*	358	▪ SCI – Lough Ree SPA ▪ Amber List*
Mallard	*Anas platyrhynchos*	337	▪ SCI – Lough Ree SPA ▪ Amber List*
Tufted Duck	*Aythya fuligula*	285	▪ SCI – Lough Ree SPA ▪ Amber List*
Eurasian Teal	*Anas crecca*	206	▪ SCI – Lough Ree SPA ▪ Amber List*
Eurasian Coot	*Fulica atra*	195	▪ SCI – Lough Ree SPA ▪ Amber List*
Northern Shoveler	*Spatula clypeata*	192	▪ SCI – Lough Ree SPA ▪ Red List*
Whooper Swan	*Cygnus cygnus*	126	▪ Annex I Birds Directive ▪ SCI – Lough Ree SPA ▪ Amber List*
Common Pochard	*Aythya ferina*	120	Red List*
Black-headed Gull	*Chroicocephalus ridibundus*	119	Amber List*
Mute Swan	*Cygnus olor*	101	Amber List*
Common Goldeneye	*Bucephala clangula*	44	▪ SCI – Lough Ree SPA ▪ Red List*
Little Grebe	*Tachybaptus ruficollis*	43	SCI – Lough Ree SPA
Eurasian Curlew	*Numenius arquata*	27	Red List*
Greylag Goose	*Anser anser*	18	Amber List*
Gadwall	*Mareca strepera*	14	Amber List*

Common Name	Scientific Name	Peak	Conservation Status
Common Snipe	*Gallinago gallinago*	13	Red List*
Great Cormorant	*Phalacrocorax carbo*	12	Amber List*
Common Redshank	*Tringa totanus*	10	Red List*
Common Moorhen	*Gallinula chloropus*	9	-
Great Crested Grebe	*Podiceps cristatus*	8	Amber List*
Lesser Black-backed Gull	*Larus fuscus*	5	Amber List*
Scaup	*Aythya marila*	4	Red List*
Little Egret	*Egretta garzetta*	3	Annex I Birds Directive
Common Gull	*Larus canus*	2	Amber List*
Grey Heron	*Ardea cinerea*	2	-
Great Black-backed Gull	*Larus marinus*	1	-
Common Kingfisher	*Alcedo atthis*	1	Annex I Birds Directive Amber List*
Red-breasted Merganser	*Mergus serrator*	3	Amber List*
Common Scoter	*Melanitta nigra*	1	Red List*
Dunlin	*Calidris alpina*	1	Red List*
Water Rail	*Rallus aquaticus*		-
Great Northern Diver	*Gavia immer*	1	Annex I Birds Directive Amber List*
Northern Pintail	*Anas acuta*	1	Amber List*
Eurasian Woodcock	*Scolopax rusticola*	1	Red List*
Common Greenshank	*Tringa nebularia*	1	-
European Herring Gull	*Larus argentatus*	1	-

* BoCCI (Gilbert *et al.*, 2021)

8.8.2 Field Study

. Upon the initial identification of key target species for the collision risk assessment (see Section 8.7.5.2), field observations and a subsequent review of the desk study (see Section 8.8.1) led to an update of the species list. As a result, 15 additional species were included as KARs, reflecting the presence of these species on-site during the field surveys. The additional 15 species are described below:

- **Order Accipitriformes**: Common Buzzard, Eurasian Sparrowhawk and White-tailed Eagle (*Haliaeetus albicilla*)

  Although the Common Buzzard and Eurasian Sparrowhawk are Green listed (Gilbert *et al.*, 2021), these are two raptor species vulnerable to collision (Percival, 2003). White-tailed Eagle, beyond presenting the same vulnerability to collision with wind farms, are Red listed (Gilbert *et al.*, 2021) and designated under Annex I of the Birds Directive.

- **Order Anseriformes**: Greylag Goose (*Anser anser*), Mute Swan (*Cygnus olor*), and Northern Pintail (*Anas acuta*)

  Waterfowl from this group are especially at risk of collision, particularly during migration or low-visibility conditions. Their tendency to fly in flocks and at moderate altitudes often intersects with turbine blade height, increasing susceptibility.
  Although these 3 species are not red listed under Gilbert *et al.* (2021), they were often recorded at the proposed wind farm site, including instances of 'Confirmed' breeding (Mute Swan). Species may be affected by disturbance or displacement caused by noise and human activity, which can disrupt nesting or foraging behaviour, particularly in sensitive wetland areas.

- **Order Charadriiformes**: Black-headed Gull (*Chroicocephalus ridibundus*), Common Gull (*Larus canus*), Common Ringed Plover (*Charadrius hiaticula*), Common Sandpiper (*Actitus hypoleucos*), Eurasian Whimbrel (*Numenius phaeopus*), and Lesser Black-backed Gull (*Larus fuscus*)

  This diverse group includes both breeding species and migratory visitors, making them vulnerable to multiple types of impacts. Disturbance and displacement are particularly relevant during the breeding season, especially for ground-nesting species like the Common Ringed Plover, which are highly sensitive to construction noise or vibration
  These species were classified as target species despite being Amber listed (Gilbert *et al.*, 2021) as they occur locally regularly occur at the site during both seasons, while confirmed breeding at the proposed wind farm site (e.g. Common Ringed Plover), or possibly breeding in close proximity (Lesser Black-backed Gull).

  Eurasian Whimbrel and Common Sandpiper were likely recorded during migration, with the former being a regular presence at the proposed wind farm site during these periods.

  Collision risk is moderate to high for gulls, Whimbrel, and other migratory birds that frequently fly at rotor-swept heights while moving between roosting and feeding areas. For migratory species like the Whimbrel and Common Sandpiper, the wind farm may

also act as a barrier, increasing energetic costs or causing altered flight routes during crucial seasonal movements

- **Order Podicipediformes**: Great Crested Grebe (*Podiceps cristatus*); **Order Gruiformes**: Common Moorhen (*Gallinula chloropus*)

  Despite Great Crested Grebe being classified as Amber listed, and Common Moorhen as Green listed in the Birds of Conservation Concern in Ireland (Gilbert *et al.*, 2021), they are both waterbird species with recorded at the proposed wind farm site, including 'Confirmed' breeding observations (Great Crested Grebe).

  Both of these waterbird species, while generally not at high risk of collision due to their low, localized flight patterns, are sensitive to disturbance and displacement, particularly during breeding. The Great Crested Grebe was confirmed breeding on site, making it vulnerable to habitat disturbance or hydrological changes during construction.

  The primary risk here is indirect habitat loss resulting from construction activities or altered water quality (e.g. sedimentation, pollution), which can degrade aquatic habitats essential for feeding and reproduction

- **Order Suliformes**: Great Cormorant (*Phalacrocorax carbo*); **Order Pelecaniformes**: Grey Heron (*Ardea cinerea*)

  Although Amber listed (Gilbert *et al.*, 2021), these species were highly recorded using the proposed wind farm site. Both species are regular visitors to the site and were observed frequently, particularly during the breeding season. These large birds often fly between nesting colonies and foraging grounds at heights that intersect with turbine rotors, presenting a moderate collision risk. Additionally, the use of nearby wetlands for feeding may decline if turbines or human activity reduce the suitability of these habitats, leading to displacement or reduced habitat use over time

Some species were not considered KARs despite having been recorded during the field study for the proposed development. These include the majority of species from the Order Passeriformes (with the exception of Meadow Pipit, *Anthus pratensis*; Skylark and Redwing, *Turdus iliacus*), as these species are generally considered unaffected by wind farms (SNH, 2017). Furthermore, other species, including those considered as key target species were also not awarded with the KAR classification as they were considered absent or rare occurrences at the proposed wind farm site, the higher availability of favoured habitats away from the proposed wind farm, or due to its classification by Gilbert *et al.* (2021) and as such likely significant effects can reasonably be excluded. Species excluded from the KAR classification and where no likely significant effects will occur are included in Table 8.15.

In this assessment, the terms regular, occasional, rare, and irregular are used to describe the frequency of species occurrence within and around the proposed wind farm site. These categories are based on the number and consistency of observations recorded during baseline surveys, informed by professional judgment and established good practice. The following general definitions apply:

- **Regular** – Species recorded consistently across seasons or years, typically observed in >50% of relevant surveys.

- **Occasional** – Species recorded less frequently, typically in 10–50% of surveys.
- **Irregular** – Species with no discernible seasonal or annual pattern, and whose presence is unpredictable.
- **Rare** – Species recorded only once or twice during the full survey period.

These classifications follow the general principles outlined in CIEEM (2018) and SNH (2017). Where relevant, occurrence categories are also considered in relation to wider datasets such as I-WeBS and BTO Bird Atlas records.

Table 8.15: Bird Species Excluded from KAR Classification

Family	Common Name	Scientific Name	Rationale
Accipitridae	Western Marsh Harrier	*Circus aeruginosus*	▪ No records of the species using habitats within or adjacent to the proposed wind farm site; the field study for the proposed development ▪ Only a single flight record (duration: 100 seconds, altitude: <25 m) across seven survey seasons, indicating negligible collision risk and no significant interaction with the proposed turbine rotor-swept area.
Anatidae	Northern Pintail	*Anas acuta*	▪ Species recorded on the ground within the site during only one season (non-breeding 2022/23), with no records in the surrounding environment; ▪ A single flight record (6 individuals) across seven seasons, indicating minimal use of the airspace and a negligible risk of collision with turbines.
	Tufted Duck	*Aythya fuligula*	▪ Single non-flight record within the site over seven seasons (27 individuals); ▪ One offsite flight record (3 individuals), indicating negligible collision risk and no significant interaction with the proposed turbine rotor-swept area.
	Greylag Goose	*Anser anser*	▪ No records of the species using habitats within or adjacent to the development area; ▪ Only two flight records across seven seasons (both during non-breeding periods: 2021/22 and 2022/23), indicating negligible collision risk and limited interaction with the turbine rotor-swept area.
	Common Goldeneye	*Bucephala clangula*	▪ No records of the species using habitats within the site and irregular presence within the wider environment. ▪ No flight records across seven seasons.
	Common Pochard	*Aythya ferina*	
	Common Shelduck	*Tadorna tadorna*	
	Gadwall	*Mareca strepera*	

Family	Common Name	Scientific Name	Rationale
	Pink-footed Goose	*Anser brachyrhynchus*	
Apodidae	Common Swift	*Apus apus*	▪ Irregular flying presence (Breeding Season 2024)
Scolopacidae	Common Redshank	*Tringa totanus*	▪ Irregular presence onsite and within the wider environment; ▪ No flying records. ▪ No 'Confirmed' breeding activity recorded (a pair was classified with 'Probable' breeding due to its presence over suitable habitat at the Derryadd bog - Appendix 8.3k); ▪ No records during the non-breeding seasons..
	Common Sandpiper	*Actitus hypoleucos*	▪ Irregular presence onsite (two records at the end of the breeding season 2024) and within the wider environment - Appendix 8.3m; ▪ No flying records. ▪ No breeding activity recorded and limited usage of the site over the non-breeding season.
	Jack Snipe	*Lymnocryptes minimus*	▪ Rare presence onsite (one record of one individual at the end of the non-breeding season 2023/24) and within the wider environment - Appendix 8.3ii; ▪ No flying records. ▪ No breeding activity recorded and the surveyed area over the non-breeding season.
	Common Greenshank	*Tringa nebularia*	▪ No records onsite during the field study; ▪ One record near the shore of Lough Ree at the end of the non-breeding season 2023/24; ▪ No flying records.
	Black-tailed Godwit	*Limosa limosa*	▪ No records of the species using habitats within the site and rare presence within the wider environment (one record of nine individuals - Appendix 8.3b); ▪ No breeding activity recorded and limited usage of the site over the non-breeding season.
Laridae	Common Tern	*Sterna hirundo*	▪ Irregular presence only in the wider environment.
	Great Black-backed Gull	*Larus marinus*	
Haematopodidae	Eurasian Oystercatcher	*Haematopus ostralegus*	▪ Irregular presence only in the wider environment (Breeding Seasons 2021 and 2023)

Family	Common Name	Scientific Name	Rationale
Alcedinidae	Common Kingfisher	*Alcedo atthis*	▪ Irregular presence onsite and within the wider environment (no breeding behaviour recorded); ▪ Low flying species.
Rallidae	Eurasian Coot	*Fulica atra*	▪ Despite being a SCI of Lough Ree SPA (with abundant presence on the wider environment), it was an irregular presence onsite; ▪ No flight records.
	Common Moorhen	*Gallinula chloropus*	▪ Green listed species (Gilbert *et al.*, 2021)
Ardeidae	Great Egret	*Ardea alba*	▪ Irregular presence onsite (1 ind.) and wider environment (2 ind.); ▪ No flight records.
	Grey Heron	*Ardea cinerea*	▪ Green listed species (Gilbert *et al.*, 2021).
Podicipedidae	Great Crested Grebe	*Podiceps cristatus*	▪ Infrequent presence onsite (non-flying records in Breeding Seasons 2023 and 2024; 2 flying records in Non-breeding Season 2021/22 and Breeding Season 2024)); ▪ Amber listed species Gilbert *et al.*, 2021).
Tytonidae	Western Barn Owl	*Tyto alba*	▪ No records onsite (flying and non/flying); ▪ 3 records on the wider environment.
Strigidae	Short-eared Owl	*Asio flammeus*	▪ No records within the proposed wind farm site; ▪ Only one brief flying record (40 secs, <25m,Breeding Season 2022, hunting over the River Shannon - Appendix 8.3ww).
	Long-eared Owl	*Asio otus*	▪ One record within the proposed wind farm site (one individual hunting, in June 2023 - Appendix 8.3mm); ▪ Rare occurrence in the wider environment (in May 2021 - Appendix 8.3mm); ▪ No recorded flight activity.

Following the prescriptions of Percival (2003) and the SNH (2017), a total of 30 target species are then considered, constituting the KARs for the assessment of ornithological effects from the proposed wind farm. However, in compliance with the Article 5 of the Birds Directive, and the Wildlife Act (as amended), other species are considered for the assessment of effects due to vegetation clearance (from March to August, inclusive - Section 40), and due to destruction of nests, eggs, or unflown young (Section 22), and addressed in Section 8.9.

The full dataset collected for the field study informing the present assessment, as well as the mapping of the records is included in Appendix 8.3.

8.8.2.1 Whooper Swan

The complete dataset and mapping on observations of Whooper Swan during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3bbb.

8.8.2.1.1 Breeding Season

There were five records of Whooper Swan observed during the breeding season, however no breeding activity was noted. These records occurred predominantly in April (2022, 2023, and 2024) and September (2023) and are believed to relate to birds on migration.

One record, consisting of a single individual, was observed in July 2023. This bird is believed to be an early migrant or possibly a failed breeder from another location. It was not recorded during previous or subsequent visits and was therefore determined not to be breeding within or near the site.

8.8.2.1.2 Non-breeding Season

Whooper Swans were recorded regularly throughout the survey period within and around the site. Observations were confined to the typical wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 147 records were observed, amounting to 5,322 seconds of flight time. These flights were primarily associated with commuting and were widely distributed across the proposed wind farm site without any discernible spatial pattern, mostly under the rotor airspace height.

Throughout the surveys, Whooper Swans were observed opportunistically using flooded bogs and other waterbodies for roosting and feeding. Notable locations where feeding and roosting flocks were recorded included Derryaroge and Derryadd bogs (onsite) and Fortwilliam Turlough, located approximately 5 km west of the proposed wind farm site. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 180 birds, with an average of 20 birds occurring across all of the survey periods. The majority of observations within the proposed wind farm site remained below national importance (150 birds constitute a flock of national importance [Burke *et al.* 2018]), although two observations of Whooper Swan were above the national importance threshold with 180 birds observed roosting within the Derryadd section of the site (within one hour after sunrise) during November 2022, and 151 birds observed roosting within the Derryaroge section of the site (within one hour after sunset) during December 2022.

Surveys of the surrounding area recorded Whooper Swans primarily along the River Shannon and in agricultural fields to the north-east and west of the site, with flock sizes ranging from 1 to 253 birds. The fields at Bunacloy, Co. Longford (approximately 1 km north-east), hosted 253 birds in February 2023. Fortwilliam Turlough, located about 5 km west of the proposed wind farm site, also supported a notable wintering population, with a maximum recorded count of 137 birds.

8.8.2.2 Greater White-fronted Goose

The complete dataset and mapping on observations of Greater White-fronted Goose during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3aaa

8.8.2.2.1 Breeding Season

There were no records of Greater White-fronted Goose within or near the site over the breeding bird survey period.

8.8.2.2.2 Non-breeding Season

Greater White-fronted Goose was recorded rarely over the survey period, with only one observation across all survey methods within and around the site. The single observation was recorded in October 2022 during a VP survey, when a flock of 16 birds flew high over the Derryaroge bog for a total of 20 seconds, they did not land or interact with the site. The species was not recorded in subsequent surveys.

8.8.2.3 Mallard

The complete dataset and mapping on observations of Mallard during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3nn

8.8.2.3.1 Breeding Season

Mallard was recorded regularly throughout the survey period, with a total of 249 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons.

During the VP surveys, a total of 114 records were observed, amounting to 3,567 seconds of flight time. These flights were primarily associated with commuting, foraging, roosting or loafing and were widely distributed, but concentrated near waterbodies or wetland habitats across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Mallard was observed on, or near, water bodies, such as the numerous ponds, flooded areas or drainage ditches scattered throughout the site. Notable locations where feeding or roosting was regularly recorded included Derryadd and Derryaroge bogs within the site. Mallard are known to have breed onsite with records of adults and ducklings recorded, as well as several adults and pairs within suitable breeding habitat during the breeding season.

8.8.2.3.2 Non-breeding Season

Mallard was recorded regularly throughout the survey period, with a total of 343 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 104 records were observed, amounting to 5903 seconds of flight time. These flights were primarily associated with commuting, foraging, roosting or loafing and were widely distributed, but concentrated near waterbodies or wetland habitats across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Mallard was observed on, or near, water bodies, such as the numerous ponds, flooded areas or drainage ditches scattered throughout the site. Notable locations where feeding or roosting was regularly recorded included Derryadd and Derryaroge bogs within the site. The number of birds observed onsite remained below national importance (280 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock of 42 birds recorded at Lough Bannow in October 2022. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 42 birds.

Surveys of the surrounding area recorded Mallard at most of the survey locations , with flock sizes ranging from 1 to 88 birds. The number of birds observed outside of the site also remained below national importance (280 birds constitute a flock of national importance - (Burke *et al.*, 2018)), with the maximum occurring being a flock of 88 birds recorded at near Cloondara on the Camlin River in November 2023, 4.5km north-east of the proposed wind farm site.

8.8.2.4 Eurasian Wigeon

The complete dataset and mapping on observations of Eurasian Wigeon during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3x

8.8.2.4.1 Breeding Season

There were ten records of Eurasian Wigeon observed during the breeding season, however no breeding activity was noted. These records occurred predominantly in April (2022 and 2023) and September (2021 and 2022) and are believed to relate to birds on migration.

There were four records, consisting of single individuals, observed in the months of May, June and August in 2021. These birds are believed to be early migrants or possibly failed breeders from another location. Two of the records were consisted of a male within the site and were recorded flying briefly but were not recorded during subsequent visits and was therefore determined not to be breeding within or near the site. The remaining records were located beyond 5 km from the proposed wind farm site boundary and were not recorded in subsequent visits.

8.8.2.4.2 Non-breeding Season

Eurasian Wigeon was recorded regularly throughout the survey period, with a total of 149 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 20 records were observed, amounting to 443 seconds of flight time. These flights were primarily associated with commuting, and were, to the north of the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Eurasian Wigeon was observed using flooded bogs or other waterbodies for roosting and feeding. Notable locations where foraging and loafing was recorded included Derryadd bog (onsite) and Fortwilliam Turlough, located approximately 5 km west of the proposed wind farm site. The number of birds observed onsite remained below national importance estimates (560 birds constitute a flock of national importance [Burke *et al.*

2018]), with the maximum occurring onsite being a flock of 70 birds recorded at Lough Bannow in February 2023. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 70 birds.

Surveys of the surrounding area recorded Eurasian Wigeon primarily to the west and north of the site in large waterbodies or other wetland areas, with flock sizes ranging from 1 to 320 birds. Rhynmount bog and wetlands, located approximately 1.5km north of the site, hosted 320 birds in January 2023. Lough Ree, approximately 2.5km west from the proposed wind farm site, also supported a notable wintering population, with a maximum recorded count of 210 birds in November 2021.

8.8.2.5 Eurasian Teal

The complete dataset and mapping on observations of Eurasian Teal during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3v

8.8.2.5.1 Breeding Season

There were ten records of Eurasian Teal observed during the breeding season, however no breeding activity was noted. These records occurred predominantly in April (2022 and 2023) and September (2021 and 2022) and are believed to relate to birds on migration.

There were four records, consisting of single individuals, observed in the months of May, June and August in 2021. These birds are believed to be early migrants or possibly failed breeders from another location. Two of the records were consisted of a male within the site and were recorded flying briefly but were not recorded during subsequent visits and was therefore determined not to be breeding within or near the site. The remain records were located beyond 5km from the proposed wind farm site boundary and were not recorded in subsequent visits

8.8.2.5.2 Non-breeding Season

Eurasian Teal was recorded regularly throughout the survey period, with a total of 111 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 25 records were observed, amounting to 409 seconds of flight time. These flights were primarily associated with commuting and were largely distributed, in the Derryaroge bog to the north of the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Eurasian Teal was observed using flooded bogs or other waterbodies for roosting and feeding. Notable locations where foraging and loafing was recorded included Derryadd bog (onsite) and Fortwilliam Turlough, located approximately 5 km west of the proposed wind farm site. The number of birds observed onsite remained below national importance estimates (360 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock of 1 bird recorded at Derryaroge in November 2021. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 32 birds.

Surveys of the surrounding area recorded Eurasian Teal primarily to the west and north of the site in large waterbodies or other wetland areas, with flock sizes ranging from 1 to 150 birds. Rhynmount bog and wetlands, located 1.5 km north of the site, hosted 150 birds in January 2023.

8.8.2.6 Mute Swan

The complete dataset and mapping on observations of Mute Swan during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3qq

8.8.2.6.1 Breeding Season

Mute Swan was recorded regularly throughout the survey period, with a total of 88 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons.

During the VP surveys, a total of 7 records were observed, amounting to 264 seconds of flight time. These flights were primarily associated with commuting and were widely distributed across the proposed wind farm site without any discernible spatial pattern. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Mute Swan was observed on, or near, water bodies, such as the numerous ponds, flooded areas or drainage ditches scattered throughout the site. Notable locations where feeding or loafing was regularly recorded included Derryadd and Lough Bannow bogs within the site. Mute Swan are known to have breed onsite with records of adults on nests recorded in two seasons, as well as several adults and pairs within suitable breeding habitat during the breeding season. Breeding activity was located entirely within wetlands in the Derryadd and Lough Bannow bogs.

8.8.2.6.2 Non-breeding Season

Mute Swan was recorded regularly throughout the survey period, with a total of 301 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 43 records were observed, amounting to 1426 seconds of flight time. These flights were primarily associated with commuting, foraging, roosting and were widely distributed across the proposed wind farm site without any discernible spatial pattern. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Mute Swan was observed using flooded bogs, waterbodies and wetlands for roosting, loafing and feeding. Notable locations where Mute Swan was recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Rhynmount bog and Lough Ree (outside of site). The number of birds observed onsite did not occur at national importance estimates (90 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock of eight birds recorded at Lough Bannow in February 2024. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 8 birds.

Surveys of the surrounding area recorded Mute Swan primarily where wetlands or waterbodies occurred, with flock sizes ranging from 1 to 65 birds. Lough Ree, located approximately 2km west of the site, hosted 65 birds in October 2022. While near Cloondara on the Camlin River in November 2023, approximately 4.5km north-east of the proposed wind farm site also supported a notable wintering population, with a maximum recorded count of 39 birds.

8.8.2.7 Northern Shoveler

The complete dataset and mapping on observations of Northern Shoveler during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3tt.

8.8.2.7.1 Breeding Season

There were nine records of Northern Shoveler observed during the breeding season; however, no breeding activity was noted. These records occurred predominantly in April (2022 and 2023) and are believed to relate to birds on migration.

There were four records, consisting of single individuals and one flock of four, observed in the months of May and June in 2022 and 2023. These birds are believed to be early migrants or possibly failed breeders from another location. Only one of these records were recorded within the proposed wind farm site, where they were recorded loafing and swimming briefly. The species were not recorded during subsequent visits and was therefore determined not to be breeding within the site. The remain records were located beyond the proposed wind farm site boundary and were not recorded in subsequent visits.

8.8.2.7.2 Non-breeding Season

Northern Shoveler was recorded regularly throughout the survey period, with a total of 37 observations across all survey methods within and around the proposed wind farm site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 2 records were observed, amounting to 14 seconds of flight time within Band 1 height (0-25m, i.e. below rotor airspace - Appendix 8.3tt). These flights were primarily associated with commuting and were to the north of the proposed wind farm site. Due to its low level of flight activity, Northern Shoveler were not included in the collision risk modelling.

Throughout the surveys, Northern Shoveler was observed using waterbodies, wetlands and flooded bogs for foraging and roosting. Notable locations where foraging and roosting were recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Rhynmount bog, Derrycashel bog, Fortwilliam Turlough, Newpark Turlough, Corlea bog and Lough Ree (outside of site). The number of birds observed onsite occurred at national importance estimates (20 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock of 28 birds recorded at Lough Bannow bog in February, 2023. Flock sizes within the proposed wind farm site during the study period ranged from 2 to 28 birds.

Surveys of the surrounding area recorded Northern Shoveler primarily where wetlands or waterbodies occurred, with flock sizes ranging from 1 to 140 birds. Newpark Turlough, located approximately 3 km south-west of the site, hosted birds in flock numbers at national

importance, with a flock of 140 birds in February 2023. Fortwilliam Turlough, approximately 4.2 km south-west from the proposed wind farm site, also supported a nationally important wintering population, with a maximum recorded count of 20 birds.

8.8.2.8 European Golden Plover

The complete dataset and mapping on observations of European Golden Plover during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3z.

8.8.2.8.1 Breeding Season

There were 12 records of Golden Plover observed during the breeding season, however no breeding activity was noted. These records occurred only in the months of April (2022, 2023, and 2024) and September (2022) and are believed to relate to birds on migration and were therefore determined not to be breeding within or near the site.

8.8.2.8.2 Non-breeding Season

European Golden Plover was recorded regularly throughout the survey period, with a total of 121 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 72 records were observed, amounting to 9,091 seconds of flight time. These flights were primarily associated with foraging, commuting and roosting and were widely distributed across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts collisions with operating turbines could potentially cause an increase in mortality rate to the local European Golden Plover wintering population.

Throughout the surveys, European Golden Plover was observed using waterbodies, wetlands and flooded bogs/fields for foraging, commuting and roosting within and outside of the proposed wind farm site. Notable locations where roosting and commuting was recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Cloondara, Derrycashel, Erra, Cloontuskert, Lough Ree, Fortwilliam Turlough, Derryart, Derryshannoge, and Derryglash (outside of site), mostly over exposed cutaway bog. The number of birds observed onsite did not meet national importance estimates (920 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock of 310 birds recorded at Derryadd bog in October 2022. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 310 birds.

Surveys of the surrounding area outside of the proposed wind farm site recorded European Golden Plover primarily where wetlands or waterbodies occurred, with flock sizes ranging from 1 to 500 birds. Cloonkeel, approximately located 825m north-east of the site, hosted 500 birds in February, 2022. Cloondara, approximately 4.5 km from the proposed wind farm site, also supported a significant wintering population, with a maximum recorded count of 350 birds.

8.8.2.9 Northern Lapwing

The complete dataset and mapping on observations of Northern Lapwing during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3rr

8.8.2.9.1 Breeding Season

Northern Lapwing was recorded regularly throughout the survey period, with a total of 287 observations across all survey methods within and around the site. The species was recorded in the majority of months during the 2021, 2022, 2023, and 2024 breeding seasons, with the exception of April 2021 and September 2023.

During the VP surveys, 48 flight records were observed, totalling 3,103 seconds of flight time. These flights were primarily associated with breeding activity (display flights, mobbing, or short flights within breeding grounds), as well as foraging, roosting, and resting. Flight activity was widely distributed, but more concentrated around waterbodies and wetland habitats across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Northern Lapwing was observed on, or near, water bodies, such as the numerous ponds, wetlands or flooded areas scattered throughout the Derryaroge, Derryadd and Lough Bannow bogs within the site. Northern Lapwing are known to have bred onsite with records of breeding activity in 2021, 2022, 2023 and 2024. Breeding was confirmed in 2021, 2022 and 2023 when adults on nests or recently fledged chicks were recorded. Probable and possible breeding was recorded in all survey seasons, with observations of courtship displays, agitated alarm calls, and pairs occupying suitable breeding habitat.

8.8.2.9.2 Non-breeding Season

Northern Lapwing was recorded regularly throughout the survey period, with a total of 154 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 69 records were observed, amounting to 3,530 seconds of flight time. These flights were primarily associated with commuting and were and were widely distributed across the proposed wind farm site (Map 3.5 - Appendix 8.5). Lapwing is likely to have two distinct populations using the wind farm site: a breeding population and a wintering population. This is reflected in the recording rates for the Lapwing breeding season (April – July) and main wintering period (November – March). While the recording rates for the breeding and wintering populations were similar, the total bird-secs at potential collision height were much higher in winter. The collision risk model (see Appendix 8.4) concluded that any potential impacts collisions with operating turbines could potentially cause an increase in mortality rate to the local Northern Lapwing breeding population.

Throughout the surveys, Northern Lapwing was observed using waterbodies, wetlands and flooded bogs/fields for foraging, commuting and roosting. Notable locations where commuting was recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Cloonkeel. Clonard, Derrycashel, Cloondara, Rhynmount, Lough Ree, Fortwilliam Turlough, Newpark Turlough, Derrygowna, Derrindiff, Derryad and Cloonbreany (outside of site). The number of birds observed onsite did not occur at national importance estimates (850 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring

onsite being a flock of 85 birds recorded at Derryaroge in November, 2023. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 85 birds.

Surveys of the surrounding area recorded Northern Lapwing primarily where wetlands or waterbodies occurred, with flock sizes ranging from 1 to 260 birds. Knappoge along the River Shannon, located 2.5km north-east of the site, hosted 260 birds in November 2021. Cloondara, located approximately 4.5 km north-east from the proposed development site, also supported a notable wintering population, with a maximum recorded count of 210 birds in November 2022.

8.8.2.10 Common Ringed Plover

The complete dataset and mapping on observations of Common Ringed Plover during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3l

8.8.2.10.1 Breeding Season

Common Ringed Plover was recorded frequently throughout the survey period, with a total of 86 observations across all survey methods within and around the site. The species was recorded during the 2021, 2022, 2023, and 2024 breeding seasons, but did not occur in every month. There were no records of flight activity for Common Ringed Plover during the VP surveys.

Throughout the surveys, Common Ringed Plover was observed on, or near, water bodies, such as the numerous ponds, wetlands or flooded areas scattered throughout the Derryaroge, Derryadd and Lough Bannow bogs within the site. Common Ringed Plover are known to have bred onsite with records of breeding activity in 2021, 2022, 2023 and 2024. Breeding was confirmed in 2022 and 2024 when adults on nests or recently fledged chicks were recorded. Probable and possible breeding was recorded in all survey seasons, with observations of courtship displays, agitated alarm calls, and pairs occupying suitable breeding habitat.

8.8.2.10.2 Non-breeding Season

Common Ringed Plover was recorded irregularly throughout the survey period, with a total of 9 observations across all survey methods within and around the site. Observations were confined to the wintering period, only in the months of February (2023) and March (2023 and 2024). During the VP surveys, a total of 1 record was observed, amounting to 6 seconds of flight time. This flight involved an individual commuting along the River Shannon to the north-west of the proposed wind farm site. Due to its low level of flight activity, Common Ringed Plover were not included in the collision risk modelling.

Throughout the surveys, Common Ringed Plover was observed using flooded bogs and waterbodies for roosting, foraging and commuting. Notable locations where roosting and foraging was recorded included Derryadd and Lough Bannow bogs (within the site) and Gortgallan bog and Rhynmount (outside of site).The number of birds observed onsite did not occur at national importance estimates (120 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock of 3 birds recorded at Derryadd and Lough Bannow in February, 2023. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 3 birds.

Surveys of the surrounding area recorded Common Ringed Plover primarily within Gortgallan bog and Rhynmount bog and wetlands with flock sizes ranging from 1 to 3 birds.

8.8.2.11 Lesser Black-backed Gull

The complete dataset and mapping on observations of Lesser Black-headed Gull during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3jj

8.8.2.11.1 Breeding Season

Lesser Black-backed Gull was recorded regularly throughout the survey period, with a total of 937 observations across all survey methods within and around the site. The species was recorded during the 2021, 2022, 2023, and 2024 breeding seasons, with the exception of April 2021.

During the VP surveys, 700 flight records were observed, totalling 71,921 seconds of flight time. These flights were primarily associated with commuting as well as foraging, roosting, and resting. Flight activity was widely distributed across the site, with some evidence of flightline density across the middle / southern section of Derryaroge Bog, but other than this there was little evidence of significant spatial structure or apparent habitat preference within the proposed wind farm site. The number of birds recorded in each observation ranged from 1 to 75, with an average of four birds per observation. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Lesser Black-backed Gull was observed mainly flying or commuting over the site, with additional records near or on water bodies, such as the numerous ponds, wetlands, or flooded areas scattered throughout Derryaroge, Derryadd, and Lough Bannow bogs within the site, typically associated with roosting or resting behaviour. The species occurred mainly during the spring and summer months (April–August). This likely reflects birds commuting to and from the Lesser Black-backed Gull breeding colony at Lough Ree, located approximately 6 km west of the proposed wind farm site, where up to 1,400 birds have been observed during the breeding season, as well as autumn migration activity.

There were no records of Lesser Black-backed Gull breeding onsite, and no suitable nesting habitat for the species was identified within the proposed wind farm site.

8.8.2.11.2 Non-breeding Season

Lesser Black-backed Gull was recorded regularly throughout the survey period, with a total of 50 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons with the majority of observations during March and are believed to relate to birds on migration.

During the VP surveys, a total of 30 records were observed, amounting to 755 seconds of flight time. These flights were primarily associated with commuting and were widely distributed across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Lesser Black-backed Gull was observed using flooded bogs and waterbodies for commuting, foraging and roosting. Notable locations where commuting, foraging and roosting was recorded included Derryaroge, Derryadd and Lough Bannow bogs

(within the site) and Kilnacarrow, Lough Ree, Gortgallan bog, Newpark Turlough and Lyneen (outside of site). The maximum number of birds occurring onsite being a flock of 20 birds recorded at Lough Bannow bog in November, 2021. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 20 birds.

Surveys of the surrounding area recorded Lesser Black-backed Gull primarily within Lough Bannow (within the site) and Newpark Turlough, Lough Ree and Lyneen (outside of site), with flock sizes ranging from 1 to 20 birds. Lough Ree, located 2.5km west of the site, hosted 20 birds in March, 2023.

8.8.2.12 Black-headed Gull

The complete dataset and mapping on observations of Black-headed Gull during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3a

8.8.2.12.1 Breeding Season

Black-headed Gull was recorded regularly throughout the survey period, with a total of 343 observations across all survey methods within and around the site. The species was recorded during the 2021, 2022, 2023, and 2024 breeding seasons, with the exception of April 2021.

During the VP surveys, 182 flight records were observed, totalling 12,140 seconds of flight time. These flights were primarily associated with commuting as well as foraging, roosting, and resting. Flight activity was widely distributed across the site, with some evidence of flightline density across the north of Derryadd Bog, but other than this there was little evidence of significant spatial structure or apparent habitat preference within the proposed wind farm site. The number of birds recorded in each observation ranged from 1 to 53, with an average of five birds per observation. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Black-headed Gull was observed mainly flying or commuting over the site, with additional records near or on water bodies, such as the numerous ponds, wetlands, or flooded areas scattered throughout Derryaroge, Derryadd, and Lough Bannow bogs within the site, typically associated with roosting or resting behaviour. The species occurred mainly during the spring and summer months (April–August). This likely reflects birds commuting to and from the Black-headed Gull breeding colony at Lough Ree, located approximately 6 km west of the proposed wind farm site, where up to 210 birds have been observed and a smaller breeding south of Killashee, located approximately 700m east of the proposed wind farm site, where up to 75 birds have been observed.

Black-headed Gull is known to have bred onsite, with records of breeding activity in 2023 and 2024. Breeding was confirmed in these years when adults holding apparent territories exhibited agitated behaviour, or when recently fledged chicks were recorded in a flooded area of bog within Derryaroge Bog. No nests were located; however this was due to dense vegetation and difficulty accessing the location, but an estimated two to three pairs were recorded in both seasons.

8.8.2.12.2 Non-breeding Season

Black-headed Gull was recorded regularly throughout the survey period, with a total of 59 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 14 records were observed, amounting to 229 seconds of flight time. These flights were primarily associated with foraging and commuting and were widely distributed across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Black-headed Gull was observed using flooded bogs and waterbodies for foraging, commuting and roosting. Notable locations where foraging, commuting and roosting was recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Fortwilliam Turlough, Newpark Turlough, Carrigens/Lisnacusha Turlough, Lough Ree, Ballynahinch, Knappoge, Termonbarry, Cloondara, Lyneen and Derryad (outside of site). The maximum number of birds occurring onsite being a flock of 49 birds recorded at Lough Bannow bog in March, 2023. Flock sizes within the proposed wind farm site during the study period ranged from 3 to 49 birds.

Surveys of the surrounding area recorded Black-headed Gull primarily around the majority of the site, where wetlands or waterbodies occurred, with flock sizes ranging from 1 to 65 birds. Cloondara, located 4.5 km north-east of the site, hosted 65 birds in January, 2023. Cloonmore, approximately 4.3 km from the proposed wind farm site, also supported a notable wintering population, with a maximum recorded count of 47 birds in December 2022.

8.8.2.13 Common Gull

The complete dataset and mapping on observations of Common Gull during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3f

8.8.2.13.1 Breeding Season

Common Gull was recorded frequently throughout the survey period, with a total of 47 observations across all survey methods within and around the site. The species was recorded during the 2021, 2022, 2023, and 2024 breeding seasons, typically between April and July, with little to no records in August or September.

During the VP surveys, three flight records were observed, totalling 115 seconds of flight time. These flights were primarily associated with commuting and widely distributed across the site, with no significant spatial structure or apparent habitat preference within the proposed wind farm site. The number of birds recorded in each observation was low with only one or two individuals per observation. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Common Gull was observed mainly near or on water bodies, such as the numerous ponds, wetlands, or flooded areas scattered throughout Derryaroge and Lough Bannow bogs within the site, typically associated with nesting or resting behaviour. Common

Gull is known to have bred onsite, with records of breeding activity in 2023 and 2024. Breeding was confirmed in these years when adults holding apparent territories exhibited agitated behaviour, or when recently fledged chicks were recorded in a flooded area of bog within Derryaroge and Lough Bannow Bogs. No nests were located in Derryaroge Bog; however this was due to dense vegetation and difficulty accessing the location, but an estimated two pairs were recorded in both seasons. In Lough Bannow Bog two pairs with nests were recorded in 2024.

8.8.2.13.2 Non-breeding Season

Common Gull was recorded Irregularly throughout the survey period, with a total of 7 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in October(2022, 2023), December(2022), February (2023) and March (2023, 2024).

During the VP surveys, a total of 3 records were observed, amounting to 16 seconds of flight time. These flights were primarily associated with foraging and commuting and were concentrated within the Derryadd bog section of the site and to the north-west of the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Common Gull was observed using flooded bogs and waterbodies for foraging, roosting and commuting. Notable locations where foraging, roosting, and commuting was recorded included Lough Bannow bog (within the site) and Fortwilliam Turlough, Cloondara, Cloonbony and Ballyglass (outside of site).The maximum number of birds occurring onsite being a flock of 5 birds recorded at Lough Bannow bog in November, 2022. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 5 birds.

Surveys of the surrounding area recorded Common Gull primarily using waterbodies and flooded bogs, with flock sizes ranging from 1 to 12 birds. Cloondara, located 4.5 km north-east of the site, hosted 12 birds in March, 2024. Rhynmount approximately 2.3 km from the proposed wind farm site, also supported a wintering population, with a maximum recorded count of 2 birds in March 2023.

8.8.2.14 Common Snipe

The complete dataset and mapping on observations of Common Snipe during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3o

8.8.2.14.1 Breeding Season

Common Snipe was recorded regularly throughout the survey period, with a total of 220 observations across all survey methods within and around the site. The species was recorded in the majority of months during the 2021, 2022, 2023, and 2024 breeding seasons, with the exception of April and August 2021.

During the VP surveys, 38 flight records were observed, totalling 4,306 seconds of flight time. These flights were primarily associated with breeding activity and display flights. Flight activity was largely concentrated around the waterbodies and wetland habitats across the proposed development site, particularly in the Derryaroge and Derryadd bogs. The collision risk model

(see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Common Snipe was observed on, or near, water bodies, such as the numerous ponds, wetlands or flooded areas scattered throughout the Derryaroge, Derryadd and Lough Bannow bogs within the site. Although there was no confirmed breeding activity (i.e., no nests or chicks recorded) during the survey period, Common Snipe is likely to have bred onsite, with probable and possible breeding evidence recorded in 2021, 2022, 2023, and 2024. Breeding indicators included courtship displays, agitated alarm calls, and pairs occupying suitable breeding habitat. Given the species cryptic behaviour, it is assumed that successful breeding likely occurred within the proposed wind farm site.

8.8.2.14.2 Non-breeding Season

Common Snipe was recorded regularly throughout the survey period, with a total of 168 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 28 records were observed, amounting to 284 seconds of flight time. These flights were primarily associated with commuting and foraging and were widely distributed across the proposed wind farm site. Common Snipe was not included in the collision risk model since vantage point surveys are not an effective method of sampling their flight activity.

Throughout the surveys, Common Snipe was observed using flooded bogs and waterbodies for foraging, roosting and commuting. Notable locations where foraging, roosting and commuting were recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Fortwilliam Turlough, Derraghan More, Derrindiff, Derryshannoge, Barncor, Derryad, Lyneen, Derryoghil, Grillagh, Gorteenboy, Gortgallan bog, Ballyglass, Cloontuskert, Erra, Cloonbony, Derrycashel bog, Cloonard, Rhynmount bog, Cloondara and Slieve (outside of site). The maximum number of birds occurring onsite being a flock of 18 birds recorded at Derryadd bog in November, 2023. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 18 birds.

Surveys of the surrounding area recorded Common Snipe primarily using surrounding waterbodies and flooded fields/bogs, with flock sizes ranging from 1 to 17 birds. Derrycashel bog, located 2.8 km north of the site, hosted 17 birds in November, 2022. Derryshannoge, approximately 400m from the proposed wind farm site, also supported a wintering population, with a maximum recorded count of 7 birds in February 2023.

8.8.2.15 Eurasian Whimbrel

The complete dataset and mapping on observations of Eurasian Whimbrel during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3w

8.8.2.15.1 Breeding and Non-breeding Season

Eurasian Whimbrel was recorded occasionally throughout the breeding and non-breeding survey periods, with a total of 25 observations across all survey methods within and around the

site. Throughout the surveys, Eurasian Whimbrel was recorded exclusively during migration periods, with observations limited to spring and autumn passage in the years 2021 to 2024.

All records of Eurasian Whimbrel were associated with foraging and commuting behaviour in wetland habitats, with notable observations occurring in Derryadd bog, within the proposed wind farm site, when a flock of 147 birds were observed commuting across the site. No evidence of breeding or prolonged site residency was recorded, as the species is not known to breed in Ireland. Given its migratory nature, Whimbrel is considered a transient visitor to the site, with no significant long-term reliance on local habitats.

8.8.2.16 Eurasian Curlew

The complete dataset and mapping on observations of Eurasian Curlew during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3s

8.8.2.16.1 Breeding Season

There were ten records of Eurasian Curlew observed during the breeding season, however no breeding activity was noted. These records occurred predominantly in April (2023) and September (2021 and 2022) and are believed to relate to birds on migration.

There were six records observed in the months of June (2022), July (2022) and August (2021). These birds are believed to be early migrants or possibly failed breeders from another location. These records occurred outside of the core breeding period for the species (April to June [Gilbert *et al.* 2011]) and were recorded in unsuitable breeding habitat. Considering this and that the species was not recorded during previous or subsequent visits it was therefore determined not to be breeding within or near the site.

8.8.2.16.2 Non-breeding Season

Eurasian Curlew was recorded irregularly throughout the survey period, with a total of 19 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded from November to March during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 4 records were observed, amounting to 77 seconds of flight time. These flights were primarily associated with commuting and foraging and were mainly confined to the Derryadd bog section of the site and to the north of the site along the River Shannon.

Throughout the surveys, Eurasian Curlew was observed using flooded bogs/fields and waterbodies for foraging, roosting and commuting. Notable locations where foraging, roosting and commuting was recorded included Derryadd and Lough Bannow bogs (within the site) and Lough Ree, Fortwilliam Turlough, Newpark Turlough, Carrigeens and Derrycashel (outside of site). The number of birds observed onsite did not occur at national importance estimates (350 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock number of 75 birds recorded at Lough Bannow bog in February 2023. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 75 birds.

Surveys of the surrounding area recorded Eurasian Curlew primarily using the surrounding waterbodies and flooded fields/bogs, with flock sizes ranging from 1 to 22 birds. Cloontuskert,

located 380m north-west of the site, hosted 21 birds in December 2022. Carrigeens approximately 2.9km west from the proposed wind farm site, also supported a notable wintering population, with a maximum recorded count of 15 birds in January 2023.

8.8.2.17 Eurasian Woodcock

The complete dataset and mapping on observations of Eurasian Woodcock during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3y

8.8.2.17.1 Breeding Season

Eurasian Woodcock was recorded frequently throughout the survey period, with a total of 46 observations across all survey methods within and around the site. The species was recorded during the 2021, 2022, 2023, and 2024 breeding seasons, but did not occur in every month. There were no records of flight activity for Eurasian Woodcock during the VP surveys.

Throughout the surveys, Eurasian Woodcock was observed near, scrub, forest of immature woodlands within Lough Bannow bog (within the site) or Kilnacarrow, to the north of the proposed development (outside the site). Although there was no confirmed breeding activity (i.e., no nests or chicks recorded) during the survey period, Eurasian Woodcock is likely to have bred onsite, with probable and possible breeding evidence recorded in 2021, 2022, 2023, and 2024. Breeding indicators included courtship display flights and males apparently holding territories in suitable breeding habitat. Given the species cryptic behaviour, it is assumed that successful breeding likely occurred within the proposed wind farm site.

8.8.2.17.2 Non-breeding Season

Eurasian Woodcock was recorded rarely over the survey period, with only two observations across all survey methods within and around the site. The two observations were recorded in November and December 2022. Both observations involved a single bird. The species was not recorded in subsequent surveys.

8.8.2.18 Little Grebe

The complete dataset and mapping on observations of Little Grebe during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3ll

8.8.2.18.1 Breeding Season

Little Grebe was recorded regularly throughout the survey period, with a total of 165 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons, with the exception of April and July 2021.

During the VP surveys, a total of two records were observed, amounting to 75 seconds of flight time. These flights were associated entirely with commuting across the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Little Grebe was observed on, or near, water bodies, such as the numerous ponds, flooded areas or drainage ditches scattered throughout the site. Notable locations where feeding or nesting was regularly recorded included Derryaroge bogs within the site. Little Grebe are known to have bred onsite with records of adults on nest, as well as adults

and pairs, calling/displaying within suitable breeding habitat during the breeding season, across the Derryaroge, Derryadd and Lough Bannow bogs within the proposed wind farm site.

8.8.2.18.2 Non-breeding Season

Little Grebe was recorded regularly throughout the survey period, with a total of 15 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons. There were no records of flight activity for Little Grebe during the VP surveys in the non-breeding season.

Throughout the surveys, Little Grebe was observed using flooded bogs/fields and waterbodies for foraging and commuting. Notable locations where foraging was recorded included Derryaroge, Derryadd bog and Lough Bannow (within the site) and Lough Ree, Fortwilliam Turlough, Newpark Turlough, Derryad, Mosstown, Cloontuskert, Cloonard, Rhynmount, Derrycashel, Killashee and Aghakeeran (outside of site). The number of birds observed onsite did not occur at national importance estimates (20 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being a flock number of 5 birds recorded at Lough Bannow bog in October 2022. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 5 birds.

Surveys of the surrounding area recorded Little Grebe where wetlands or waterbodies occurred, with flock sizes ranging from 1 to 15 birds. Newpark Turlough, located 3.1km south-west of the site, hosted 15 birds in December 2023. Lough Ree approximately 5 km south-west from the proposed wind farm site, also supported a notable wintering population, with a maximum recorded count of 12 birds in October 2021.

8.8.2.19 Common Buzzard

The complete dataset and mapping on observations of Common Buzzard during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3c

8.8.2.19.1 Breeding Season

Common Buzzard was recorded regularly throughout the survey period, with a total of 668 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons.

During the VP surveys, a total of 496 records were observed, amounting to 79,186 seconds of flight time. These observations were primarily associated with commuting and foraging and were widely distributed throughout the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Common Buzzard was observed commuting, soaring and/or foraging over bogland, grassland and forestry in and surrounding the proposed wind farm site. Flights were widely distributed across the proposed wind farm site without any discernible spatial pattern. The species typically occurred in small numbers, usually just one bird up to a maximum of five birds observed hunting or flying.

Common Buzzard breeding activity was recorded within and immediately surrounding the proposed wind farm site. There was no nests and the exact breeding locations could not be confirmed over the survey period, but Buzzard is likely to have bred in the immediate area of the proposed wind farm site. A number of possible and probable breeding records were observed, including adults and pairs calling or displaying within suitable breeding habitat during the breeding season. These records were noted less than 100 m to the north and approximately 500 m to the south-west of the proposed wind farm site during the 2022, 2023, and 2024 breeding seasons. Additionally, juveniles were heard calling near suitable breeding habitat later in the season. It is estimated that at least two pairs likely bred within 500 m of the proposed wind farm site in each of these years.

8.8.2.19.2 Non-breeding Season

Common Buzzard was recorded regularly throughout the survey period, with a total of 193 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 142 records were observed, amounting to 16,906 seconds of flight time. These observations were primarily associated with commuting and foraging and were widely distributed throughout the proposed wind farm site.

Throughout the surveys, Common Buzzard was observed commuting and foraging over bogland, grassland and forestry in and surrounding the proposed wind farm site. Notable locations where foraging and commuting was recorded included Derryaroge, Derryadd bog and Lough Bannow (within the site) and Lough Ree, Fortwilliam Turlough, Tureen, Derryshannoge, Derraghan More, Gortgallan bog, Cloontuskert, Erra, Ballynakill, Cloonkeel, Knappoge, Derrycashel, Termonbarry, Rhynmount and Longford Town (outside of site). The species typically occurred in small numbers, usually just one bird up to a maximum of 5 birds observed hunting or flying. Due to this species rapidly expanding in Ireland and since there is no recent population estimate available it was not included in the Collision risk model.

8.8.2.20 Eurasian Sparrowhawk

The complete dataset and mapping on observations of Eurasian Sparrowhawk during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3u.

8.8.2.20.1 Breeding Season

Eurasian Sparrowhawk was recorded regularly throughout the survey period, with a total of 103 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons.

During the VP surveys, a total of 78 records were observed, amounting to 8,401 seconds of flight time. These observations were primarily associated with commuting and hunting and were widely distributed throughout the proposed wind farm site, with a concentration around the scrub and woodland habitats within the proposed wind farm site. The species typically occurred in small numbers, usually just one bird up to a maximum of two birds observed hunting or flying. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

There was no Eurasian Sparrowhawk breeding activity recorded within and immediately surrounding the proposed wind farm site over the survey period.

8.8.2.20.2 Non-breeding Season

Eurasian Sparrowhawk was recorded regularly throughout the survey period, with a total of 64 observations across all survey methods within and around the site. Observations were confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 41 records were observed, amounting to 2,916 seconds of flight time. These observations were primarily associated with displaying, commuting and foraging and were widely distributed throughout the proposed wind farm site.

Throughout the surveys, Eurasian Sparrowhawk was observed displaying, commuting and foraging over bogland, grassland and forestry in and surrounding the proposed wind farm site. Notable locations where displaying, foraging and commuting was recorded included Derryaroge, Derryadd bog and Lough Bannow (within the site) and Lough Ree, Cloonmustra, Erra, Cloonkeel, Derrycashel bog, Derraghan More, Corlea, Derryoghil and Grillagh (outside of site). The species typically occurred in small numbers, usually just one or two birds observed displaying, hunting and flying. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

8.8.2.21 Hen Harrier

The complete dataset and mapping on observations of Hen Harrier during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3hh

8.8.2.21.1 Breeding Season

There was one record of Hen Harrier observed during the breeding season, however no breeding activity was noted. This record occurred April 2023 and involved a female hunting. No suitable breeding Hen Harrier was noted over the survey period and no other records of Hen Harrier were recorded in previous or subsequent visits, therefore this species is determined not to be breeding within or near the site.

8.8.2.21.2 Non-breeding Season

Hen harrier was recorded irregularly throughout the survey period, with a total of 22 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded from November to March of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 18 records were observed, amounting to 1,562 seconds of flight time. These observations were primarily associated with commuting and foraging and were widely distributed throughout the proposed wind farm site.

Throughout the surveys, Hen Harrier was observed commuting and foraging over bogland, in and surrounding the proposed wind farm site. No roosting activity was observed during surveys. Notable locations where foraging and commuting was recorded included Derryaroge, Derryadd

and Lough Bannow bogs (within the site) and Derrycashel bog, Rhynmont and Cloonbearla (outside of site). The species typically occurred in small numbers, usually just one bird observed foraging and commuting. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

8.8.2.22 White-tailed Eagle

Further information on observations of White-tailed Eagle during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3ccc.

8.8.2.22.1 Breeding Season

There were no records of White-tailed Eagle within or near the site over the breeding bird survey period.

8.8.2.22.2 Non-breeding Season

White-tailed Eagle was seen on one occasion in in February 2022 as an incidental record over the entire survey period from 2021 to 2024. The record related to distant view of a White-tailed Eagle being mobbed by a Common Buzzard outside of the proposed wind farm site to the north-west of the Derryadd Bog. There was no previous record of this species and it was not recorded again in subsequent visits.

8.8.2.23 Common Kestrel

The complete dataset and mapping on observations of Common Kestrel during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3g

8.8.2.23.1 Breeding Season

Common Kestrel was recorded regularly throughout the survey period, with a total of 408 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons, with the exception of April 2021.

During the VP surveys, a total of 306 records were observed, amounting to 55,222 seconds of flight time. These observations were primarily associated with commuting and foraging and were widely distributed across the proposed wind farm site without any discernible spatial pattern. The species typically occurred in small numbers, usually just one bird up to a maximum of four birds observed on one occasion. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Common Kestrel breeding activity was recorded within and immediately surrounding the proposed wind farm site. There was no nests and the exact breeding locations could not be confirmed over the survey period, but Common Kestrel are likely to have bred in the immediate area of the proposed wind farm. A number of possible and probable breeding records were observed, including adults and pairs alarm calling or seen within suitable breeding habitat during the breeding season. These records were noted less than 1km to the south and east to the proposed wind farm site during the 2022, 2023, and 2024 breeding seasons. Additionally,

juveniles were seen near suitable breeding habitat later in the season. It is estimated that at least two pairs likely bred within 500 m of the proposed wind farm site in each of these years.

8.8.2.23.2 Non-breeding Season

Common Kestrel was recorded regularly throughout the survey period, with a total of 159 observations across all survey methods within and around the site. Observations were primarily confined to the wintering period, from October to March. The species was recorded in each of these months during the 2021/2022, 2022/2023, and 2023/2024 seasons.

During the VP surveys, a total of 121 records were observed, amounting to 17,786 seconds of flight time. These observations were primarily associated with commuting and foraging and were widely distributed throughout the proposed wind farm site.

Throughout the surveys, Common Kestrel was observed commuting and foraging over bogland, wetland, forestry in and surrounding the proposed wind site. Notable locations where foraging and commuting was recorded included Derryaroge, Derryadd and Lough Bannow bogs (within the site) and Derraghan More, Derryshannoge, Lough Ree, Kilnacarrow, Erra, Cloonbearla, Derrycashel, Cloonard, Cloonkeel, Grillagh, Derryoghil and Derryad (outside of site). The species typically occurred in small numbers, usually just one or two birds observed foraging and commuting. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level during the non-breeding season.

8.8.2.24 Peregrine Falcon

The complete dataset and mapping on observations of Peregrine Falcon during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3uu

8.8.2.24.1 Breeding Season

Peregrine Falcon was recorded frequently during breeding bird surveys, with 36 observations over the 2021, 2022, 2023 and 2024 breeding seasons. The species typically occurred in small numbers, usually just one bird observed hunting or flying. Appendix 8.3y

During the VP surveys, a total of 18 records were observed, amounting to 2270 seconds of flight time. These flights were primarily associated with commuting or hunting and were largely distributed, in along the margins the proposed wind farm site or around wetland habitats in the Derryaroge bog to the north and Lough Bannow to the south of the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Peregrine Falcon was confirmed breeding at a location 1.8 km west of the proposed wind farm site in 2024. At least two chicks were successfully fledged. It is assumed that the majority of Peregrine Falcon records observed within the proposed wind farm site area associated with this breeding location.

8.8.2.24.2 Non-breeding Season

Peregrine Falcon was recorded irregularly during the winter bird surveys, with 15 observations over the 2021/2022, 2022/2023 and 2023/2024 non-breeding seasons. The species typically occurred in small numbers, usually just one bird observed hunting or flying.

During the VP surveys, a total of 15 records were observed, amounting to 795 seconds of flight time. These flights were primarily associated with commuting or hunting and were largely distributed, in along the margins the proposed wind farm site or around wetland habitats in the Derryaroge bog to the north and Lough Bannow to the south of the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

8.8.2.25 Merlin

The complete dataset and mapping on observations of Merlin during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3pp

8.8.2.25.1 Breeding Season

There were two records of Merlin observed during the breeding season; however no breeding activity was noted (Appendix 8.3pp). These records occurred in April 2023 and involved a bird hunting. No suitable breeding Merlin habitat was noted over the survey period and no other records of Merlin were recorded in previous or subsequent visits, therefore this species is determined not to be breeding within or near the site.

8.8.2.25.2 Non-breeding Season

Merlin was recorded irregularly during the winter bird surveys, with 9 observations over the 2021/2022, 2022/2023 and 2023/2024 non-breeding seasons. The species typically occurred in small numbers, usually just one bird observed hunting or flying.

During the VP surveys, a total of 8 records were observed, amounting to 192 seconds of flight time. These flights were primarily associated with commuting or hunting and were largely recorded over bog habitat, confined mainly to the Derryadd bog in the centre and Lough Bannow bog to the south of the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

8.8.2.26 Little Egret

The complete dataset and mapping on observations of Little Egret during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3kk

8.8.2.26.1 Breeding Season

Little Egret was recorded regularly during breeding bird surveys, with 234 observations over the 2021, 2022, 2023 and 2024 breeding seasons. The species typically occurred in small numbers, usually just one or two bird observed foraging, resting or flying.

During the VP surveys, a total of 86 records were observed, amounting to 4,401 seconds of flight time. These flights were primarily associated with commuting and were widely distributed across the proposed wind farm site without any discernible spatial pattern. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

The was no evidence of Little Egret breeding within or around the proposed wind farm site over the survey period. There was 16 records of adults, either in pairs or single, foraging along

wetland habitats, however no evidence of breeding (displaying, nests or chicks) were noted and the species were not recorded at these locations in subsequent visits.

8.8.2.26.2 Non-breeding Season

Little Egret was recorded regularly during non-breeding bird surveys, with 124 observations over the 2021/2022, 2022/2023 and 2023/2024 breeding seasons. The species typically occurred in small numbers, usually just one or two bird observed foraging, resting or flying.

During the VP surveys, a total of 51 records were observed, amounting to 1,233 seconds of flight time. These flights were primarily associated with commuting and were widely distributed across the proposed wind farm site without any discernible spatial pattern. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Little Egret were observed using flooded bogs, wetlands and other waterbodies for roosting and feeding. Notable locations where feeding and roosting occurred included Derryaroge and Derryadd bogs (onsite). The number of birds observed onsite remained below the national importance threshold (20 birds constitute a flock of national importance), with the maximum occurring onsite being 11 birds recorded at Derryaroge in March 2022. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 11 birds, with an average of 2 birds occurring across all of the survey periods.

8.8.2.27 Great Cormorant

The complete dataset and mapping on observations of Great Cormorant during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3cc

8.8.2.27.1 Breeding Season

Great Cormorant was recorded regularly during breeding bird surveys, with 220 observations over the 2021, 2022, 2023 and 2024 breeding seasons. The species typically occurred in small numbers, usually just one or two bird observed foraging, resting or flying.

During the VP surveys, a total of 135 records were observed, amounting to 8,868 seconds of flight time. There was a strong concentration of Cormorant during the breeding season, with flightlines concentrated along the River Shannon to the north of the proposed wind farm site. However, these flightlines were outside the wind farm site boundary. Within the wind farm site, there was some indication of a concentrations of flightlines along a corridor through the middle of Derryaroge Bog in 2021, which was reflected in the distribution of flight activity densities at potential collision height. However, the number of flightlines was small, and this pattern was not repeated in 2022, 2023 or 2024, when very few flightlines were recorded across the wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

The was no evidence of Great Cormorant breeding within the proposed wind farm site over the survey period, however a breeding colony was recorded on some small islands on Lough Ree located approximately 6km from the proposed wind farm site in 2021, 2022 and 2023. There was a maximum of 86 birds recorded in May 2022 and remained at this location throughout the breeding seasons.

8.8.2.27.2 Non-breeding Season

Great Cormorant was recorded frequently during non-breeding bird surveys, with 124 observations over the 2021/2022, 2022/2023 and 2023/2024 breeding seasons. The species typically occurred in small numbers, usually just one or two bird observed foraging, resting or flying.

During the VP surveys, a total of 30 records were observed, amounting to 765 seconds of flight time. There was a strong concentration of Great Cormorant during the non-breeding season, with flightlines concentrated along the River Shannon to the north of the proposed wind farm site, while there was very few flights within the proposed wind farm site. The collision risk model (see Appendix 8.4) concluded that any potential impacts from collisions with operating turbines would not be significant at an international, national, or local level.

Throughout the surveys, Great Cormorant were observed using flooded bogs, wetlands and other waterbodies for roosting and feeding. Notable locations where feeding and roosting Were located predominantly along River Shannon or Lough Ree, outside of the proposed wind farm site. The number of birds observed onsite remained below the national importance threshold (110 birds constitute a flock of national importance [Burke *et al.* 2018]), with the maximum occurring onsite being 2 birds recorded at Derryaroge in March 2022. Flock sizes within the proposed wind farm site during the study period ranged from 1 to 2 birds, with an average of 1 bird occurring across all of the survey periods.

Surveys of the surrounding area recorded Whooper Swans primarily along the River Shannon and in agricultural fields to the north-east and west of the site, with flock sizes ranging from 1 to 130 birds. Lough Ree located approximately 6 km west from the proposed wind farm site, contained the majority of non-breeding records, with a maximum 130 birds recorded in March 2023.

8.8.2.28 Meadow Pipit

The complete dataset and mapping on observations of Meadow Pipit during the breeding seasons and non-breeding seasons survey period can be found within Appendix 8.3oo

8.8.2.28.1 Breeding Season

Meadow Pipit was recorded regularly throughout the survey period, with a total of 1,591 observations across all survey methods within and around the site. The species was recorded in every month of the 2021, 2022, 2023, and 2024 breeding seasons.

Meadow Pipit breeding activity was recorded within and immediately surrounding the proposed wind farm site over the course of the survey period. Meadow Pipit are known to have bred onsite with records of adults on nest, as well as adults and pairs, calling/displaying within suitable breeding habitat during the breeding season, across the vegetated cutover bog and open areas of the Derryaroge, Derryadd and Lough Bannow bogs within the proposed wind farm site. The species typically occurred in small numbers, usually just one bird or pairs but up to a maximum of 16 birds were observed, numbers typically increased in the months of August and September.

8.8.2.28.2 Non-breeding Season

During the non-breeding season, Meadow Pipit was not recorded within the proposed wind farm site. However, it should be noted that the survey effort was primarily focused on breeding birds for this species, as these are more likely to be affected by habitat loss and displacement associated with the proposed development. Given this survey focus and the species' relatively low detectability outside the breeding season, the absence of non-breeding records does not necessarily indicate absence of the species during this period.

8.8.2.29 Eurasian Skylark

8.8.2.29.1 Breeding Season

Eurasian Skylark was recorded in low numbers during the survey period; however, the species was confirmed to occur within the site during the breeding season. Although detailed data on its distribution and abundance are limited, suitable breeding habitat such as open grassland and vegetated cutover bog/peatland is present throughout the site. Given the species association with such habitats and its cryptic nesting behaviour, it is considered likely that Skylark breeds within the site.

8.8.2.29.2 Non-breeding Season

During the non-breeding season, Eurasian Skylark was not recorded within the proposed wind farm site. However, it should be noted that the survey effort was primarily focused on breeding birds for this species, as these are more likely to be affected by habitat loss and displacement associated with the proposed development. Given this survey focus and the species' relatively low detectability outside the breeding season, the absence of non-breeding records does not necessarily indicate absence of the species during this period.

8.8.2.30 Redwing

The complete dataset and mapping on observations of Redwing during the breeding seasons and non-breeding seasons survey period can be found within

8.8.2.30.1 Breeding Season

There were no records of Redwing within or near the site over the breeding bird survey period.

8.8.2.30.2 Non-breeding Season

Redwing was recorded irregularly during the winter bird surveys, with 7 observations over the 2022/2023 and 2023/2024 non-breeding seasons. The species typically occurred in small flocks of between 3 and 45 birds within the Lough Bannow bog (within the site) and Derryhaunmore, Derryad, Derryoghil, Cloonfore and Cloonbony (outside of site). Birds were observed commuting and foraging over grasslands and boglands.

8.8.2.31 Summary of KARs recorded during Field Surveys and Sensitivity Evaluation.

Following the results from the Field Study described in the Sections above, the ornithological assessment of the effects from the various phases of the proposed development will pay particular emphasis on the KARs in Table 8.16.

Table 8.16: Summary of KARs recorded during Field Surveys and Sensitivity Evaluation.

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
Whooper Swan	Amber List Annex I Lough Ree SPA	Whooper Swan is a regular non-breeding winter visitor, present October–March annually; not breeding onsite, with only rare spring/summer records linked to migration or failed breeders. Frequently recorded in flight and on the ground, using wetlands for roosting and feeding; activity was widespread with no spatial concentration. Flock sizes mostly below national importance but occasionally exceeded thresholds; collision risk from turbines assessed as not significant.	Very High	SCI for nearby SPA
Greater White-fronted Goose	Amber List Annex I Ballykenny-Fisherstown Bog SPA	Greater White-fronted Goose is a rare non-breeding visitor, with no breeding records onsite or nearby during the breeding season. Only one brief observation during the entire survey period: a flock of 16 birds flying high over the site in October 2022; no interaction with the site recorded.	Very High	SCI for nearby SPA
Mallard	Amber List - Lough Ree SPA	Mallard is a regular breeding and non-breeding species, recorded throughout all months and across all survey years (2021–2024). Confirmed breeding onsite with sightings of adults, ducklings, and breeding pairs in suitable habitats.	Very High	SCI for nearby SPA

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		Frequently observed in flight and on the ground, with high numbers of records in both seasons. Activity was concentrated near waterbodies and wetlands, with no spatial constraint across the site. Flock sizes remained below national importance thresholds both onsite and in the wider area. Collision risk was assessed as not significant at any scale.		
Eurasian Wigeon	Amber List - Lough Ree SPA	Eurasian Wigeon is a regular non-breeding winter visitor, present from October to March annually; not breeding onsite, with only rare spring and summer records linked to migration or failed breeders. Occasionally observed in flight and regularly on the ground, using wetlands and flooded bogs for feeding and roosting; flight activity was limited and mostly peripheral to the site. Flock sizes remained below national importance, with a maximum of 70 birds onsite; collision risk from turbines assessed as not significant.	Very High	SCI for nearby SPA
Eurasian Teal	Amber List - Lough Ree SPA	Eurasian Teal is a regular non-breeding winter visitor, recorded October–March annually; not breeding onsite, with only rare records during spring and summer, likely related to migration or failed breeders.	Very High	SCI for nearby SPA

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		Occasionally observed in flight and regularly on the ground, using wetlands and flooded bogs for feeding and roosting; flight activity was limited and mostly located north of the site. Flock sizes remained well below national importance thresholds, with a maximum of 32 birds onsite; collision risk from turbines assessed as not significant.		
Mute Swan	Amber List - -	Mute Swan is a regular breeding and non-breeding species, recorded throughout the year; confirmed breeding onsite in multiple seasons, with adults and nests observed in wetlands. Frequently observed in flight and on the ground, using waterbodies, flooded bogs, and wetlands for feeding, roosting, and loafing; flight activity was widespread across the site with no spatial concentration. Flock sizes remained below national importance thresholds, with a maximum of 8 birds onsite; collision risk from turbines assessed as not significant.	Low	Species listed in the Amber List of Birds of Conservation Concern
Northern Shoveler	Red List - Lough Ree SPA	Northern Shoveler is a regular non-breeding winter visitor, recorded from October to March annually; not breeding onsite, with only rare spring and summer records linked to migration or failed breeders.	Very High	SCI for nearby SPA

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		Occasionally observed in flight and regularly on the ground, using wetlands and flooded bogs for foraging and roosting; flight activity was minimal, primarily to the north of the site. Flock sizes occasionally met national importance thresholds, with a maximum of 28 birds onsite; collision risk was not significant, and the species was excluded from collision risk modelling.		
European Golden Plover	Red List Annex I Lough Ree SPA	European Golden Plover is a regular non-breeding winter visitor, recorded from October to March annually; not breeding onsite, with only spring and autumn records linked to migration. Frequently observed in flight and on the ground, using wetlands, flooded bogs, and fields for foraging, commuting, and roosting; flight activity was widespread across the site. Flock sizes did not reach national importance thresholds onsite, with a maximum of 310 birds; potential collision risk identified for local wintering populations, which could increase mortality rates.	Very High	SCI for nearby SPA
Northern Lapwing	Red List	Northern Lapwing is a regular breeding and wintering species, with breeding confirmed from 2021 to 2024 onsite, especially in	Very High	SCI for nearby SPA

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
	- Lough Ree SPA	wetland areas; also recorded regularly during the winter months. Frequently observed in flight and on the ground, particularly associated with wetlands and waterbodies for foraging, commuting, roosting, and breeding displays; flight activity is distributed across the site. Flock sizes onsite did not reach national importance thresholds, with a maximum of 85 birds; potential collision risk identified, particularly for the breeding population, with possible increased mortality rates.		
Common Ringed Plover	Amber List - -	Common Ringed Plover recorded regularly during breeding seasons (2021-2024), with confirmed breeding in 2022 and 2024 and probable breeding in all years. Flight activity was minimal, with no significant flight records during the VP surveys, and low winter observations (only 9 records). Flock sizes did not reach national importance onsite, with the largest recorded flock being 3 birds, indicating a relatively small wintering presence. Collision risk not modelled due to low flight activity.	Low	Species listed in the Amber List of Birds of Conservation Concern
Lesser Black-backed Gull	Amber List	Lesser Black-backed Gull was recorded regularly during breeding seasons (2021-2024), with no breeding onsite, but	Low	Species listed in the Amber List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
	- -	evidence of commuting to a nearby colony at Lough Ree. Significant flight activity during VP surveys, with 700 records totalling 71,921 seconds of flight time, largely associated with commuting and foraging, but no significant collision risk identified. Wintering observations were lower (50 records), with maximum flock size of 20 birds recorded onsite. Collision risk minimal, as the species was not recorded in significant numbers.		
Black-headed Gull	Amber List - -	Regularly recorded during both breeding and non-breeding seasons (2021–2024), with confirmed breeding in 2023 and 2024 at Derryaroge Bog (estimated 2–3 pairs). Mainly observed commuting, foraging, and roosting across the site, especially over bogs and wetlands; activity linked to nearby colonies at Lough Ree (~6 km west) and south of Killashee (~700 m east). Flight activity was widespread with no significant spatial pattern; collision risk model indicated no significant impact from turbines.	Low	Species listed in the Amber List of Birds of Conservation Concern
Common Gull	Amber List -	Common Gull was recorded regularly during the 2021–2024 breeding seasons, with confirmed breeding in 2023 and 2024,	Low	Species listed in the Amber List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
	-	particularly at Derryaroge and Lough Bannow bogs. Flight activity was minimal, with only 3 flight records (115 seconds of flight time) observed, and no significant habitat preferences; collision risk considered low. Wintering observations were sparse, with a maximum of 5 birds recorded onsite; collision risk minimal, with occasional foraging and commuting at nearby water bodies.		
Common Snipe	Red List - -	Regularly recorded during the breeding season (2021–2024), with flight activity linked to breeding and display behaviors, especially in Derryaroge and Derryadd bogs. While no confirmed nests or chicks were found, breeding is likely due to courtship displays and suitable habitat. Flight activity was primarily associated with breeding, with 38 flight records observed, totaling over 4,300 seconds of flight time, with no significant collision risks. Wintering observations (October–March) included flocks of up to 18 birds, using flooded bogs for foraging and roosting. The species was not included in collision risk modeling due to its cryptic behavior and flight patterns not suited for VP survey	Medium	Species listed in the Red List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
Eurasian Whimbrel	Red List - -	Occasionally recorded during migration periods (spring and autumn) across the years 2021–2024, with a total of 25 observations, primarily foraging and commuting. Notable observation included a flock of 147 birds commuting across Derryadd bog, within the site. No evidence of breeding or long-term residency was recorded.	Medium	Species listed in the Red List of Birds of Conservation Concern
Eurasian Curlew	Red List - -	Eurasian Curlew was recorded irregularly during the breeding season (April–September), with no breeding activity confirmed. Records primarily occurred in April, June, July, and September, likely related to migratory movements or failed breeders. Flight activity was limited to occasional commuting and foraging, with birds primarily observed in Derryadd bog and along the River Shannon. Activity was widespread across the site with no apparent spatial concentration. Wintering observations were recorded from November to March, with flock sizes ranging from 1 to 75 birds. The species did not reach nationally important flock sizes, and the collision risk from turbines was assessed as not significant.	Medium	Species listed in the Red List of Birds of Conservation Concern
Eurasian Woodcock	Red List	Eurasian Woodcock was recorded regularly during the 2021–2024 breeding seasons,	Medium	Species listed in the Red List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
	- -	with probable breeding evidence such as courtship displays and males holding territories. No confirmed nests or chicks were found, but successful breeding is assumed due to the species' cryptic behavior. Flight activity was not recorded, but observations were concentrated around scrub and forested habitats in Lough Bannow bog (within the site) and Kilnacarrow (outside the site). Winter observations were rare, with only two single bird records in November and December 2022. The collision risk from turbines was not assessed due to the low occurrence of the species.		
Little Grebe	Green List - Lough Ree SPA	Little Grebe was recorded regularly during the 2021–2024 breeding seasons, with confirmed breeding activity including nesting and displaying adults. Flight activity was limited to commuting, and potential turbine collision risks were assessed as not significant. Observations were spread throughout the site, particularly in wetlands, ponds, and flooded areas, with no significant spatial concentration. Winter observations were regular (October to March), with flocks of up to 5 birds	Very High	SCI for nearby SPA

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		recorded onsite, and foraging and commuting were widespread. Surrounding areas hosted larger flocks, with a maximum of 15 birds recorded.		
Common Buzzard	Green List - -	Common Buzzard was recorded regularly during the 2021–2024 breeding and wintering seasons, with observed breeding activity including calling and displaying pairs, and juveniles heard calling. Flight activity was widespread across the site, with no clear spatial concentration and was associated with commuting and foraging. Collision risk with turbines was assessed as not significant. The species was typically observed in small numbers (1 to 2 individuals), with a maximum of five birds recorded at one time. Breeding likely occurred within 500m of the proposed development site.	Low	Species listed in the Green List of Birds of Conservation Concern
Eurasian Sparrowhawk	Green List - -	Eurasian Sparrowhawk was recorded regularly during the 2021–2024 breeding and winter seasons, with flight activity associated with commuting and hunting, concentrated around scrub and woodland habitats. No breeding activity was confirmed onsite. Flight observations were widespread, typically involving one or two birds. The species was excluded from the collision risk model due to the low risk posed.	Low	Species listed in the Green List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
Hen Harrier	Amber List Annex I -	Hen Harrier was recorded irregularly during the 2021–2024 wintering seasons (October–March), with foraging and commuting activity across bogland habitats. No roosting or breeding activity was observed onsite. The species typically occurred in small numbers, with flight activity distributed widely across the site, and the collision risk from turbines was assessed as not significant. Only one breeding season record was made (April 2023), involving a female hunting, with no evidence of breeding onsite.	High	Ecologically sensitive species
White-tailed Eagle	Red List Annex I -	White-tailed Eagle was not recorded during the breeding season (2021–2024) within or near the site. The species was recorded only once during the non-breeding season, in February 2022, with a distant observation of an individual being mobbed by a Common Buzzard. This was an incidental record, with no further sightings throughout the survey period and no evidence of regular presence.	High	Ecologically sensitive species
Common Kestrel	Red List - -	Common Kestrel was recorded regularly throughout both the breeding and non-breeding seasons (2021–2024), with observations across all months except for April 2021.	Medium	Species listed in the Red List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		Breeding activity was likely occurring in the vicinity, with possible and probable breeding records including alarm calling and sightings of juveniles near suitable habitat. In the non-breeding season, the species was observed commuting and foraging across bogland, wetlands, and forestry, with the collision risk model indicating no significant impacts from turbines.		
Peregrine Falcon	Green List Annex I -	Peregrine Falcon was recorded frequently during the breeding season (2021–2024), with observations typically of one bird hunting or flying. Breeding was confirmed 1.8 km west of the site in 2024, where at least two chicks were fledged. Most records in the development area are assumed to be associated with this breeding location. In the non-breeding season, the species was observed irregularly, primarily commuting or hunting, with no significant collision risk identified from turbines.	Medium	Species listed in the Annex I of the Birds Directive
Merlin	Amber List Annex I -	Merlin was recorded twice during the breeding season (April 2023), involving a hunting bird; however, no suitable breeding habitat was present, and the species is not considered to be breeding within or near the site.	Medium	Species listed in the Annex I of the Birds Directive

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		In the non-breeding season, Merlin was observed irregularly and in low numbers, primarily hunting or commuting over bog habitat; collision risk from turbines was assessed as not significant.		
Little Egret	Green List Annex I -	Recorded regularly during both breeding and non-breeding seasons (2021–2024), typically in small numbers (1–2 birds). No confirmed breeding; birds observed foraging near wetlands, but no evidence of nesting or juveniles. Frequently used flooded bogs and wetlands for feeding and roosting; collision risk model found no significant turbine impact.	Medium	Species listed in the Annex I of the Birds Directive
Great Cormorant	Amber List - -	Recorded regularly during both breeding and non-breeding seasons (2021–2024), usually 1–2 birds observed foraging, flying, or resting. Breeding activity not confirmed onsite, but a colony was present on Lough Ree (~6 km west), with up to 86 birds recorded in May 2022. Most flight activity occurred along the River Shannon, outside the development area; collision risk model found no significant impact from turbines.	Low	Species listed in the Amber List of Birds of Conservation Concern
Meadow Pipit	Red List	Regularly recorded during all breeding seasons (2021–2024) and confirmed	Medium	Species listed in the Red List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
	- -	breeding onsite across Derryaroge, Derryadd, and Lough Bannow bogs. Breeding activity included adults on nests and displaying pairs within suitable cutover bog and open vegetation; peak numbers (up to 16 birds) noted in August–September. Not recorded in the non-breeding season, but survey effort was primarily focused on breeding birds for this species.		
Eurasian Skylark	Amber List - -	Recorded in low numbers during the breeding season, with confirmed presence and likely breeding within suitable open grassland and cutover bog habitats across the site. Cryptic nesting behaviour and habitat availability suggest the species is a regular breeder despite limited observation data. Not recorded in the non-breeding season, but survey effort was primarily focused on breeding birds for this species.	Low	Species listed in the Amber List of Birds of Conservation Concern
Redwing	Red List - -	No records of Redwing during the breeding season. Recorded irregularly in small flocks (3–45 birds) during the non-breeding season in the 2022/2023 and 2023/2024 periods.	Medium	Species listed in the Red List of Birds of Conservation Concern

Species	Designation	Summary of Baseline data	Percival Sensitivity Evaluation (Percival 2003)	Sensitivity Evaluation Rational (Table 8.6)
		Observed commuting and foraging primarily over grasslands and boglands, especially in Lough Bannow bog (within the site) and nearby areas.		

8.9 POTENTIAL EFFECTS

Section 8.9.1 below presents an assessment of the projected environmental conditions if the proposed development was not carried out (i.e. the 'Do-Nothing' scenario). In this scenario the assessment considers the progression of environmental conditions at the proposed wind farm site in the absence of the proposed wind farm, and the implementation of rehabilitation and management of the Derryaroge, Derryadd, and Lough Bannow bogs under its existing IPC Licence (P0504-01).

The following sections assess the potential significant effects on birds during the following phases of the proposed development, should the development be consented:

- Construction Phase (Section 8.9.2): Evaluation of the likely effects on birds during the construction of the wind farm.
- Operation Phase (Section 8.9.3): Assessment of the likely effects on birds during the operational phase of the wind farm.
- Decommissioning Phase (Section 8.9.4): Consideration of the likely effects associated with the decommissioning of the wind farm at the end of its operational life

As described in Section 8.7.2, the range of potential impact sources associated with the proposed development that may affect bird species and their habitats include:

- Construction Phase
    - Habitat Loss due to turbine and infrastructure installation.
    - Water Quality Impacts from runoff and water abstraction, potentially affecting wetland habitats.
    - Disturbance and Displacement caused by noise, machinery, and human activity.
    - Nest Destruction if vegetation clearance occurs during the breeding season without mitigation.
- Operational Phase
    - Disturbance and Displacement resulting from turbine presence and visual movement.
    - Collision Risk for birds flying at rotor height or along migratory pathways.
- Decommissioning Phase
    - Temporary Habitat Disturbance associated with turbine removal and site reinstatement.
    - Short-Term Disturbance due to machinery use and human activity during decommissioning works.

8.9.1 Do-nothing Scenario

The assessment of potential effects under the 'do-nothing' scenario for the proposed wind farm shares a similar context with the one described in Chapter 7 - Biodiversity, i.e. it would consist implementation of the measures included in the Draft Rehabilitation Plans for Derryaroge, Derryadd and Lough Bannow Bogs (Appendix 7.2), in compliance with the IPC Licence P0504-01.

The site would continue to operate in compliance with its IPC licence requirements (ref. no P0504-01). This involves the continuation of ongoing decommissioning activities associated

with the removal of peat stockpiles and all peat extraction machinery, rail infrastructure, structures and materials from the site, and environmental monitoring. Following the successful decommissioning of the site it is intended that the site would be rehabilitated in line with condition 10 of the IPC licence. As part of Condition-10 of this licence, decommissioning and rehabilitation must be carried out on the former peat production areas. These land uses and activities will also continue if the proposed wind farm does proceed.

As a result, of implementation of measures, over time, gradual ecological succession is expected to occur, leading to the development of an increasingly diverse mosaic of wetland habitats within lower-lying depressions, interspersed with areas of emergent scrub, primarily dominated by birch, in drier or more elevated zones. As rehabilitation progresses, the extent of bare peat is anticipated to decline, replaced by more established vegetation communities.

Currently, there is a high number of waterbird species using both the wetland habitats (e.g. foraging), as well as the drier habitats (Section 8.8.2). The species of the Anatidae and Charadriidae Families have been currently finding favoured habitat conditions at the proposed wind farm site for roosting and resting due to the cutover bog habitat being dominated by bare peat with occasional cover by graminoid/grassland species, as part of the early stages of vegetation succession (Appendix 7.9).

However, the natural vegetation succession (which will be followed by the development of coarser habitats, as mentioned above) will likely represent the loss of suitable habitat conditions (i.e. lower grassland habitat cover) for these protected species (e.g. Northern Lapwing, Whooper Swan), and incite their displacement from the site (similarly to the situations described for: European Golden Plover, Northern Lapwing, and Common Snipe - Amar *et al.*, 2011; for European Golden Plover - Wilson *et al.*, 2014; for Northern Lapwing - Bertholdt *et al.*, 2017; for Eurasian Curlew - Rivers *et al.*, 2024; BoCCI species - Guilfoyle *et al.*, 2025). While, under the context of the 'do-nothing' scenario described above, the proposed wind farm site would develop better suited foraging habitats for bird species (i.e. wetland habitat), amongst which wildfowl and wader species, the site will likely be abandoned by species that currently use it for roosting/resting (i.e. grassland habitat).

With regards to the site's foraging potential for waterbirds, the likely positive effects on the aquatic environment associated with the 'do-nothing' scenario are likely to improve the abundance and diversity of prey/food items for these bird species (e.g. aquatic plants, invertebrates, fish), which is likely to have a positive effect to bird populations.

8.9.2 Construction Phase

Following the methodology outlined above for assessing significant effects on ornithological receptors, the potential sources of impact associated with the proposed wind farm development include:

1) direct habitat loss (see Section 8.9.2.1.1),
2) indirect habitat loss (Section 8.9.2.1.2),
3) disturbance and displacement (Section 8.9.2.1.3)
4) habitat loss at TDR POIs (Section 8.9.2.2)

Although bird collision with wind turbines and their structures can occur from the moment of their erection (i.e. during the Construction Phase, similarly to collisions with towers and other tall structures - Gehring *et al.*, 2009; Brown and Conover, 2011), this EIAR assumes that the time between the turbines' erection and the beginning of the operation phase is not significant (i.e. likely, a small fraction of the 24 months for the Construction Phase), when considering the duration of the Operation Phase (i.e. 30 years; Chapter 3 - Description of the Proposed Development). A similar assessment approach is considered for the proposed meteorological masts, and other structures associated with the Construction Phase of the proposed wind farm. It should be noted that the risk of bird collision with the proposed wind farm is assessed only for the Operation Phase, as no significant risk or likely significant effect is deemed to be present during the short period prior to the start of proper operations.

8.9.2.1 Proposed Wind Farm

8.9.2.1.1 Direct Habitat Loss Effects

8.9.2.1.1.1 Habitat Loss due to Construction of Infrastructure

The construction phase of the proposed development is associated with permanent loss of habitat to accommodate its works, activities, and infrastructure. For the assessment of its effects, because birds are highly mobile and may be unaffected by general habitat loss if alternative habitat than the one to be lost is available near the source of the effect, it would be unrealistic to consider the proposed wind farm site as an isolated landscape feature. Therefore, appropriate consideration is given to the habitat composition of the wider landscape (within 5 km from the proposed wind farm site as recommended in Percival, 2003) to confirm availability of alternative habitat, as described in Section 8.7.4. To that effect, the Corine Land Cover 2018[4] identifies 14 land cover types within this area as illustrated in Figure 8.9. The land cover types are characterised as (Kosztra *et al.*, 2019):

- *Pastures, meadows and other permanent grasslands under agricultural use* [231] - Permanent grassland characterized by agricultural use or strong human disturbance. Floral composition dominated by *graminacea* and influenced by human activity. Typically used for grazing-pastures, or mechanical harvesting of grass–meadows;
- *Peatbogs* [412] - Wetlands with accumulation of considerable amount of decomposed moss (mostly *Sphagnum*) and vegetation matter. Both natural and exploited peat bogs;
- *Land principally occupied by agriculture, with significant areas of natural vegetation* [243] - Areas principally occupied by agriculture, interspersed with significant natural or semi-natural areas (including forests, shrubs, wetlands, water bodies, mineral outcrops) in a mosaic pattern;
- *Transitional woodland/shrub* [324] - Transitional bushy and herbaceous vegetation with occasional scattered trees. Can represent woodland degradation, forest regeneration/recolonization or natural succession;
- *Water bodies* [512] - Natural or artificial water bodies with presence of standing water surface during most of the year;

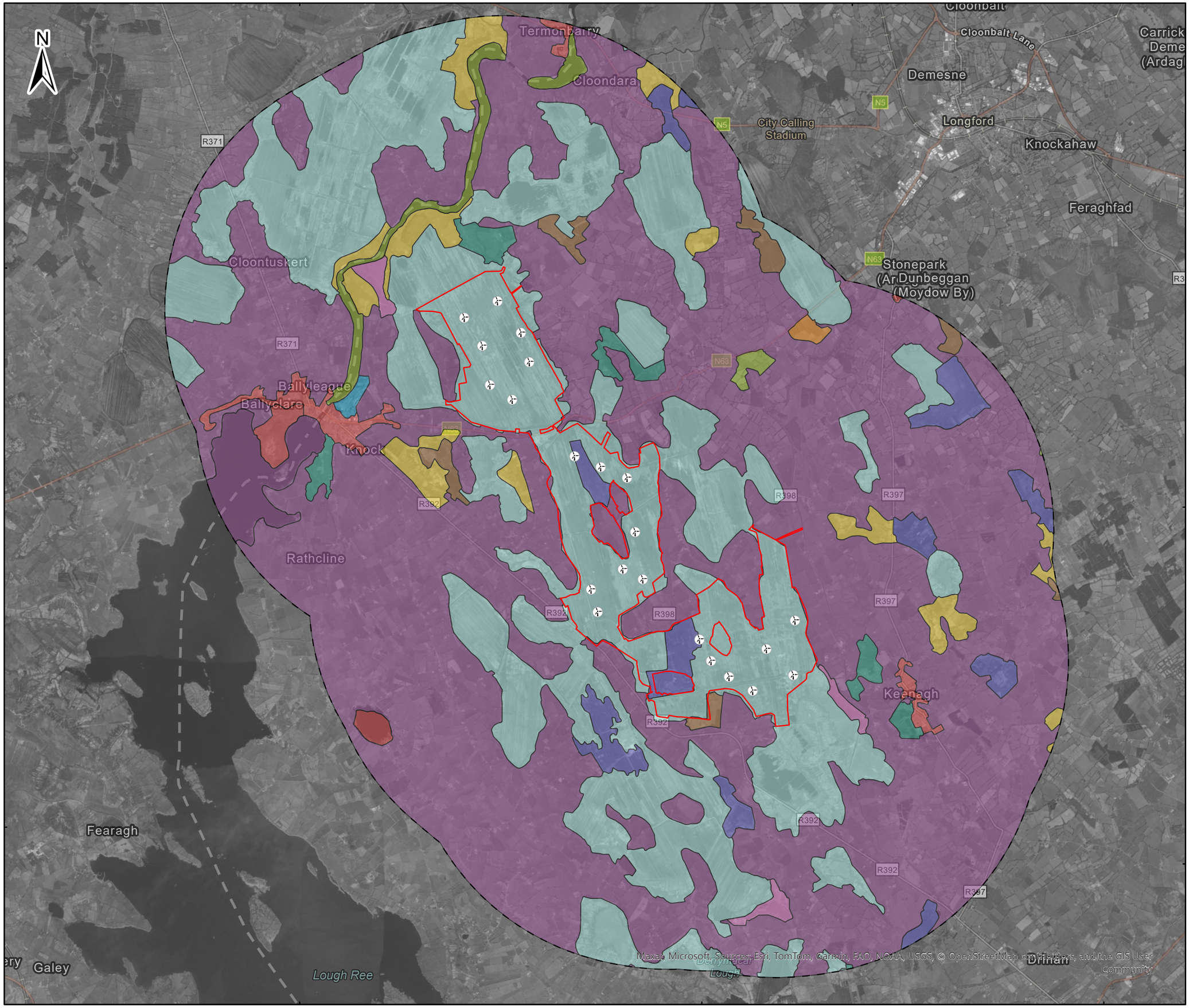
- *Mixed forest* [313] - Vegetation formation composed principally of trees, including shrub and bush understorey, where neither broad-leaved nor coniferous species predominate;
- *Water courses* [511] - Natural or artificial water-courses serving as water drainage channels. Includes canals. Minimum width for inclusion: 100 m;
- *Discontinuous urban fabric* [112] - The discontinuous urban fabric class is assigned when urban structures and transport networks associated with vegetated areas and bare surfaces are present and occupy significant surfaces in a discontinuous spatial pattern. The impermeable features like buildings, roads and artificially surfaced areas range from 30 to 80 % land coverage;
- *Coniferous forest* [312] - Vegetation formation composed principally of trees, including shrub and bush understorey, where coniferous species predominate;
- *Broad-leaved forest* [311] - Vegetation formation composed principally of trees, including shrub and bush understorey, where broad-leaved species predominate;
- *Inland marshes* [411] - Low-lying land usually flooded in winter, and with ground more or less saturated by fresh water all year round;
- *Non-irrigated arable land* [211] - Cultivated land parcels under rainfed agricultural use for annually harvested non-permanent crops, normally under a crop rotation system, including fallow lands within such crop rotation. Fields with sporadic sprinkler-irrigation with non-permanent devices to support dominant rainfed cultivation are included;
- *Complex cultivation patterns* [242] - Mosaic of small cultivated land parcels with different cultivation types - annual crops, pasture and/or permanent crops -, eventually with scattered houses or gardens;
- *Industrial or commercial units and public facilities* [121] - Buildings, other built-up structures and artificial surfaces (with concrete, asphalt, tarmacadam, or stabilised like e.g. beaten earth) occupy most of the area. It can also contain vegetation (most likely grass) or other non-sealed surfaces. This class is assigned for land units that are under industrial or commercial use or serve for public service facilities.

Table 8.17: Land Cover within 5km from the Proposed Wind Farm (adapted from Corine Land Cover 2018

Corine Code	Description	Area (ha)	% (within the 5km Zone)
231	Pastures	13,990	57.8%
412	Peat bogs	7,546	31.2%
243	Land principally occupied by agriculture with significant areas of natural vegetation	611	2.5%
324	Transitional woodland scrub	607	2.5%
512	Water bodies	324	1.3%
313	Mixed forests	238	1.0%
511	Stream courses	208	0.9%
112	Discontinuous urban fabric	198	0.8%
312	Coniferous forests	186	0.8%
311	Broad-leaved forests	105	0.4%

Corine Code	Description	Area (ha)	% (within the 5km Zone)
411	Inland marshes	104	0.4%
211	Non-irrigated arable land	35	0.1%
242	Complex cultivation patterns	27	0.1%
121	Industrial and commercial units	26	0.1%

8°0'0"W
7°50'0"W
53°42'0"N
53°36'0"N
774600
767500
760400
600000
608000
616000



Legend

- Proposed wind farm site boundary
- Turbine Layout
- Zone of Influence

CORINE Land Cover 2018

- 112 - Discontinuous urban fabric
- 121 - Industrial and commercial units
- 211 - Non-irrigated arable land
- 231 - Pastures
- 242 - Complex cultivation patterns
- 243 - Land principally occupied by agriculture with significant areas of natural vegetation
- 311 - Broad-leaved forests
- 312 - Coniferous forests
- 313 - Mixed forests
- 324 - Transitional woodland scrub
- 411 - Inland marshes
- 412 - Peat bogs
- 511 - Stream courses
- 512 - Water bodies

0 2 4
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	06/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd Wind Farm

Title: Figure 8-9
Corine Land Cover 2018 of the Proposed Wind Farm Site and Wider Landscape (5km)

Scale @ A3: 1:70,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	March 2025

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www.tobin.ie

Map Ref: 11399-121-CORINE-P.APP.BO-TOB-A

Draft: A

8.9.2.1.1.2 Assessment of Effects due to Direct Habitat Loss During the Construction Phase

The extents calculated in Table 7.33 (Chapter 7 - Biodiversity), concerning the habitats to be lost during the construction phase of the proposed development, are then compared with the habitat characterisation of the wider landscape described above, rendering the habitat loss' context on the local scale. This process provides a more accurate depiction of how ordinary, or rare, a given habitat is in the local environment, while allowing for better precision in the calculation of *Magnitude* as a variable in the assessment of the ornithological *Significance* of habitat loss. Thus, Table 8.18 includes the habitat loss extents calculated in Table 7.33, the correspondence with the Corine Land Cover 2018 habitat codes, and the proportions of such extents in the wider landscape for the calculation of the *Magnitude* variable.

Table 8.18: Habitat Loss During the Construction Phase of the Proposed Wind Farm, Corresponding Proportion in the Wider Landscape and Respective Magnitude (as per Percival, 2003)

Habitat	Loss Area	% of habitat loss within wind farm site	Corresponding Corine Code Table 8.17	Habitat occurrence within the 5 km Zone (%)	Magnitude
PB4 - Cutover bog	125.9ha	11.16%	412	**1.7%**	**Low**
WN7 - Bog woodland	52.5ha + 59.25ha*	26.4%	324 311	**7.4%**	**Medium**
FL8 - Other artificial lakes and ponds	5.6ha	7.10%	512	**1.7%**	**Low**
WS2 - Immature woodland	5.4ha + 1.42ha*	33.7%	324	**0.9%**	**Negligible**
WS1 - Scrub	4.9ha + 0.66ha*	15.27%	324	**0.8%**	**Negligible**
PB1 - Raised bog	2.0ha	3.84%	412	**<0.1%**	**Negligible**
GS3 - Dry-humid acid grassland	1.2ha	36.86%	231	**0.0%**	**Negligible**
WD4 - Conifer plantation	0.8ha	1.70%	312	**0.4%**	**Negligible**
WN2 - Oak-ash-hazel woodland	0.66ha*	48.3%	311	0.6%	Negligible
WD3 - (Mixed) conifer woodland	0.5ha	48.95%	312	**0.3%**	**Negligible**
GS2 - Dry meadows and grassy verges	0.5ha	78.42%	231	**<0.1%**	**Negligible**
HH1 - Dry siliceous heath	0.5ha	39.80%	231	**<0.1%**	**Negligible**
ED1 - Exposed sand, gravel or till	0.4ha	14.94%	112	**0.2%**	**Negligible**
WD2 - Mixed broadleaved/conifer woodland	0.4ha	60.04%	313	**0.2%**	**Negligible**
GS4 - Wet grassland	0.3ha	6.48%	411	**0.3%**	**Negligible**

Habitat	Loss Area	% of habitat loss within wind farm site	Corresponding Corine Code Table 8.17	Habitat occurrence within the 5 km Zone (%)	Magnitude
FS1 - Reed and large sedge swamps	0.2ha	0.71%	411	**0.2%**	**Negligible**
PF2 - Poor fen and flush	0.2ha	4.90%	411	**0.2%**	**Negligible**
GA2 - Amenity grassland (improved)	0.2ha	61.52%	231	**<0.1%**	**Negligible**
WN6 - Wet willow-alder-ash woodland	619m^2 + 1,300m^{2*}	5.36%	311 324	**<0.1%**	**Negligible**
BL2 - Earth banks	446m^2	7.40%	112	**<0.1%**	**Negligible**
WD1 - (Mixed) broadleaved woodland	442m^2	2.20%	311	**<0.1%**	**Negligible**
HD1 - Dense bracken	412m^2	1.23%	324	**<0.1%**	**Negligible**

* areas associated with Section 7.10.1 – Habitat Loss due to Mitigation Measures

The non-flight bird records collected during the Field Study were projected against the habitats to be lost during the Construction Phase of the proposed wind farm to inform on each species habitat use within these locations. However, considering the dynamic habitat profile at the site, and that the habitat surveys informing Chapter 7 – Biodiversity were undertaken under dry weather, it is likely that habitats like 'PB4 – Cutover bog' could be inundated at the time of the avian field study. Therefore, the results of the habitat surveys in Chapter 7 – Biodiversity were combined with the field identification of the dominant habitat of each KAR sighting to list the 'Relevant Habitats Used (% of use onsite) within the Area of Habitat Loss' (Table 8.19). This method is considered to provide a better estimate of the nature of habitats used by each KAR, along with the *Magnitude* of the effect of habitat loss during the Construction Phase of the proposed wind farm.

To this effect, along with the estimate of the *Magnitude* of the effect, assesses the *Significance* of the habitat loss effect. Moreover, it should also be noted that habitat fragmentation[11] is a relevant secondary effect on avian communities from habitat loss, and its potential effects are assessed in association with the habitat loss in Table 8.19.

[11] "the discontinuity, resulting from a given set of mechanisms, in the spatial distribution of resources and conditions present in an area at a given scale that affects occupancy, reproduction, or survival in a particular species (Franklin et al., 2002)

Table 8.19: Habitat Loss Assessment for each KAR

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td>Black-headed Gull</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Low</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Very low</td></tr></table></td><td>Black-headed Gull individuals were observed at the areas subject to habitat loss during the Construction of the proposed wind farm in three occasions over the Breeding Season 2022 (3 individuals), 2023 (6 individuals), and 2024 (6 individuals) – Ref. P01388, P04265, and P05334 in Appendix 8.3a. The individuals observed using the habitats at the site were using flooded areas of PB4 habitat (exhibiting ‘Probable’ breeding behaviour (alarm calling).
The loss of is habitat at the proposed wind farm represents an effect of Low Magnitude (Percival, 2003), considering the availability of this habitat in the local area (Table 8.17). This Magnitude combined with the Black-headed Gull Sensitivity (i.e. ‘Very Low’ – Table 8.16), results in a Very Low Significance (Percival, 2003) for the habitat loss effect for this species.
Considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Because the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat, which is this likely to reduce the ecological value of other PB4 habitat within the site, representing a synergistic Type of effect (EPA, 2022).</td></tr>
</table>

KAR within Area of Habitat Loss	Relevant Habitats Used within Area of Habitat Loss	Habitat Loss Effect		Description
		EPA (2022)	Percival (2003)	
Common Buzzard	FS1 - Reed and large sedge swamps PB4 - Cutover bog	*Quality*: Negative *Significance*: Slight *Extent and Context*: FS1 2.0ha (<0.1% within 5km); PB4 125.9ha (1.7% within 5km); WN7 111.75ha (7.4% within 5km) *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Medium *Significance*: Very low	Common Buzzard has been mostly observed hunting over the areas to be cleared during the Construction Phase of the proposed wind farm. The *Magnitude* of the habitat loss effect on Common Buzzard is derived from the loss of the most favoured habitat to be lost (WN7 – Bog Woodland), which is of Medium *Magnitude* (Percival, 2003) - Table 8.17. The Common Buzzard Low *Sensitivity* (Table 8.16) and the aforementioned *Magnitude* result in a Very Low *Significance* (Percival, 2003) of the habitat loss effect on this species. Considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development) the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Because the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the WN7, PB4 and FS1 habitats, which is this likely to reduce the ecological value of other habitats of similar nature within the site as hunting ground for Buzzard, and this effect is then considered a synergistic. *Type* of effect (EPA, 2022).
Common Gull	FL8 - Other artificial lakes and ponds	*Quality*: Negative *Significance*: Slight *Extent and Context*: 5.6ha (1.7% within 5km) *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Low *Significance*: Very low	Common Gull was sighted once over the areas associated with habitat loss during the Construction Phase of the proposed wind farm over the Breeding Season 2023, displaying 'Probable' breeding behaviour (Appendix 8.3f). Common Gull use of the proposed wind farm site over the field study was mostly concentrated in locations away from the areas subject to habitat loss during the Construction Phase of the proposed wind farm, in the Derryaroge and Lough Bannow bogs (Appendix 8.3f). The loss of is habitat at the proposed wind farm represents an effect of Low *Magnitude* (Percival, 2003), considering the

<table>
<tr><th>KAR within Area of Habitat Loss</th><th>Relevant Habitats Used within Area of Habitat Loss</th><th colspan="3">Habitat Loss Effect</th><th>Description</th></tr>
<tr><th></th><th></th><th colspan="2">EPA (2022)</th><th>Percival (2003)</th><th></th></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td><td>availability of this habitat in the local area (Table 8.17). This Magnitude combined with the Common Gull Sensitivity (i.e. ‘Low’ – Table 8.16), results in a Very Low Significance (Percival, 2003) for the habitat loss effect for this species.
Considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Because the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the FL8 habitat, which is this likely to reduce the ecological value of other FL8 habitat within the site for Common Gull, representing a synergistic Type of effect (EPA, 2022).</td></tr>
<tr><td>Common Kestrel</td><td>PB4 - Cutover bog

WN7 - Bog woodland</td><td colspan="2"><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="3">Extent and Context</td><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>WN7</td><td>111.75ha (7.4% within 5km)</td></tr>
<tr><td>WS1</td><td>5.56ha (0.8% within 5 km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table></td><td><table>
<tr><td>Sensitivity</td><td>Medium</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Low</td></tr>
</table></td><td>Common Kestrel has been observed hunting over the areas to be cleared during the Construction Phase of the proposed wind farm. Although some of the locations where Common Kestrel has been sighted have been classified as WN7 and WS1 as the primary habitat, the habitat it was reported as being used for hunting was PB4 (P01064, P01259, P01781, P02664, P02947, P04503, P04762, P06174, and P06477 - Appendix 8.3g).
The Magnitude of the habitat loss effect on Common Kestrel is derived from the loss of the most favoured habitat to be lost (PB4 – Cutover bog), which is of Low Magnitude (Percival, 2003) - Table 8.17The Common Kestrel Medium Sensitivity (Table 8.16) and the aforementioned Magnitude, result in a Low</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td>WS1 - Scrub</td><td></td><td></td><td>Significance (Percival, 2003) of the habitat loss effect on this species.
Considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Also, the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4habitat, which is likely to reduce the ecological value of other PB4 habitat within the site as hunting grounds for Common Kestrel, and this effect Type is then considered synergistic (EPA, 2022).</td></tr>
<tr><td>Common Ringed Plover</td><td>FL8 - Other artificial lakes and ponds</td><td><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="2">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
</table></td><td><table>
<tr><td>Sensitivity</td><td>Low</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Very low</td></tr>
</table></td><td>Common Ringed Plover individuals were observed at the areas subject to habitat loss during the Construction of the proposed wind farm, exhibiting foraging and breeding behaviour, including one ‘Confirmed’ (i.e. nest recorded during the breeding season 2022 - P00954, Appendix 8.3l). The individuals were mostly observed at habitats classified as PB4 at the time of the sightings (Appendix 8.3l), and the relevant habitats at these locations within the areas to be subject of habitat loss were classified as PB4 and FL8.
The loss of these habitats’ extents at the proposed wind farm represents an effect of Low Magnitude (Percival, 2003), considering the availability of these habitats within the site, and</td></tr>
</table>

KAR within Area of Habitat Loss	Relevant Habitats Used within Area of Habitat Loss	Habitat Loss Effect		Description
		EPA (2022)	Percival (2003)	
	PB4 - Cutover bog	*Type*: Synergistic		around the local area (Table 8.17). This *Magnitude* combined with the Common Ringed Plover *Sensitivity* (i.e. 'Low' – Table 8.16), would result in a Very Low *Significance* (Percival, 2003) for the habitat loss effect for this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). The habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 and FL8 habitats, which is this likely to reduce the value of other habitat of the same nature within the site, which would represent a synergistic *Type* of effect (EPA, 2022).
Common Snipe	FL8 - Other artificial lakes and ponds	*Quality*: Negative *Significance*: Slight *Extent and Context*: FL8 5.6ha (1.7% within 5km); PB4 125.9ha (1.7% within 5km) *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: Synergistic	*Sensitivity*: Medium *Magnitude*: Low *Significance*: **Low**	Although Common Snipe is a cryptic species, commonly under-represented in ornithology surveys, it has been recorded during the field study within the areas subject to habitat loss during the Construction Phase of the proposed wind farm. These observations have been mostly recorded as flushed birds within PB4 habitat, with four records classified as 'Probable' breeding behaviour (i.e. male drumming/display – P00955, P01450, P04074, and P06113 - Appendix 8.3o). The habitat classification for these locations during the habitat survey (Chapter 7 – Biodiversity) identified two types of relevant habitats for Common Snipe - FL8 and PB4. The loss of the extents of these habitats at the proposed wind farm represents an effect of Low *Magnitude* (Percival, 2003),

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td>PB4 - Cutover bog</td><td></td><td></td><td>considering the availability of these habitats within the site, and around the local area (Table 8.17). This Magnitude combined with the Common Snipe Sensitivity (i.e. 'Medium' – Table 8.16), result in a Low Significance (Percival, 2003) for the habitat loss effect for this species.
Furthermore, considering the habitats' extents to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
The habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 and FL8 habitats, which is this likely to reduce the value of other habitats of the same nature within the site, representing a synergistic Type of effect (EPA, 2022).</td></tr>
<tr><td>Eurasian Curlew</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Medium</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Low</td></tr></table></td><td>Eurasian Curlew was observed once during the field study within the areas to be subject of habitat loss during the Construction Phase of the proposed wind farm. This sighting was at the Lough Bannow bog, during the Breeding Season 2022 (likely a late migrant), where the individual was flushed from PB4 habitat during a transect survey (P01451 - Appendix 8.3s).
The loss of the extent of PB4 habitat at the proposed wind farm site represents an effect of Low Magnitude (Percival, 2003), considering the availability of this habitat within the site, and around the local area (Table 8.17). This Magnitude combined with the Eurasian Curlew Sensitivity (i.e. 'Medium' – Section 8.8.2.31), result in a Low Significance (Percival, 2003) for the habitat loss effect for this species.
Furthermore, considering the habitats' extents to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 –</td></tr>
</table>

<table>
<tr><th>KAR within Area of Habitat Loss</th><th>Relevant Habitats Used within Area of Habitat Loss</th><th colspan="3">Habitat Loss Effect</th><th>Description</th></tr>
<tr><th></th><th></th><th colspan="2">EPA (2022)</th><th>Percival (2003)</th><th></th></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td><td>Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
The habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4, which is this likely to affect the ecological value of other PB4 habitats within the site, representing a synergistic Type of effect (EPA, 2022).</td></tr>
<tr><td rowspan="2">Eurasian Sparrowhawk</td><td>PB4 - Cutover bog

WN7 - Bog woodland</td><td colspan="2"><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="3">Extent and Context</td><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>WN7</td><td>111.75ha (7.4% within 5km)</td></tr>
<tr><td>WS2</td><td>6.82ha (0.9% within 5 km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table></td><td><table>
<tr><td>Sensitivity</td><td>Low</td></tr>
<tr><td>Magnitude</td><td>Medium</td></tr>
<tr><td>Significance</td><td>Very low</td></tr>
</table></td><td>Eurasian Sparrowhawk has been observed hunting over the areas to be cleared during the Construction Phase of the proposed wind farm over the Breeding Seasons 2022 and 2023, and Non-breeding Season 2022/23 (P01554, P03597, P04560, and P04870 - Appendix 8.3u). The hunting activity of Eurasian Sparrowhawk was recorded over PB4, WN7 and WS2 habitats, as classified by the habitat survey informing Chapter 7 – Biodiversity.
The Magnitude of the habitat loss effect on Eurasian Sparrowhawk is derived from the loss of the most favoured habitat to be lost (WN7 – Bog Woodland), which is of Medium Magnitude (Percival, 2003) -Table 8.17. Eurasian Sparrowhawk Low Sensitivity (Table 8.16) and the aforementioned Magnitude result in a Very Low Significance (Percival, 2003) of the habitat loss effect on this species.
Considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td>WS2 - Immature woodland</td><td></td><td></td><td>development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Also, the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the WN7, PB4 and WS2 habitats, which is likely to reduce the ecological value of other habitats of similar nature within the site as hunting grounds for Eurasian Sparrowhawk, and this effect is then considered of synergistic Type (EPA, 2022).</td></tr>
<tr><td>Eurasian Teal</td><td>FL8 - Other artificial lakes and ponds
PB4 - Cutover bog
PF2 - Poor fen and flush</td><td>
<table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="3">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>PF2</td><td>0.2ha (0.2% within 5 km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table>
</td><td>
<table>
<tr><td>Sensitivity</td><td>Very High</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Medium</td></tr>
</table>
</td><td>Eurasian Teal occurred at locations subject to habitat loss during the Construction Phase of the proposed wind farm, with all observation being of flushed birds within wetlands (FL8, PF2 - P05166, P05647, P05819, P06249 and P06405), or flooded PB4 habitat (P01779 - Appendix 8.3v).
The loss of these habitats during the Construction Phase of the proposed wind farm represents an effect of Low to Negligible Magnitude (Percival, 2003), considering the availability of these habitats in proximity of the proposed wind farm (Table 8.17). This Magnitude range combined with the Eurasian Teal Sensitivity (i.e. 'Very High' – Table 8.16), results in a Medium Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. ,30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4, FL8, and PF2 habitats onsite, this effect is considered of synergistic Type (EPA, 2022), as this</td></tr>
</table>

<table>
<tr><th>KAR within Area of Habitat Loss</th><th>Relevant Habitats Used within Area of Habitat Loss</th><th colspan="3">Habitat Loss Effect</th><th>Description</th></tr>
<tr><th></th><th></th><th colspan="2">EPA (2022)</th><th>Percival (2003)</th><th></th></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td><td>fragmentation is likely to reduce the ecological value of other habitats of similar nature within the site to Eurasian Teal.</td></tr>
<tr><td>Eurasian Woodcock</td><td>FL8 - Other artificial lakes and ponds

PB4 - Cutover bog</td><td colspan="2"><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Imperceptible</td></tr>
<tr><td rowspan="3">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>WS1</td><td>5.56ha (0.8% within 5 km)</td></tr>
<tr><td>Probability</td><td colspan="2">Unlikely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">-</td></tr>
</table></td><td><table>
<tr><td>Sensitivity</td><td>Medium</td></tr>
<tr><td>Magnitude</td><td>Negligible</td></tr>
<tr><td>Significance</td><td>Very low</td></tr>
</table></td><td>Eurasian Woodcock was observed at locations subject to habitat loss during the Construction Phase of the proposed wind farm. With the exception one sighting during the Non-breeding Season 2022/23 at the Derryaroge bog (P03999), all records were collected near ‘Woodcock T3’, near woodland habitat at Lough Bannow bog (P00029, P00030, P00045, P00046, P00882, P00883, P00898, and P00899 - Appendix 8.3y).
Although these records are located within areas subject to vegetation clearance during the Construction Phase of the proposed wind farm, the woodland habitats bounding ‘Woodcock T3’ (the species favoured habitat type - Gilbert et al., 2011) will not be cleared. Therefore, the effect of habitat loss on Eurasian Woodcock is classified as of Unlikely Probability (EPA, 2022). To assure consistency with the methodology described in Section 8.7.3, the other effect descriptors are also determined, as much as possible. Thus, the Magnitude (Percival, 2003) of habitat loss to Eurasian Woodcock is Negligible, which, combined with the Medium Sensitivity of the species (Section 8.8.2.31), determines a Very Low Significance (Percival, 2003) for the unlikely habitat loss effects on Eurasian Woodcock.</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td>WS1 - Scrub</td><td></td><td></td><td>Although the habitats to be lost will not include favoured habitats for Eurasian Woodcock (which determines the Imperceptible Significance (EPA, 2022) classification), the habitat loss occurring within the neighbouring habitats will be effective for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development), which would represent an effect of Long -term Duration, Constant Frequency, and Negative Quality Significance (EPA, 2022).
Considering the unlikely probability for the habitat loss effect on Eurasian Woodcock, there is no suitable effect typology prescribed by the EPA (2022).</td></tr>
<tr><td>European Golden Plover</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Medium</td></tr></table></td><td>European Golden Plover occurred at locations subject to habitat loss during the Construction Phase of the proposed wind farm over the Non-breeding Seasons 2022/23, and 2023/24., Most of these observations refer to flocks (flock sizes ranging from 6 to 195 individuals) of European Golden Plover roosting at PB4 (P01842, P02946, P03106, P03838, P06266, P06420, and P06543 - Appendix 8.3z).
The loss of this habitat extent during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (Percival, 2003), considering the availability of this habitat within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the European Golden Plover Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Medium Significance (Percival, 2003) for the habitat loss effect on this species.
Considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration,</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Also, considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type, as this fragmentation is likely to reduce the value of other habitats of similar nature within the site to roosting European Golden Plover (EPA, 2022).</td></tr>
<tr><td>Great Cormorant</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Low</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Very low</td></tr></table></td><td>Great Cormorant was observed at the areas subject to habitat loss during the Construction Phase of the proposed wind farm while foraging over PB4 habitat at the Derryaroge bog, during the Breeding Season 2023 (P04081, P04239, and P04469 - Appendix 8.3cc).
The loss of this habitat represents an effect of Low Magnitude (Percival, 2003) to Great Cormorant, considering the availability of this habitat within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Great Cormorant Sensitivity (i.e. ‘Low’ – Table 8.16), results in a Very Low Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. ,30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the foraging value of other habitats of similar nature within the site for Great Cormorant.</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td>Lesser Black-backed Gull</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Low</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Very low</td></tr></table></td><td>Lesser Black-backed Gull was observed at the areas subject to habitat loss during the Construction Phase of the proposed wind farm over the Breeding Season 2021, 2022 and 2023 (P00102, P00205, P00209, P00213, P01022, P01234, P01268, P01389, P01416, P01651, P01752, and P04567 - Appendix 8.3jj), during CBS surveys (Section 8.6.2.3). P01234 and P04567 records represent flocks of seven and eight individuals, respectively, roosting at PB4 habitat and bounding wetland habitat at the Derryadd bog. No breeding activity was noted for any of these records of Lesser Black-backed Gull.
The loss of this habitat represents an effect of Low Magnitude (Percival, 2003) to Lesser Black-backed Gull, considering the availability of this habitat within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Lesser Black-backed Gull Sensitivity (i.e. 'Low' – Table 8.16), results in a Very Low Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the roosting value of other habitats of similar nature within the site for Lesser Black-backed Gull.</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td rowspan="2">Little Egret</td><td>FL8 - Other artificial lakes and ponds</td><td rowspan="2"><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="2">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table></td><td rowspan="2"><table>
<tr><td>Sensitivity</td><td>Medium</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Low</td></tr>
</table></td><td rowspan="2">Little Egret was observed foraging at the areas subject to habitat loss during the Construction Phase of the proposed wind farm over all the Breeding Seasons in the field study (2021, 2022, 2023, and 2024), and in one single instance during the Non-breeding Season 2023. These records were mostly located within the Derryaroge (P01258, P01267, P01275, P04082, P04471, P04597, P05391, P05788, P05817, and P06252), and Derryadd bogs (P00105, P00108, P00110, P00212, P00214, and P06133), with one single record in Lough Bannow bog (P04682) - Appendix 8.3jj.
The loss of this habitat represents an effect of Low Magnitude (Percival, 2003) to Little Egret, considering the availability of this habitat within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Little Egret Sensitivity (i.e. ‘Medium’ – Table 8.16), results in a Low Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. ,30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the foraging value of other habitats of similar nature within the site for Little Egret.</td></tr>
<tr><td>PB4 - Cutover bog</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td rowspan="3">Little Grebe</td><td>FL8 - Other artificial lakes and ponds</td><td rowspan="3"><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="3">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>PF2</td><td>0.2ha (0.2% within 5 km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table></td><td rowspan="3"><table>
<tr><td>Sensitivity</td><td>Very High</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Medium</td></tr>
</table></td><td rowspan="3">Little Grebe was observed at the areas subject to habitat loss during the Construction Phase of the proposed wind farm over the Breeding Seasons 2022, 2023 and 2024, and the Non-breeding Season 2023/24. All observations were of individuals or pairs (no ‘Probable’ or ‘Confirmed’ breeding recorded) using FL8 habitat, or flooded areas over PB4 habitat, to feed (P01024, P01452, P04599, P05025, P05191, P05360, P06254, P06407, P06414, and P06522 - Appendix 8.3II).
The loss of these habitats represents an effect of Low Magnitude (Percival, 2003) to Little Grebe, considering the availability of these habitats within and in proximity of the proposed wind farm (Table 8.17. This Magnitude, combined with the Little Grebe Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Medium Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development), the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Since the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the FL8, PB4, and PF2 habitats onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce feeding value of other habitats of similar nature within the site for Little Grebe.</td></tr>
<tr><td>PB4 - Cutover bog</td></tr>
<tr><td>PF2 - Poor fen and flush</td></tr>
</table>

<table>
<tr><th>KAR within Area of Habitat Loss</th><th>Relevant Habitats Used within Area of Habitat Loss</th><th colspan="3">Habitat Loss Effect</th><th>Description</th></tr>
<tr><th></th><th></th><th colspan="2">EPA (2022)</th><th>Percival (2003)</th><th></th></tr>
<tr><td rowspan="2">Mallard</td><td>FL8 - Other artificial lakes and ponds</td><td rowspan="2"><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="3">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>PF2</td><td>0.2ha (0.2% within 5 km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table></td><td rowspan="2"><table>
<tr><td>Sensitivity</td><td>Very High</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Medium</td></tr>
</table></td><td rowspan="2">Mallard was observed at the areas subject to habitat loss during the Construction Phase of the proposed wind farm over all Breeding Seasons within the Field Study, as well as the Non-breeding Season 2022/23 and 2023/24. The largest flocks within these records were recorded at Lough Bannow bog by the end of the Breeding Season 2022 (21 individuals - P01778, Appendix 8.3nn), and the beginning of the Non-breeding Season 2022/23 (42, and 22 individuals at P01829, and P02663, respectively - Appendix 8.3nn). The other records within the areas for habitat loss were of five individuals or less, occupying wetland (FL8 and PF2) and PB4, distributed along Derryaroge (P04220, P04470, P04595, and P04604), Derryadd (P00101, P00104, P00207, P00208, P00210, and P06523), and Lough Bannow bogs (P00011, P04433, P04683, P04768, P05006, P05022, P05694, P06103, P06247, P06412, , and P06542 - Appendix 8.3nn). ‘Probable’ breeding activity was recorded in two of these sighting, one in the Derryaroge bog (P04595), and the other at Lough Bannow bog (P05022).
The loss of these habitats represents an effect of Low Magnitude (Percival, 2003) to Mallard, considering the availability of these habitats within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Mallard Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Medium Significance (Percival, 2003) for the habitat loss</td></tr>
<tr><td>PB4 - Cutover bog</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td>PF2 - Poor fen and flush</td><td></td><td></td><td>effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development), the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Since the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the FL8, PB4, and PF2 habitats onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce foraging value of other habitats of similar nature within the site for Mallard.</td></tr>
<tr><td>Meadow Pipit</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Medium</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Low</td></tr></table></td><td>Although commonly under-represented in wind farm pre-construction ornithological surveys, Meadow Pipit has been often recorded at the areas subject to habitat loss within the proposed wind farm site during all Breeding Seasons from 2022 to 2024, along Derryaroge (P00919, P01269, P01276, P01543, P04761, and P05390 - Appendix 8.3oo), Derryadd (P01030, P01253, P01387, P01390, P01414, P01415, P01421, P01507, P01753, P04535, P04561, P04879, P05363, P05512, P05514, P05553, P05633, P05803, and P05844 - Appendix 8.3oo), and Lough Bannow Bogs (P01021, P04128, P04137, P04767, P05007, P05502, P05821, P05823, P06099, P06101, and P06114 - Appendix 8.3oo). Most of these records were of flushed birds in PB4 habitat, but there were two of these records of ‘Confirmed’ (P00919, and P01253) and three of ‘Probable’ breeding activity (P04561, P05007, and P06101), also within PB4 habitat.
The loss of this habitat represents an effect of Low Magnitude (Percival, 2003) to Meadow Pipit, considering the availability of this habitat within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Meadow Pipit</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Sensitivity (i.e. ‘Medium’ – Table 8.16), results in a Low Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long-term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Since the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the foraging and breeding/nesting value of other habitats of similar nature within the site for Meadow Pipit.</td></tr>
<tr><td>Mute Swan</td><td>FS1 - Reed and large sedge swamps</td><td><table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="2">Extent and Context</td><td>FS1</td><td>2.0ha (<0.1% within 5km</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table></td><td><table>
<tr><td>Sensitivity</td><td>Low</td></tr>
<tr><td>Magnitude</td><td>Negligible</td></tr>
<tr><td>Significance</td><td>Very low</td></tr>
</table></td><td>Mute Swan was observed mostly foraging at the areas subject to habitat loss during the Construction Phase of the proposed wind farm over the Breeding Season 2023, and Non-breeding Season 2022/23, within Derryadd and Lough Bannow bogs. These sightings were of Mute Swan in groups of two or three individuals, foraging over wetland areas (some over flooded PB4) - P01859, P02914, P03645, P04079, and P04603, in Appendix 8.3qq.
Although there was an ample number of sightings of Mute Swan at the site using alternative locations with similar habitats than those that will be affected by the Construction Phase of the proposed wind farm (Appendix 8.3qq), the loss of these habitats represents an effect of Negligible Magnitude (Percival, 2003) to</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td>PB4 - Cutover bog</td><td></td><td></td><td>Mute Swan, also considering the availability of these habitats in proximity of the proposed wind farm (Table 8.17). This Magnitude combined with Mute Swan Sensitivity (i.e. ‘Low’ – Section 8.8.2.31), results in a Very Low Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development), the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the FS1 and PB4 habitats, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the foraging, roosting, and breeding value of other habitats of similar nature within the site to Mute Swan.</td></tr>
<tr><td>Northern Lapwing</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Medium</td></tr></table></td><td>Northern Lapwing was observed at the areas subject to habitat loss during the Construction Phase of the proposed wind farm over all Breeding Seasons within the Field Study, as well as the Non-breeding Season 2022/23 and 2023/24. The largest flock within these records was recorded at Derryaroge bog during the Breeding Season 2024 (10 individuals - P05544, Appendix 8.3qq), with the other sightings being of six individuals or less (P00004, P00043, P00098, P00100, P00103, P00107, P00109, P00202, P00204, P00206, P00211, P00215, P00857, P00896, P01266, P01449, P03816, P04264, P04468, P04534, P04536, P04679, P05005, P05158, P05165, P05213, P05333, and P06085 - Appendix 8.3qq). All of these records refer to birds using PB4 habitat, with eight sightings of ‘Confirmed’ breeding (P00040, P00042, P00893, P00895, P00957, P01037, P01537,</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td></td><td>P04555) and 51 records of ‘Probable’ breeding at the proposed wind farm site (Appendix 8.3rr).
The loss of this habitats represents an effect of Low Magnitude (Percival, 2003) to Northern Lapwing, considering the availability of this habitats within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Northern Lapwing Sensitivity (i.e. ‘Very High’ – Section 8.8.2.31), results in a Medium Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development), the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Since the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce breeding value of other habitats of similar nature within the site for Northern Lapwing.</td></tr>
<tr><td>Northern Shoveler</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Medium</td></tr></table></td><td>There is one record of Northern Shoveler within the locations subject to habitat loss during the Construction Phase of the proposed wind farm over the Non-breeding Season 2022/23, while foraging over flooded PB4 habitat at the Derryaroge bog (2 individuals, P01856 - Appendix 8.3tt).
The loss of this habitat extent during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (Percival, 2003), considering the availability of this habitats within and in proximity of the proposed wind farm (Table 8.17. This Magnitude, combined with the Northern Shoveler Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Medium</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).
Also, considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the foraging value of other habitats of similar nature within the site to Northern Shoveler.</td></tr>
<tr><td>Peregrine Falcon</td><td>PB4 - Cutover bog</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>125.9ha (1.7% within 5km)</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Medium</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Low</td></tr></table></td><td>There is one record of Peregrine Falcon within the locations subject to habitat loss during the Construction Phase of the proposed wind farm over the end of the Breeding Season 2022, while hunting over PB4 habitat at the Derryaroge bog (P01780 - Appendix 8.3uu).
The loss of this habitat extent during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (Percival, 2003), considering the availability of this habitat within and in proximity of the proposed wind farm (Table 8.17). This Magnitude, combined with the Peregrine Falcon Sensitivity (i.e. ‘Medium’ – Table 8.16), results in a Low Significance (Percival, 2003) for the habitat loss effect on this species. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Slight Significance (EPA, 2022).</td></tr>
</table>

<table>
<tr><th rowspan="2">KAR within Area of Habitat Loss</th><th rowspan="2">Relevant Habitats Used within Area of Habitat Loss</th><th colspan="2">Habitat Loss Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Also, considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 habitat onsite, this effect is considered of synergistic Type (EPA, 2022), as this fragmentation is likely to reduce the hunting value of other habitats of similar nature within the site to Peregrine Falcon.</td></tr>
<tr><td>Whooper Swan</td><td>FL8 - Other artificial lakes and ponds</td><td>
<table>
<tr><td>Quality</td><td colspan="2">Negative</td></tr>
<tr><td>Significance</td><td colspan="2">Slight</td></tr>
<tr><td rowspan="2">Extent and Context</td><td>FL8</td><td>5.6ha (1.7% within 5km)</td></tr>
<tr><td>PB4</td><td>125.9ha (1.7% within 5km)</td></tr>
<tr><td>Probability</td><td colspan="2">Likely</td></tr>
<tr><td>Duration and Frequency</td><td colspan="2">Long -term; constantly</td></tr>
<tr><td>Type</td><td colspan="2">Synergistic</td></tr>
</table>
</td><td>
<table>
<tr><td>Sensitivity</td><td>Very High</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Significance</td><td>Medium</td></tr>
</table>
</td><td>Whooper Swan occurred at locations subject to habitat loss during the Construction Phase of the proposed wind farm during the Non-breeding Seasons 2022/23, and 2023/24, over the Derryaroge (peak flock size: 35; P03954, P04024, P04025, P04068, P04069, P04070, P05894, P06348, and P06521 - Appendix 8.3bbb), Derryadd (peak flock size: 50; P01845, P02913, P03158, P03171, and P05882 - Appendix 8.3bbb), and Lough Bannow bogs (flock size: 4; P03837 - Appendix 8.3bbb). These sightings were of individuals roosting in the vicinity of wetland habitats (e,g. vegetated PB4 – peak flock size: 50; P01845, P02913, P03158, P03171, P03837, P03954, P04024), and/or foraging on FL8 and flooded PB4 habitats (P01845, P02913, P03837, P05882, and P06521), and foraging on the wetlands.
The loss of these habitats during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (Percival, 2003), considering the availability of these habitats</td></tr>
</table>

KAR within Area of Habitat Loss	Relevant Habitats Used within Area of Habitat Loss	Habitat Loss Effect		Description
		EPA (2022)	Percival (2003)	
	PB4 - Cutover bog			within, and in proximity of the proposed wind farm (Table 8.17). This *Magnitude* combined with the Whooper Swan *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Medium *Significance* (Percival, 2003) for the habitat loss effect on Whooper Swan. Furthermore, considering the habitats to be lost will be mostly replaced by infrastructure for the duration of the proposed wind farm lifespan (i.e. ,30 years – Chapter 3 – Description of the proposed development) the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Considering the fact that the habitat loss to accommodate for the construction of the infrastructure of the proposed wind farm fragments the PB4 and FL8 habitats, this effect is considered of synergistic *Type* (EPA, 2022), as this fragmentation is likely to reduce the foraging and roosting value of other habitats of similar nature within the site to Whooper Swan.

8.9.2.1.1.3 Conclusion on the Assessment of Effects due to Direct Habitat Loss

The assessment of the *Significance* of habitat loss effects on KAR determines whether an anticipated effect is acceptable. It is classified as (Percival, 2003):

- **Very Low** or **Low** Significance: "*should not normally be of concern, though normal design care should be exercised to minimise impacts*";
- **Medium** Significance: "*represents a potentially significant impact that requires careful individual assessment. Such an impact could warrant planning refusal, but it may be of a scale that can be resolved by revised design or appropriate mitigation*"; and
- **High** and **Very High** Significance: "*represent a highly significant impact on bird populations and would warrant refusal of a planning proposal*".

From the assessment above, seven KARs are appraised has potentially being affected with Medium *Significance* by the habitat loss associated with the proposed wind farm, for which appropriate mitigation should be applied to reduce this *Significance*:

- Eurasian Teal;
- European Golden Plover;
- Little Grebe;
- Mallard;
- Northern Lapwing;
- Northern Shoveler; and
- Whooper Swan.

8.9.2.1.2 Water Quality Effects

Chapter 7 (Biodiversity) includes an assessment of the proposed development on water quality, specifically Section 7.11.2.1.3.1.2 appraises the potential effects due to siltation, contaminants (including hydrocarbons, concrete washout and bentonite) and dust during the construction phase as being significant.

8.9.2.1.2.1 Siltation

The construction phase of the proposed development construction of drainage which might appear capable of generating a higher sediment release than the drainage system settling capacity. However, the efficiency of this water management network that is operational at the proposed wind farm site (e.g. drains, water pumps, settlement ponds, regular monitoring and maintenance), which has been designed by Bord na Móna and EPA to be able to accommodate the settlement of sediment generated by peat extraction activities throughout the whole site, is demonstrable by the fact that no exceedances to the SS limit have been reported over 12 years. During this period, the number of sources and amounts of sediment generated during the excavations for peat extraction (excavations were made, potentially, across the whole site) would be likely higher than the amount of sediment generated during the construction phase of the proposed development. Therefore, it can be confidently concluded that the existing drainage system, in particular the settlement ponds, is sufficient to retain the discrete amounts of sediment/silt generated during the Construction Phase.

8.9.2.1.2.2 Contaminants

During the construction phase of the proposed development there are multiple activities outlined in Chapter 3 (Description of Proposed Development) that present a risk of contaminant release to nearby water bodies. These include:

- Refuelling at the Construction Compounds;
- Storage of contaminants at the Construction Compounds (e.g. hydrocarbons);
- Refuelling with mobile bowser;
- Machinery and vehicle movement;
- Use of bentonite in drilling or trenchless installation activities; and
- Concrete washout and handling during turbine base construction and civil works

As verified during the field study, several protected bird species profusely use wetland habitats (permanent and temporary) within the proposed wind farm site. Any of the effects on water quality could, then, affect the quality of these wetland habitats, reducing their value as a habitat resource for birds, which would effectively represent habitat loss for these species.

The use of mobile bowsers and onsite fuel storage poses a risk of hydrocarbon spills at unconfined or sensitive locations, potentially leading to contamination of surface water features. Likewise, improper handling or containment of bentonite slurry, a common lubricant and support fluid in drilling operations, can result in suspended solids entering nearby streams or wetlands, increasing turbidity and reducing oxygen levels, which may impair aquatic life.

Additionally, if concrete washout is not managed in a designated, lined area, alkaline runoff rich in lime and other caustic substances may leach into the surrounding soils or watercourses. Such discharges can significantly affects pH levels.

These contaminants, particularly hydrocarbons, bentonite fines, and alkaline concrete washout, can have acute and chronic effects on aquatic species. Hydrocarbons are known to be bioavailable and can bioaccumulate in organisms (Sekhar et al., 2003; Li et al., 2009), while their persistence in sediments can prolong exposure (McGrath et al., 2019; Wu et al., 2019). Such degradation of aquatic and wetland reducing prey availability. thereby indirectly impacting bird species that depend on these food resources. Without adequate mitigation, these pollutants could compromise the ecological integrity of receiving waters and associated avian habitats.

Therefore, the potential contamination effects during the construction phase of the proposed development are appraised as significant and long-term. Adverse impacts on water quality could, in turn, degrade the condition of associated wetland habitats.

Table 8.20: Description of Potential Contamination Effects on the Wetland Habitat during the Construction Phase

KER	Descriptor	Effect
Wetland Habitat (Contamination)	***Quality of Effects***	Negative
	Significance	Significant
	Extent and Context	Hydrological Pathway
	Probability	Likely
	Duration	Long-term

8.9.2.1.3 Dust Effects

Construction activities such as excavation, earthworks, vehicle movement, and the development of access and amenity tracks can generate quantities of airborne dust, especially during dry weather conditions. The creation and use of these tracks, including the movement of construction machinery and increased human activity, may disturb surface soils and result in dust dispersion beyond the immediate work areas.

If unmanaged, dust generated during construction can settle on surrounding vegetation, soil surfaces, and water bodies, leading to localised contamination. This may indirectly affect bird species by degrading the quality of foraging habitats, particularly in sensitive ecosystems such as bogs, heathlands, wetlands, and semi-natural grasslands. Additionally, effects to vegetation may affect nesting or sheltering opportunities for ground-nesting and wetland-associated bird species. Furthermore, elevated dust levels can degrade habitat quality for ground-nesting birds.

Table 8.21: Description of Potential Dust Effects on the Biodiversity during the Construction Phase

KER	Descriptor	Effect
Terrestrial and Aquatic Habitats (Dust Effects)	***Quality of Effects***	Negative
	Significance	Significant
	Extent and Context	Localised airborne pathways
	Probability	Likely
	Duration	Medium-term

8.9.2.1.4 Disturbance/Displacement Effects

Birds often respond to human presence or related activities, such as noise, vibration, or movement, by moving away, a behaviour known as disturbance or displacement. This can negatively impact feeding success, reduce usable habitat, lower reproduction and survival rates,

and increase vulnerability to predators (BES, 2020). Such effects are commonly observed during the construction phase of wind farms, with bird densities declining at varying distances from disturbance sources. The extent of impact depends on factors including species sensitivity, time of year, and the size of the construction area or wind farm (Pearce-Higgins et al., 2012).

8.9.2.1.4.1 Assessment of Disturbance/Displacement Effects During the Construction Phase

The minimum distance at which humans should be separated from wildlife to avoid disturbance/displacement effects is defined as 'Minimum Approach Distance' (MAD), and is the distance metric used in this Section to assess disturbance effects[12]. Goodship and Furness (2022), BES (2020), and Ruddock and Whitfield (2007), published important reviews to establish indicative MAD for some species in each season (Table 8.20) This distance metric is the basis of the approach followed herein for the assessment of disturbance/displacement effects during the Construction Phase of the proposed wind farm. The first step in this approach is the delineation of three areas as illustrated in the diagram in Figure 8.10:

1) A buffer from the areas associated with the construction of infrastructure – represents the potentially unusable areas/habitats for each relevant species, due to disturbance;
2) A buffer from the relevant non-flight observations of each KAR (birds in flight were not considered to be significantly disturbed by the Construction Phase works);
3) The intersection of Buffer 1) and Buffer 2) - represents the area whose use could be interrupted by means of disturbance/displacement during the Construction Phase of the proposed wind farm.

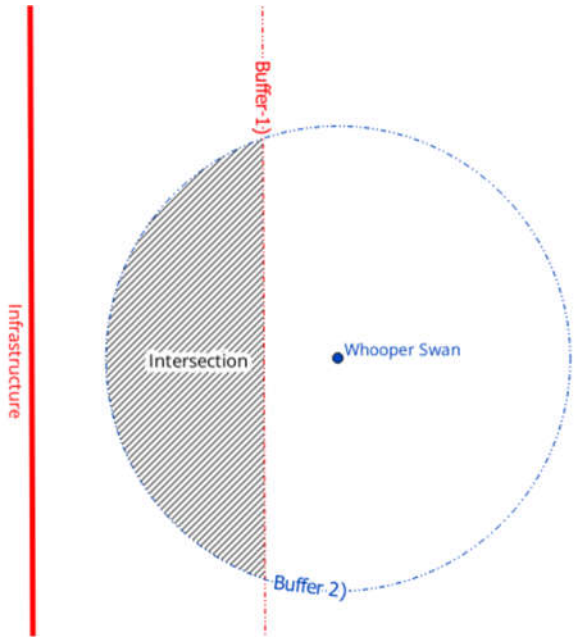

Figure 8.10: Illustration Representative of Disturbance/Displacement Assessment Approach (Whooper Swan used as an example)

[12] There are other distance metrics used in scientific literature to assess disturbance: 'Flight Initiation Distance' (FID) – distance at which a bird moves away from a source of human disturbance; 'Alert Distance' (AD) - the distance at which a bird or group of birds starts to show alert behaviour; 'Flight Initiation Distance' (FID) - the distance at which a bird or group of birds starts to escape (Goodship and Furness, 2022)

The extent of each habitat within the areas formed by the Intersection (Figure 8.10), for each of the Breeding and Non-breeding Seasons, was calculated (based on the results of the habitat surveys – Chapter 7 – Biodiversity), and which form the basis for the determination of the Extent (EPA, 2022) and *Magnitude* (Percival, 2003) of the disturbance/displacement effect. However, if displacement occurs in an area where there is abundant alternative habitat to easily accommodate the disturbed/displaced birds, the effect may actually be inconsequential (Percival, 2003). Therefore, to estimate the availability of habitats of similar nature and extent than the habitats that will be effectively unusable by these species due to disturbance/displacement effects for the duration of the Construction Phase of the proposed development (approximately 24 months) – the habitats within Buffer 3)/Intersection - the habitats' occurrence within 5km from the proposed wind farm site boundary was estimated (as suggested by Percival, 2003) (with the use of the Corine 2018 dataset, as described in Section 8.7.4.2).

The extents of areas 1) and 2) are defined by a scoping process. The scoping process consisted, in a first instance, on the selection of important locations for KARs based on the findings of the field study, i.e. only KARs recorded within the proposed wind farm site are included. These important locations include: a) locations where 'Confirmed' and 'Probable' breeding behaviour was identified; b) locations used during the non-breeding season (mostly for waterbirds).

Following these considerations, and because there are species whose MADs have not been included in the reviewed literature, indicative MADs for these species are defined based on the MAD values for ecologically approximately similar species, such as:

- Mute Swan ⇔ Whooper Swan;
- Northern Lapwing ⇔ European Golden Plover;
- Eurasian Sparrowhawk ⇔ Common Kestrel; and
- Eurasian Woodcock ⇔ Common Snipe.

The MADs used for the definition of the extents for Buffers 1) and 2) are presented in Table 8.22.

Table 8.22: Indicative MADs for Scoped KARs

KAR	Breeding Season indicative MAD*	Non-breeding Season indicative MAD	Source
Whooper Swan	-	600m	Goodship and Furness (2022)
Mallard	100m	100m	Goodship and Furness (2022)
Eurasian Wigeon	-	500m	Goodship and Furness (2022)
Eurasian Teal	-	500m	BES (2020)
Mute Swan	600m	600m	Goodship and Furness (2022)
Northern Shoveler	-	200m	Goodship and Furness (2022)
European Golden Plover	-	500m	Goodship and Furness (2022)
Northern Lapwing	500m	500m	Goodship and Furness (2022)
Common Ringed Plover	200m	300m	Goodship and Furness (2022)
Lesser Black-backed Gull	-	200m	BES (2020)
Black-headed Gull	750m	200m	BES (2020)
Common Gull	750m	200m	BES (2020)
Common Snipe	400m	-	BES (2020)

KAR	Breeding Season indicative MAD*	Non-breeding Season indicative MAD	Source
Eurasian Curlew	-	650m	Goodship and Furness (2022)
Eurasian Woodcock	400m	400m	BES (2020)
Little Grebe	200m	200m	BES (2020)
Common Buzzard	200m	200m	Goodship and Furness (2022)
Eurasian Sparrowhawk	-	50m	
Hen Harrier	-	750m	Goodship and Furness (2022)
Common Kestrel	200m	50m	Goodship and Furness (2022)
Peregrine Falcon	-	200m	Goodship and Furness (2022)
Little Egret	-	200m	BES (2020)
Great Cormorant	-	200m	BES (2020)

*For KARs with no 'Confirmed' or 'Probable' breeding records, no MAD is suggested for the Breeding Season

The scoping process resulted in 12 KARs during the breeding season, and 20 KARs during the non-breeding season, being scoped-in for the assessment of disturbance/displacement effects during the duration of the Construction Phase of the proposed wind farm (approximately 24 months) - Table 8.24 and Table 8.25.

Passerine KARs are most markedly affected by disturbance during incubation over the Breeding Season (Kovařík *et al.*, 2009), particularly for ground-nesting species, such as Meadow Pipit, but there is limited literature on the study of disturbance distances for these species. Therefore, the assessment of disturbance effects on these species considered these effects to be of similar nature (and extent/*Magnitude*) than the effects of habitat loss, appraised in Section 8.9.2.1.1.

Table 8.23: Relevant Habitats' Extents for the Assessment of Displacement/Disturbance Effects

KAR	Relevant Habitat within Intersection Area	Area (ha)	% of Habitat within 5km	*Magnitude* (Percival, 2003)
Breeding Season				
Black-headed Gull	FL8 - Other artificial lakes and ponds	32.17	9.9%	Medium
	FS1 - Reed and large sedge swamps	23.34	22.4%	
	GS3 - Dry-humid acid grassland	1.94	<0.0%	
	GS1 - Dry calcareous and neutral grassland	0.13	<0.0%	
	GS4 - Wet grassland	5.98	5.8%	
	PB1 - Raised bog	8.14	0.1%	
	PB4 - Cutover bog	289.09	3.8%	
	PF1 - Rich fen and flush	1.23	1.2%	
	PF2 - Poor fen and flush	0.51	0.5%	
Common Buzzard	WN7 - Bog woodland	2.81	0.5%	Very low
Common Gull	FL8 - Other artificial lakes and ponds	46.06	14.2%	Medium
	FP1 - Calcareous springs	0.16	0.1%	
	FS1 - Reed and large sedge swamps	16.75	22.4%	
	GS1 - Dry calcareous and neutral grassland	0.13	<0.0%	
	GS3 - Dry-humid acid grassland	1.19	<0.0%	
	GS4 - Wet grassland	1.51	5.8%	

KAR	Relevant Habitat within Intersection Area	Area (ha)	% of Habitat within 5km	*Magnitude* (Percival, 2003)
	PB1 - Raised bog	2.76	0.1%	
	PB4 - Cutover bog	155.57	3.8%	
	PF1 - Rich fen and flush	1.07	1.2%	
Northern Lapwing	FL8 - Other artificial lakes and ponds	67.38	20.8%	Low
	FP1 - Calcareous springs	0.13	0.1%	
	FS1 - Reed and large sedge swamps	31.99	30.8%	
	FW4 - Drainage ditches	0.11	0.1%	
	GS1 - Dry calcareous and neutral grassland	0.13	<0.0%	
	GS3 - Dry-humid acid grassland	1.69	<0.0%	
	GS4 - Wet grassland	4.76	4.6%	
	PB1 - Raised bog	19.37	0.3%	
	PB4 - Cutover bog	586.55	7.8%	
	PF1 - Rich fen and flush	0.95	0.9%	
	PF2 - Poor fen and flush	1.64	1.6%	
Little Grebe	FL8 - Other artificial lakes and ponds	11.59	3.6%	Low
	FS1 - Reed and large sedge swamps	2.49	2.4%	
	PB1 - Raised bog	0.33	<0.0%	
	PB4 - Cutover bog	20.80	0.3%	
Mallard	FL8 - Other artificial lakes and ponds	1.06	0.3%	Negligible
	FS1 - Reed and large sedge swamps	0.68	0.7%	
	PB4 - Cutover bog	10.04	0.1%	
	PF2 - Poor fen and flush	0.15	0.1%	
Mute Swan	FL8 - Other artificial lakes and ponds	25.59	7.9%	Negligible
	GS3 - Dry-humid acid grassland	1.89	<0.0%	
	PB1 - Raised bog	0.54	<0.0%	
	PB4 - Cutover bog	90.54	1.2%	
	PF2 - Poor fen and flush	0.28	0.3%	
Common Ringed Plover	FL8 - Other artificial lakes and ponds	16.84	5.2%	Negligible
	FS1 - Reed and large sedge swamps	1.78	1.7%	
	GS3 - Dry-humid acid grassland	0.38	<0.0%	
	PB1 - Raised bog	0.24	<0.0%	
	PB4 - Cutover bog	95.99	1.3%	
	PF2 - Poor fen and flush	0.51	0.5%	
Common Snipe	FL8 - Other artificial lakes and ponds	30.16	9.3%	Low
	FS1 - Reed and large sedge swamps	18.49	17.8%	
	GS2 - Dry meadows and grassy verges	0.14	<0.0%	
	GS4 - Wet grassland	0.15	0.1%	
	PB1 - Raised bog	3.95	0.1%	
	PB4 - Cutover bog	221.63	2.9%	
	PF2 - Poor fen and flush	0.54	0.5%	
Eurasian Woodcock	WD1 - (Mixed) broadleaved woodland	0.21	0.2%	Negligible
	WD4 - Conifer plantation	19.89	10.7%	

KAR	Relevant Habitat within Intersection Area	Area (ha)	% of Habitat within 5km	*Magnitude* (Percival, 2003)
	WN7 - Bog woodland	15.34	2.5%	
	WS1 - Scrub	1.72	0.3%	
Non-breeding Season				
Black-headed Gull	FL8 - Other artificial lakes and ponds	2.31	0.7%	Negligible
	PB4 - Cutover bog	2.23	<0.0%	
Common Buzzard	FL8 - Other artificial lakes and ponds	1.33	0.4%	Negligible
	FS1 - Reed and large sedge swamps	2.87	2.8%	
	GS2 - Dry meadows and grassy verges	0.61	<0.0%	
	PB1 - Raised bog	1.54	<0.0%	
	PB4 - Cutover bog	65.19	0.9%	
	PF2 - Poor fen and flush	0.35	0.3%	
	WD1 - (Mixed) broadleaved woodland	0.29	0.3%	
	WN6 - Wet willow-alder-ash woodland	0.28	0.3%	
	WN7 - Bog woodland	20.08	3.3%	
	WS1 - Scrub	1.83	0.3%	
	WS2 - Immature woodland	1.24	0.2%	
Great Cormorant	FL8 - Other artificial lakes and ponds	5.02	1.6%	Negligible
	GS3 - Dry-humid acid grassland	0.34	<0.0%	
	PB4 - Cutover bog	15.72	0.2%	
Eurasian Curlew	PB4 - Cutover bog	8.41	0.1%	Negligible
Little Egret	FL8 - Other artificial lakes and ponds	11.57	3.6%	Low
	FS1 - Reed and large sedge swamps	3.27	3.1%	
	PB4 - Cutover bog	33.13	0.4%	
	PF2 - Poor fen and flush	0.24	0.2%	
European Golden Plover	FL8 - Other artificial lakes and ponds	40.61	12.5%	Negligible
	FS1 - Reed and large sedge swamps	14.02	13.5%	
	FW4 - Drainage ditches	0.11	0.1%	
	GS3 - Dry-humid acid grassland	1.48	<0.0%	
	GS4 - Wet grassland	1.94	1.9%	
	PB1 - Raised bog	7.69	0.1%	
	PB4 - Cutover bog	491.16	6.5%	
	PF2 - Poor fen and flush	0.97	0.9%	
Hen Harrier	FL8 - Other artificial lakes and ponds	1.59	0.5%	Negligible
	FS1 - Reed and large sedge swamps	1.69	1.6%	
	GS3 - Dry-humid acid grassland	0.65	<0.0%	
	GS4 - Wet grassland	1.91	1.8%	
	PB1 - Raised bog	1.28	<0.0%	
	PB4 - Cutover bog	187.67	2.5%	
	PF2 - Poor fen and flush	0.33	0.3%	
	WS1 - Scrub	7.56	1.2%	
Common Kestrel	PB1 - Raised bog	0.01	<0.0%	Negligible
	PB4 - Cutover bog	2.83	<0.0%	

KAR	Relevant Habitat within Intersection Area	Area (ha)	% of Habitat within 5km	*Magnitude* (Percival, 2003)
Northern Lapwing	FL8 - Other artificial lakes and ponds	44.06	13.6%	Low
	FS1 - Reed and large sedge swamps	13.73	13.2%	
	FW4 - Drainage ditches	0.11	0.1%	
	GS3 - Dry-humid acid grassland	1.48	<0.0%	
	GS4 - Wet grassland	2.12	2.0%	
	PB1 - Raised bog	1.92	<0.0%	
	PB4 - Cutover bog	277.82	3.7%	
	PF2 - Poor fen and flush	0.72	0.7%	
Lesser Black-backed Gull	FL8 - Other artificial lakes and ponds	5.72	1.8%	Low
	PB4 - Cutover bog	5.74	0.1%	
Little Grebe	FL8 - Other artificial lakes and ponds	14.96	4.6%	Low
	FS1 - Reed and large sedge swamps	6.37	6.1%	
	GS1 - Dry calcareous and neutral grassland	0.02	<0.0%	
	GS4 - Wet grassland	0.02	<0.0%	
	PB4 - Cutover bog	32.33	0.4%	
	PF1 - Rich fen and flush	0.08	0.1%	
Mallard	FL8 - Other artificial lakes and ponds	2.98	0.9%	Negligible
	FS1 - Reed and large sedge swamps	0.06	0.1%	
	PB1 - Raised bog	0.18	<0.0%	
	PB4 - Cutover bog	19.91	0.3%	
	PF2 - Poor fen and flush	0.46	0.4%	
Mute Swan	FL8 - Other artificial lakes and ponds	50.86	15.7%	Low
	FS1 - Reed and large sedge swamps	22.89	22.0%	
	FW4 - Drainage ditches	0.11	0.1%	
	GS3 - Dry-humid acid grassland	2.18	<0.0%	
	GS4 - Wet grassland	5.98	5.8%	
	PB1 - Raised bog	11.96	0.2%	
	PB4 - Cutover bog	456.20	6.0%	
	PF2 - Poor fen and flush	0.78	0.7%	
Common Ringed Plover	FL8 - Other artificial lakes and ponds	8.83	2.7%	Negligible
	GS3 - Dry-humid acid grassland	0.58	<0.0%	
	PB4 - Cutover bog	24.44	0.3%	
Eurasian Sparrowhawk	PB4 - Cutover bog	0.42	<0.0%	Negligible
	WN7 - Bog woodland	0.62	0.1%	
Northern Shoveler	FL8 - Other artificial lakes and ponds	0.19	0.1%	Negligible
	FS1 - Reed and large sedge swamps	1.48	1.4%	
	PB4 - Cutover bog	4.63	0.1%	
Eurasian Teal	FL8 - Other artificial lakes and ponds	27.35	8.4%	Low
	FS1 - Reed and large sedge swamps	23.67	22.8%	
	GS4 - Wet grassland	3.74	3.6%	
	PB1 - Raised bog	10.90	0.1%	
	PB4 - Cutover bog	197.14	2.6%	

KAR	Relevant Habitat within Intersection Area	Area (ha)	% of Habitat within 5km	*Magnitude* (Percival, 2003)
	PF2 - Poor fen and flush	0.91	0.9%	
	PF3 - Transition mire and quaking bog	2.27	2.2%	
Eurasian Woodcock	WN7 - Bog woodland	16.48	2.7%	Low
Eurasian Wigeon	FL8 - Other artificial lakes and ponds	4.44	1.4%	Low
	GS4 - Wet grassland	1.00	1.0%	
	PB1 - Raised bog	0.18	<0.0%	
	PB4 - Cutover bog	86.49	1.1%	
	PF2 - Poor fen and flush	0.28	0.3%	
Whooper Swan	FL8 - Other artificial lakes and ponds	71.97	22.2%	Low
	FS1 - Reed and large sedge swamps	26.60	25.6%	
	FW4 - Drainage ditches	0.28	0.1%	
	GS1 - Dry calcareous and neutral grassland	0.13	<0.0%	
	GS2 - Dry meadows and grassy verges	0.61	<0.0%	
	GS3 - Dry-humid acid grassland	1.91	<0.0%	
	GS4 - Wet grassland	7.29	7.0%	
	PB1 - Raised bog	29.59	0.4%	
	PB4 - Cutover bog	730.96	9.7%	
	PF1 - Rich fen and flush	1.07	1.0%	
	PF2 - Poor fen and flush	3.51	3.4%	

Table 8.24: Description of Displacement/Disturbance Effects during the Breeding Season

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
Black-headed Gull	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 502.29ha/363ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Medium *Significance*: Very low	The area associated with disturbance/displacement effects for Black-headed Gull over the Breeding Season occupies approximately 503ha (Appendix 8.4a), with approximately 363ha of relevant habitats for this KAR. Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Medium *Magnitude* (habitats FL8, FS1 and GS4 being the most relevant habitats for this classification - Table 8.23). This *Magnitude* combined with the Black-headed Gull *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* of effect (EPA, 2022).
Common Buzzard	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 12.6ha/2.8ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Very Low *Significance*: Very low	The area associated with disturbance/displacement effects for Common Buzzard over the Breeding Season occupies approximately 12.6ha (Appendix 8.4a), with approximately 2.8ha of relevant habitat for this KAR (WN7 habitat - Table 8.23). Considering the availability of this habitat within 5km from the proposed wind farm, the inaccessibility to this area due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Very Low *Magnitude* (Table 8.23). This *Magnitude* combined with the Common Buzzard *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022).

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
			Because the inaccessibility of this area during the Construction Phase of the proposed wind farm may fragment the accessibility to WN7 habitat, which is this likely to reduce their ecological value of other WN7 habitats within the site, this effect would be of a synergistic *Type* of effect (EPA, 2022).
Common Gull	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 333ha/226ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Medium *Significance*: Very low	The area associated with disturbance/displacement effects for Common Gull over the Breeding Season occupies approximately 333ha (Appendix 8.4a), with approximately 226ha of relevant habitats for this KAR. Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Medium Magnitude (habitats FL8, FS1 and GS4 being the most relevant habitats for this classification - Table 8.23). This Magnitude combined with the Common Gull Sensitivity (i.e. 'Low' – Table 8.16), results in a Very Low Significance (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* of effect (EPA, 2022).
Northern Lapwing	*Quality*: Negative *Significance*: Slight *Extent and Context*: 916ha/715ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium	The area associated with disturbance/displacement effects for Northern Lapwing over the Breeding Season occupies approximately 916ha (Appendix 8.4a), with approximately 715ha of relevant habitats for this KAR (Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (habitat GS4 being the most relevant habitat for this classification – Table 8.21. This *Magnitude* combined with the Northern Lapwing *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Medium *Significance* (Percival, 2003) for the disturbance/displacement effect for this species.

<table>
<tr><th rowspan="2">KAR</th><th colspan="2">Disturbance/Displacement Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td>Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Sligh Significance (EPA, 2022).
Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic Type of effect (EPA, 2022).</td></tr>
<tr><td>Little Grebe</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>42.2ha/35.2ha of relevant habitat</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Short -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Medium</td></tr></table></td><td>The area associated with disturbance/displacement effects for Little Grebe over the Breeding Season occupies approximately 42ha (Appendix 8.4a), with approximately 35ha of relevant habitats for this KAR (Table 8.23).
Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (habitats FL8, FS1, and PB4 being the most relevant habitats for this classification - Table 8.23). This Magnitude combined with the Little Grebe Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Medium Significance (Percival, 2003) for the disturbance/displacement effect for this species.
Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Sligh Significance (EPA, 2022).
Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic Type of effect (EPA, 2022).</td></tr>
<tr><td>Mallard</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Not significant</td></tr><tr><td>Extent and Context</td><td>11.9ha/11.9ha of relevant habitat</td></tr><tr><td>Probability</td><td>Likely</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Negligible</td></tr><tr><td>Significance</td><td>Low</td></tr></table></td><td>The area associated with disturbance/displacement effects for Mallard over the Breeding Season occupies approximately 11.9ha (Appendix 8.4a), with all habitats within this area being of relevance for breeding Mallard (habitats FL8, FS1, PB4, and PF2 - Table 8.23).
Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction</td></tr>
</table>

KAR	Disturbance/Displacement Effect				Description
	EPA (2022)		Percival (2003)		
	Duration and Frequency	Short -term; constantly			Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Mallard *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* of effect (EPA, 2022).
	Type	Synergistic			
Mute Swan	*Quality*	Negative	*Sensitivity*	Low	The area associated with disturbance/displacement effects for Mute Swan over the Breeding Season occupies approximately 154.4ha (Appendix 8.4a), with approximately 118.8ha of relevant habitat for this KAR (FL8, GS3, PB1, PB4, and PF2 - Table 8.23). Considering the availability of these habitat within 5km from the proposed wind farm, the inaccessibility to this area due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible Magnitude (Table 8.23). This Magnitude combined with the Mute Swan Sensitivity (i.e. 'Low' – Table 8.16), results in a Very Low Significance (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* of effect (EPA, 2022).
	Significance	Not significant	*Magnitude*	Negligible	
	Extent and Context	154.4ha/118.8ha of relevant habitat	*Significance*	Very low	
	Probability	Likely			
	Duration and Frequency	Short -term; constantly			
	Type	Synergistic			

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
Common Ringed Plover	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 138ha/115.7ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Common Ringed Plover over the Breeding Season occupies approximately 138ha (Appendix 8.4a), with approximately 115.7ha of relevant habitat for this KAR (FL8, FS1, GS3, PB1, PB4, and PF2 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to this area due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible Magnitude (Table 8.23). This Magnitude combined with the Common Ringed Plover Sensitivity (i.e. 'Low' – Table 8.16), results in a Very Low Significance (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* of effect (EPA, 2022).
Common Snipe	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 403ha/275ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Medium *Magnitude*: Low *Significance*: Low	The area associated with disturbance/displacement effects for Common Snipe over the Breeding Season occupies approximately 403ha (Appendix 8.4a), with approximately 275ha of relevant habitats for this KAR (habitats FL8, FS1, GS4, PB1, PB4, and PF2 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (Table 8.23). This Magnitude combined with the Common Snipe Sensitivity (i.e. 'Medium' – Table 8.16), results in a Low Significance (Percival, 2003) for the disturbance/displacement effect for this species. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022).

<table>
<tr><th rowspan="2">KAR</th><th colspan="2">Disturbance/Displacement Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td>Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic Type of effect (EPA, 2022).</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Eurasian Woodcock</td><td>
<table>
<tr><td>Quality</td><td>Negative</td></tr>
<tr><td>Significance</td><td>Not significant</td></tr>
<tr><td>Extent and Context</td><td>67.4ha/37.2ha of relevant habitat</td></tr>
<tr><td>Probability</td><td>Likely</td></tr>
<tr><td>Duration and Frequency</td><td>Short -term; constantly</td></tr>
<tr><td>Type</td><td>Synergistic</td></tr>
</table>
</td><td>
<table>
<tr><td>Sensitivity</td><td>Medium</td></tr>
<tr><td>Magnitude</td><td>Negligible</td></tr>
<tr><td>Significance</td><td>Very low</td></tr>
</table>
</td><td>The area associated with disturbance/displacement effects for Eurasian Woodcock over the Breeding Season occupies approximately 67.4ha (Appendix 8.4a), with approximately 37.4ha of relevant habitat for this KAR (woodland habitats WD1, WD4, WN7, and WS1 - Table 8.23).
Considering the availability of this habitat within 5km from the proposed wind farm, the inaccessibility to this area due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible Magnitude (Table 8.23). This Magnitude combined with the Eurasian Woodcock Sensitivity (i.e. ‘Medium’ – Table 8.16), results in a Very Low Significance (Percival, 2003) for the disturbance/displacement effect for this species.
Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022).
Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to woodland habitats, which is this likely to reduce the ecological value of other woodland habitats within the site, this effect would be of a synergistic Type of effect (EPA, 2022).</td></tr>
</table>

Table 8.25: Description of Displacement/Disturbance Effects during the Non-breeding Season

<table>
<tr><th rowspan="2">KAR</th><th colspan="2">Disturbance/Displacement Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td>Black-headed Gull</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Not significant</td></tr><tr><td>Extent and Context</td><td>4.5ha/4.5ha of relevant habitat</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Short -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Low</td></tr><tr><td>Magnitude</td><td>Negligible</td></tr><tr><td>Significance</td><td>Very low</td></tr></table></td><td>The area associated with disturbance/displacement effects for Black-headed Gull over the Non-breeding Season occupies approximately 4.5ha (Appendix 8.4b), fully covered by relevant habitats for this KAR (habitats FL8 and PB4 - Table 8.23).
Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible Magnitude (Table 8.23. This Magnitude combined with the Black-headed Gull Sensitivity (i.e. ‘Low’ – Table 8.16), results in a Very Low Significance (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season.
Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022).
Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to FL8 and PB4 habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic Type (EPA, 2022).</td></tr>
<tr><td>Common Buzzard</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Not significant</td></tr><tr><td>Extent and Context</td><td>96.9ha/95.6ha of relevant habitat</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Short -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Low</td></tr><tr><td>Magnitude</td><td>Negligible</td></tr><tr><td>Significance</td><td>Very low</td></tr></table></td><td>The area associated with disturbance/displacement effects for Common Buzzard over the Non-breeding Season occupies approximately 96.9ha (Appendix 8.4b). Because most of the Common Buzzard activity during the non-breeding seasons of the Field study was hunting (Appendix 8.3c), and considering the broad range of prey items of Common Buzzard hunts (Hardey et al., 2013), all semi-natural habitats within this area are considered relevant for Common Buzzard during the Non-breeding season.
Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible Magnitude (Table 8.21). This Magnitude combined with the Common Buzzard Sensitivity (i.e. ‘Low’ – Table 8.16), results in a Very Low Significance (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season.</td></tr>
</table>

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
			Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the area illustrated in the respective map for Common Buzzard in Appendix 8.4b, it is this likely the ecological value of other habitats of the same nature within the site will be reduced, this effect would be of a synergistic *Type* (EPA, 2022).
Great Cormorant	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 23.4ha/21.1ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Great Cormorant over the Non-breeding Season occupies approximately 23.4ha (Appendix 8.4b), mostly covered by relevant habitats for this KAR (habitats FL8, GS3, and PB4 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Great Cormorant *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Eurasian Curlew	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 15.1ha/8.4ha of relevant habitat	*Sensitivity*: Medium *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Eurasian Curlew over the Non-breeding Season occupies approximately 15.1ha (Appendix 8.4b), with approximately 8.4ha covered by the relevant habitat for this KAR (habitat and PB4 – Table 8.21.

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
	Probability: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic		Considering the availability of this habitat within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Eurasian Curlew *Sensitivity* (i.e. 'Medium' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to PB4 habitat, which is this likely to reduce the ecological value of the remainder PB4 habitat within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Little Egret	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 67.4ha/48.8ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Medium *Magnitude*: Low *Significance*: **Low**	The area associated with disturbance/displacement effects for Little Egret over the Non-breeding Season occupies approximately 67.4ha (Appendix 8.4b), of which approximately 48.8ha are covered by relevant habitats for this KAR (habitats FL8, FS1, GS3, PB4, and PF2 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Little Egret *Sensitivity* (i.e. 'Medium' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the disturbance/ displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
European Golden Plover	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 658.8ha/558ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Negligible *Significance*: Low	The area associated with disturbance/displacement effects for European Golden Plover over the Non-breeding Season occupies approximately 658.8ha (Appendix 8.4b), of which approximately 558ha are covered by relevant habitats for this KAR (habitats FL8, FS1, FW4, GS3, GS4, PB1, PB4, and PF2 - Table 8.23. Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (mostly derived by the area covered by the most favoured habitat – GS4; Table 8.21. This *Magnitude* combined with the European Golden Plover *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Hen Harrier	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 252ha/187.7ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: High *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Hen Harrier over the Non-breeding Season occupies approximately 252ha (Appendix 8.4b). Because Hen Harrier mostly favours open habitats for hunting (roosting habitat preference not addressed as no roosting Hen Harrier was recorded at the proposed wind farm site during the Field Study; Hardey *et al.*, 2013), habitat FL8, FS1, GS3, GS4, PB1, PB4, PF2, and WS1 are considered relevant for Hen Harrier during the Non-breeding season at the site (Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Hen Harrier *Sensitivity* (i.e. 'High' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season.

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
			Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the area illustrated in the respective map for Hen Harrier in Appendix 8.4b, it is this likely the hunting value of other habitats of the same nature within the site will be reduced, this effect would be of a synergistic *Type* (EPA, 2022).
Common Kestrel	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 3ha/2.8ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Medium *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Common Kestrel over the Non-breeding Season occupies approximately 3ha (Appendix 8.4b). Because most of the Common Kestrel activity during the non-breeding seasons of the Field study was hunting (Appendix 8.3c), habitats PB1 and PB4 are considered relevant for Common Kestrel during the Non-breeding season (Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23. This *Magnitude* combined with the Common Kestrel *Sensitivity* (i.e. 'Medium' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the area illustrated in the respective map for Common Kestrel in Appendix 8.4b, it is this likely the hunting value of other habitats of the same nature within the site will be reduced, this effect would be of a synergistic *Type* (EPA, 2022).
Northern Lapwing	*Quality*: Negative *Significance*: Slight	*Sensitivity*: Very High *Magnitude*: Low	The area associated with disturbance/displacement effects for Northern Lapwing over the Non-breeding Season occupies approximately 417.8ha (Appendix 8.4b),

KAR	Disturbance/Displacement Effect				Description
	EPA (2022)		Percival (2003)		
	Extent and Context	417.8ha/342ha of relevant habitat	*Significance*	Medium	of which approximately 342ha are covered by relevant habitats for this KAR (habitats FL8, FS1, FW4, GS3, GS4, PB1, PB4, and PF2 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (mostly derived by the area covered by the most favoured habitat – GS4; Table 8.23). This *Magnitude* combined with the Northern Lapwing *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Medium *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
	Probability	Likely			
	Duration and Frequency	Short -term; constantly			
	Type	Synergistic			
Lesser Black-backed Gull	*Quality*	Negative	*Sensitivity*	Low	The area associated with disturbance/displacement effects for Lesser Black-backed Gull over the Non-breeding Season occupies approximately 13.3ha (Appendix 8.4b), mostly covered by relevant habitats for this KAR (habitats FL8 and PB4 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (Table 8.21). This *Magnitude* combined with the Lesser Black-backed Gull *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022).
	Significance	Not significant	*Magnitude*	Low	
	Extent and Context	13.3ha/11.5ha of relevant habitat	*Significance*	Very low	
	Probability	Likely			
	Duration and Frequency	Short -term; constantly			
	Type	Synergistic			

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
			Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to FL8 and PB4 habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Little Grebe	*Quality*: Negative *Significance*: Slight *Extent and Context*: 80.1ha/53.8ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium	The area associated with disturbance/displacement effects for Little Grebe over the Non-breeding Season occupies approximately 80.1ha (Appendix 8.4b), of which, approximately 53.8ha is covered by relevant habitats for this KAR (habitats FL8, FS1, GS1, GS4, PB4, and PF1 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (Table 8.21. This *Magnitude* combined with the Little Grebe *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Medium *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Mallard	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 28.9ha/23.6ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Negligible *Significance*: Low	The area associated with disturbance/displacement effects for Mallard over the Non-breeding Season occupies approximately 28.9ha (Appendix 8.4b), of which, approximately 23.6ha is covered by relevant habitats for this KAR (habitats FL8, FS1, PB1, PB4, and PF2 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Mallard *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season.

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
			Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Mute Swan	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 712.5ha/551ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Low *Significance*: Very low	The area associated with disturbance/displacement effects for Mute Swan over the Non-breeding Season occupies approximately 712.5ha (Appendix 8.4b), of which, approximately 551ha is covered by relevant habitats for this KAR (habitats FL8, FS1, FW4, GS3, GS4, PB1, PB4, and PF2 – Table 8.21). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (Table 8.21). This *Magnitude* combined with the Mute Swan *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is 24 to 30 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Common Ringed Plover	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 40.7ha/33.9ha of relevant habitat *Probability*: Likely	*Sensitivity*: Low *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Common Ringed Plover over the Non-breeding Season occupies approximately 40.7ha (Appendix 8.4b), of which, approximately 33.9ha is covered by relevant habitats for this KAR (habitats FL8, GS3, and PB4 - Table 8.21 Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
	Duration and Frequency: Short -term; constantly *Type*: Synergistic		Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.23). This *Magnitude* combined with the Common Ringed Plover *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Eurasian Sparrowhawk	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 1ha/1ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Low *Magnitude*: Negligible *Significance*: Very low	The area associated with disturbance/displacement effects for Eurasian Sparrowhawk over the Non-breeding Season occupies approximately 1ha (Appendix 8.4b), all of which covered by relevant hunting habitats (most of its activity at the site during the non-breeding seasons of the Field Study) for this KAR (Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible *Magnitude* (Table 8.21). This *Magnitude* combined with the Eurasian Sparrowhawk *Sensitivity* (i.e. 'Low' – Section 8.8.2.31), results in a Very Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the area illustrated in the respective map for Eurasian Sparrowhawk in Appendix 8.4b, it is this likely the

<table>
<tr><th rowspan="2">KAR</th><th colspan="2">Disturbance/Displacement Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td>hunting value of other habitats of the same nature within the site will be reduced, this effect would be of a synergistic Type (EPA, 2022).</td></tr>
<tr><td>Northern Shoveler</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Not significant</td></tr><tr><td>Extent and Context</td><td>13.6ha/6.3ha of relevant habitat</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Short -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Negligible</td></tr><tr><td>Significance</td><td>Low</td></tr></table></td><td>The area associated with disturbance/displacement effects for Northern Shoveler over the Non-breeding Season occupies approximately 13.6ha (Appendix 8.4b), of which, approximately 6.3ha is covered by relevant habitats for this KAR (habitats FL8, FS1, and PB4 - Table 8.23).
Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Negligible Magnitude (Table 8.21). This Magnitude combined with the Northern Shoveler Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Low Significance (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season.
Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022).
Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic Type (EPA, 2022).</td></tr>
<tr><td>Eurasian Teal</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Slight</td></tr><tr><td>Extent and Context</td><td>373.1ha/266ha of relevant habitat</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Short -term; constantly</td></tr><tr><td>Type</td><td>Synergistic</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Low</td></tr><tr><td>Significance</td><td>Medium</td></tr></table></td><td>The area associated with disturbance/displacement effects for Eurasian Teal over the Non-breeding Season occupies approximately 373.1ha (Appendix 8.4b), of which, approximately 266ha is covered by relevant habitats for this KAR (habitats FL8, FS1, GS4, PB1, PB4, PF2, and PF3 - Table 8.23).
Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low Magnitude (Table 8.23). This Magnitude combined with the Eurasian Teal Sensitivity (i.e. ‘Very High’ – Table 8.16), results in a Medium Significance (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season.
Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as</td></tr>
</table>

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
			of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Eurasian Woodcock	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 50.3ha/16.5ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Medium *Magnitude*: Low *Significance*: Low	The area associated with disturbance/displacement effects for Eurasian Woodcock over the Non-breeding Season occupies approximately 50.3ha (Appendix 8.4b), of which, approximately 16.5ha is covered by relevant habitats for this KAR (habitats WN7 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (Table 8.21). This *Magnitude* combined with the Eurasian Woodcock *Sensitivity* (i.e. 'Medium' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the WN7 habitat, which is this likely to reduce the ecological value of other WN7 habitat within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Eurasian Wigeon	*Quality*: Negative *Significance*: Slight *Extent and Context*: 125.4ha/92.4ha of relevant habitat *Probability*: Likely	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium	The area associated with disturbance/displacement effects for Eurasian Wigeon over the Non-breeding Season occupies approximately 125.4ha (Appendix 8.4b), of which, approximately 92.4ha is covered by relevant habitats for this KAR (habitats FL8, GS4, PB1, PB4, and PF2 - Table 8.23). Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (Table 8.23). This *Magnitude* combined with the Eurasian Wigeon *Sensitivity* (i.e. 'Very

KAR	Disturbance/Displacement Effect		Description
	EPA (2022)	Percival (2003)	
	Duration and Frequency: Short -term; constantly *Type*: Synergistic		High' – Table 8.16), results in a Medium *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to these relevant habitats, which is this likely to reduce the ecological value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).
Whooper Swan	*Quality*: Negative *Significance*: Slight *Extent and Context*: 1,221.8ha/ 873.9ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium	The area associated with disturbance/displacement effects for Whooper Swan over the Non-breeding Season occupies approximately 1,221.8ha (Appendix 8.4b), of which, approximately 873.9ha is covered by relevant habitats for this KAR (habitats FL8, FS1, FW4, GS1, GS2, GS3, GS4, PB1, PB4, PF1, and PF2 - Table 8.23 Considering the availability of these habitats within 5km from the proposed wind farm, the inaccessibility to these areas due to disturbance during the Construction Phase of the proposed wind farm represents an effect of Low *Magnitude* (mostly derived by the area covered by the most favoured habitat – GS4; Table 8.23). This *Magnitude* combined with the Whooper Swan *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Medium *Significance* (Percival, 2003) for the disturbance/displacement effect for this species during the non-breeding season. Considering the duration of the Construction Phase is approximately 24 months (Chapter 3 – Description of the Proposed Development) the effect is classified as of Short -term *Duration*, Constant *Frequency*, Negative *Quality*, and Slight *Significance* (EPA, 2022). Because the inaccessibility of this area during the Construction Phase of the proposed wind farm fragments the accessibility to the relevant habitats, which is this likely to reduce the roosting and foraging value of other habitats of the same nature within the site, this effect would be of a synergistic *Type* (EPA, 2022).

8.9.2.1.4.2 Conclusion on the Assessment of Disturbance/Displacement During the Construction Phase

The assessment of disturbance/displacement effects during the Construction Phase of the proposed wind farm reveals effects of Medium *Significance* (Percival, 2003) for the following KARs and respective seasons:

- **Breeding Season:**
  - Northern Lapwing; and
  - Little Grebe.
- **Non-breeding Season:**
  - Northern Lapwing;
  - Little Grebe;
  - Eurasian Teal;
  - Eurasian Wigeon; and
  - Whooper Swan.

Following Percival (2003) guidance, effects of Medium *Significance* may be resolved with appropriate mitigation measures (Section 8.7.4.3).

All other KARs scoped in for the assessment of disturbance/displacement effects during the Construction Phase of the proposed wind farm were appraised as not being likely to be significantly affected by this effect.

8.9.2.1.5 Direct Mortality, Destruction of Eggs/Nests

During the Construction Phase of the proposed wind farm, the movement of vehicles and machinery, as well as all works for excavation and vegetation clearance, may cause adult KARs direct mortality (particularly while laying and/or incubating), and/or result in the destruction of eggs and/or nests. As the ground preparation works/vegetation clearance will be undertaken on habitats with various vegetation cover (e.g. grassland, bog, woodland), this effect could affect all KARs breeding at the site during the Construction Phase.

The significance of this effect is further reinforced by the Wildlife Act (as amended) (40), which restricts cutting, burning or destroying any vegetation on a non-cultivated land from the 1st of March to the 31st of August in any year, as well as the Article 5 of the Birds Directive (2009/147/EC), which prohibits the deliberate killing, or destruction of nests and eggs, of all species of naturally occurring birds.

Percival (2003) does not include the direct mortality, and/or destruction of eggs/nests as an effect from a wind farm development (Section 8.7.3). Therefore, for the assessment of this effect, only the EPA (2022) methodology is used for the description of this effect (Table 8.26).

The effects from direct mortality and/or destruction of eggs/nests during the Construction Phase of the proposed wind farm is appraised of slight *Significance*, considering the limited *Extent* it could occur (12% of the site's total area), the short-term (24 months) *Duration*, and the 'worst-case' *Type* of effect (EPA, 2022).

Table 8.26: Description of Effects from Direct Mortality and Destruction of Eggs/Nests

KAR	Direct Mortality/Destruction of Eggs/Nests		
	EPA (2022)		Percival (2003)
All Naturally Occurring Breeding Birds	*Quality*	Negative	Direct mortality, and/or destruction of eggs/nests is not included as a potential effect from wind farm developments.
	Significance	Slight	
	Extent and Context	~219ha (Chapter 7 – Biodiversity, including additional mitigation); ~12% of the site	
	Probability	Likely	
	Duration and Frequency	Short -term; occasionally	
	Type	'Worst-case'	

8.9.2.2 Proposed Turbine Delivery Route

8.9.2.2.1 Habitat Loss at the POIs

The proposed works associated with the TDR include vegetation clearance/tree felling at (Figure 7.16; Appendix 15-3):

- POI 1 – Removal of one tree at the side of the road;
- POI 3 – Removal of trees at a central road island;
- POI 4 – Two trees to be removed at the side of a roundabout; and
- POI 5 – One tree to be removed at the central road island. Trees to be trimmed on the side of the road.

Although all the POIs (except POI 6) are located within a urban/semi-urban environment, with significantly managed semi-natural habitats (Chapter 7 – Biodiversity), the vegetation clearance and tree felling/removal at the POIs mentioned above could give rise to result in the destruction of eggs and/or nests of KARs and other naturally occurring birds (protected under the Wildlife Acts (as amended) and the Birds Directive. With regards to POI 6 (within the proposed wind farm – Figure 7.16), this POI will also be subject to vegetation clearance to the construction of a new site entrance. However, the works at these areas are included in the assessment of ornithological effects from habitat loss at the proposed wind farm (Section 8.9.2.1.1).

The effects from the destruction of eggs/nests during the works in preparation for the TDR are appraised of slight *Significance*, considering the limited *Extent* (total of 1,374m^2 across four POIs) and low ecological value of the habitats/trees to be removed (Chapter 7 – Biodiversity), of brief *Duration*, and the 'worst-case' *Type* of effect. (EPA, 2022). As Percival (2003) does not include the destruction of eggs/nests as an effect from a wind farm development (Section 8.7.3), and only the EPA (2022) methodology is used for the description of this effect (Table 8.27).

Table 8.27: Description of Effects from Direct Mortality and Destruction of Eggs/Nests

KAR	Destruction of Eggs/Nests			
	EPA (2022)			Percival (2003)
All Naturally Occurring Breeding Birds	*Quality*	Negative		Destruction of eggs/nests is not included as a potential effect from wind farm developments.
	Significance	Slight		
	Extent and Context (Table 7.25)	POI1	878m^2 (GS2 habitat)	
		POI 3	144m (WL2 habitat)	
		POI 4	126m^2 (GS2 habitat)	
		POI 5	226m^2 (WS3 habitat)	
	Probability	Likely		
	Duration and Frequency	Brief; once		
	Type	'Worst-case'		

8.9.3 Operation Phase

The likely significant effects to occur during the operation phase of the proposed development are related with collision risk and displacement. Also, as described below, bird collision with wind turbines and their structures may occur from the moment of their erection, which is planned to take place over a nine-month period during the Construction Phase of the proposed wind farm (Chapter 3 – Description of the proposed development).

In the following Sections, where the assessment of collision effects during the Operation Phase of the proposed development is undertaken, the Operation Phase of the proposed wind farm is interpreted as the period from the moment of turbines' erection (and other supporting structures – e.g. meteorological mast) until the end of the proposed wind farm planned lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development).

8.9.3.1 Disturbance/displacement

During the operation phase, bird displacement can occur as a consequence of the proposed wind farm posing a barrier to bird movement, and require extra energy expenditure by birds to take evasive movements (Pennycuick, 1989; cited by Tolvanen *et al.*, 2023).

This effect has been recurrently mentioned in grey and scientific literature (e.g. Percival, 2003; SNH, 2017), although no standardised methodology has been consistently adopted in assessments of disturbance/displacement due to barrier effect for operational onshore wind farms (Hötker *et al.*, 2006; Masden *et al.*, 2009).

It is important to note that the proposed wind farm is separated from the River Shannon (an important National ecological corridor) by approximately 2.5 km. This separation distance from the River Shannon is likely to guarantee the unconstrained use of this important ecological corridor by commuting/migratory birds.

It is also relevant to highlight that the potential effects of disturbance/displacement by the presence of the proposed wind farm during its Operation Phase, and potential barrier effects would have similar consequences to avian fauna.

Therefore, although the proposed activities associated with the Operation Phase are of different nature than the proposed works and activities during the Construction Phase of the proposed development, a similar rationale used for the assessment of disturbance/displacement effects during the Construction Phase will be employed for the Operation Phase.

Considering that the sources for disturbance/displacement effects during construction works are occasional and disruptive (e.g. temporary operating of loud machinery, excavation works), as opposed to the disturbance caused by rare traffic and machine operation for maintenance works, and the continuous operation of a large scale device (which could incite habituation behaviours), it is considered that adopting the approach followed in the assessment of disturbance effects during the Construction Phase (Section 8.9.2.1.3) is precautionary, and conducive to an appropriate consideration of the potential disturbance effects during the Operation Phase of the proposed development.

Therefore, Table 8.28 includes the description of the assessment of disturbance effects during the Operation Phase of the proposed development for the KARs most likely and significantly affected by this effect (as appraised in Section 8.9.2.1.3), which describes effects of Medium *Significance* (Percival, 2003) for the following KARs over each season:

- **Breeding Season:**
  - Northern Lapwing; and
  - Little Grebe.
- **Non-breeding Season:**
  - Northern Lapwing;
  - Little Grebe;
  - Eurasian Teal;
  - Eurasian Wigeon; and
  - Whooper Swan.

Mitigation measures would be required for the avoidance, or reduction of significance of the disturbance/displacement effects during the Operation Phase of the proposed development (Percival, 2003).

Table 8.28: Summary Description of Potential Disturbance/Displacement Effects during the Operation Phase of the Proposed Development

KAR	Disturbance/Displacement Effect	
	EPA (2022)	Percival (2003)
Breeding Season		
Northern Lapwing	*Quality*: Negative *Significance*: Slight *Extent and Context*: 916ha/715ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium
Little Grebe	*Quality*: Negative *Significance*: Slight *Extent and Context*: 42.2ha/35.2ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium
Non-breeding Season		
Northern Lapwing	*Quality*: Negative *Significance*: Slight *Extent and Context*: 417.8ha/342ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium
Little Grebe	*Quality*: Negative *Significance*: Slight *Extent and Context*: 80.1ha/53.8ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium

KAR	Disturbance/Displacement Effect	
	EPA (2022)	Percival (2003)
Eurasian Teal	*Quality*: Negative *Significance*: Slight *Extent and Context*: 373.1ha/266ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium
Eurasian Wigeon	*Quality*: Negative *Significance*: Slight *Extent and Context*: 125.4ha/92.4ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium
Whooper Swan	*Quality*: Negative *Significance*: Slight *Extent and Context*: 1,221.8ha/ 873.9ha of relevant habitat *Probability*: Likely *Duration and Frequency*: Short -term; constantly *Type*: Synergistic	*Sensitivity*: Very High *Magnitude*: Low *Significance*: Medium

8.9.3.2 Collision Risk

One of the most apparent impacts of wind farm developments on bird communities is the risk of collision-related injuries or fatalities. While this may seem contradictory to the earlier point about displacement during the operational phase since birds disturbed by the turbines might be expected to avoid those areas the reality is more complex. Birds may initially avoid areas with active turbines, but over time, they can become habituated to the disturbance. As they begin to return to these previously abandoned areas, their risk of collision with turbine blades increases (Band et al., 2007)

Bird collisions with turbines may represent a detrimental effect to the respective populations. Markedly, the effects of collisions involving low density bird species (e.g. birds of prey), and species with low reproductive rates, will be of higher significance to their respective populations than those involving higher and more frequent broods (e.g. passerine species). Also, beyond the local topography, and the physical characteristics of the obstacle (e.g. turbine height, number of turbines), collision risk also differs significantly amongst species, depending on their morphology, foraging and flight behaviours (Linder *et al.*, 2022). For example, the visual field for some species can be quite restrictive and, while flying and foraging (i.e. head pitched forward, to

maximise binocular vision of the ground) these birds can be blind in the direction of travel, becoming highly vulnerable to collisions with tall structures in their path (Martin *et al.*, 2012). Also, birds' 'wing loading', i.e. the ration between body weight and wing area, is associated with low manoeuvrability and high occurrence of collisions (Janss, 2000). Nevertheless, the collision risk is proportional to the abundance of birds in the wind farm area, i.e. greater if a wind farm is located at (or near) feeding/roosting locations, or on migratory flyways or local flight paths (Drewitt and Langston, 2006).

8.9.3.2.1 Collision Risk Model

The proposed wind farm comprises 22 turbines, with a hub height of 107.5m and a rotor diameter of 165m (Chapter 3 – Description of the proposed development). During the Operation Phase of the proposed wind farm, these turbines will be rotating, occupying an aerial space of approximately 21,382m^2 per turbine, at a height between 25 and 190m - this is the zone flying birds will be subject to potential collision risk with the turbines.

A Collision Risk Model (CRM) was undertaken to estimate the number of collisions of flying birds with the turbines of the proposed wind farm (Appendix 8.4). The model included data from the VP surveys (Section 8.6.2.1) over seven seasons (i.e. Breeding Season 2021 to Breeding Season 2024 - Appendix 8.3) of all raptor and waterbird species (except Common Snipe, because vantage point surveys are not an effective method of sampling their flight activity - Appendix 8.4). Also, as the VP surveys are only undertaken during daylight, crepuscular species (i.e. species that are most active at dawn or dusk – e.g. Eurasian Woodcock) are not included in the CRM. In the case of Eurasian Woodcock, because this species typically flies low to the ground/canopy, it is not considered to be subject to collision risk with the turbines.

In summary, the CRM is informed by (NatureScot, 2024):

- The number of birds flying through, or around the site, their flight height, and flight duration (derived from the VP surveys during the Field Study – Section 8.6.2.1);
- Predicted changes of behaviour of birds (e.g. avoidance);
- The number, size (mentioned above) and rotation speed of turbine blades;
- Physical details on bird size and flight speed.

The CRM produces results in the form of number of bird collisions per year, along with the general assumptions and uncertainty associated with model estimates (Band, 2024).

The CRM in Appendix 8.4, further assesses the uncertainty associated with the modelling process, following NatureScot (2024). It assessed the role of several factors, such as:

- Sampling effects –when the results from the VP survey show higher or lower levels of flight activity relative to the overall distribution of flight activity in the respective season;
- Height distribution – accounts for misestimation of flight heights during the VP survey;
- Nocturnal flight activity – derived from the correction factor applied to account for nocturnal activity;
- Single transit risk – relates to Band (2024, sec. 7.2) addressing the simplifications included in the model for Stage C could represent a collision probability within around ±20%; and

- Other factors – other sources of uncertainty that cannot be quantified.

8.9.3.2.2 Collision Risk Assessment (Turbines)

For the purposes of the analysis, all collisions are considered fatal, either directly or indirectly through injury. Full details of the collision risk analysis, including target species selection criteria, is presented in the CRM report attached as Appendix 8-5.

The CRM also appraises the significance of the increase in annual mortality generated by the predicted collision risk with turbines on each species (Collision Risk Assessment). When this increase in absolute mortality is higher than 1% of a species baseline annual mortality, the effect is considered significant to that species population (Percival, 2003). Depending on the availability of populations sizes, the scale of significance is determined at national, regional and/or local level.

KARs identified as at risk to collision with turbines are listed Table 8.29, including the uncorrected and corrected estimates accounting for distance effects (i.e. under-detection of distant flightlines), and the range of uncertainty due to the factors mentioned in Section 8.9.3.2.1, and described in more detail in Appendix 8.4.

Table 8.29: Potential Increase in Annual Mortality Rates Due to the Predicted Collision Risk from the Derryadd Wind Farm (Appendix 8.4)

Species	Season	Scale	Distance Effects	
			Uncorrected	Corrected
Whooper Swan	Non-breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		Regional	0.2% (0.1% - 0.4%)	0.4% (0.2% - 0.8%)
		Local	0.4% (0.2% - 0.7%)	**0.6% (0.3% - 1.2%)**
Eurasian Teal	Non-breeding	National	0.0%	0.0%
Mallard	Non-breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
Great Cormorant	Breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		Local	0.4% (0.2% - 0.8%)	**0.6% (0.4% - 1.3%)**
Little Egret	Non-breeding	National	0.1% (0.0% - 0.2%)	0.1% (0.0% - 0.3%)
Grey Heron	Breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
Sparrowhawk	Breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
		Regional	0.3% (0.1% - 0.8%)	**0.6% (0.3% - 1.5%)**
Golden Plover (99.6%)*	Non-breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.1%)
		Local	**0.7% (0.2% - 2.7%)**	**2.1% (0.7% - 8.0%)**
Golden Plover 99.8%)*	Non-breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.1%)
		Local	**0.4% (0.1% - 1.4%)**	**1.0% (0.3% - 4.0%)**
Northern Lapwing	Breeding	National	0.0% (0.0% - 0.1%)	0.0% (0.0% - 0.1%)
		Local	**2.5% (0.9% - 12.6%)**	**4.2% (1.6% - 21.0%)**

Species	Season	Scale	Distance Effects	
			Uncorrected	Corrected
	Non-breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
Black-headed Gull	Breeding	National	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)
Lesser Black-backed Gull	Breeding	National	0.0% (0.0% - 0.1%)	0.1% (0.0% - 0.1%)
		Local	**0.6% (0.4% - 1.1%)**	**1.0% (0.7% - 2.0%)**
Common Kestrel	Breeding	National	0.0% (0.0% - 0.0%)	0.1% (0.0% - 0.1%)
		Regional	**1.9% (1.1% - 3.4%)**	**3.9% (2.3% - 6.9%)**

*avoidance rate applied in the respective estimate

The estimates anticipate significant increases in mortality for some species, with corrections for distance effects, and without corrections. The populations for which the mean values for increased mortality due to collision risk are considered significant are:

- Uncorrected for distance effects:
  - Local breeding population of Northern Lapwing; and
  - County Longford breeding population of Common Kestrel.
- Corrected for distance effects:
  - Local non-breeding population of Golden Plover (for both 99.6% and 99.8% avoidance rates);
  - Local breeding population of Northern Lapwing;
  - Local breeding population of Lesser Black-backed Gull; and
  - County Longford breeding population of Common Kestrel.

Table 8.29 includes the description of the collision risk effects on the relevant KARs, as well as the description of the factors contributing for the effect classification, derived from the Collision Risk Assessment in Appendix 8.5. It concludes that the predicted collision risk is unlikely to give rise to significant effects on any of these populations of the KARs.

It should also be noted that, although not being directly mentioned in the present Section and in Appendix 8.5, the collision risk effect assessed herein encompasses the period from the moment of the turbines' erection until the end of the Operation Phase of the proposed wind farm.

Table 8.30: Collision Risk Assessment

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
Whooper Swan	*Quality*: Negative *Significance*: Not Significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Very High *Magnitude*: Negligible *Significance*: Low	The central estimates of the potential increase in Whooper Swan annual mortality due to the predicted collision risk do not exceed the 1% *Significance* threshold (Percival, 2003), while the upper limits of the uncertainty range exceeded the 1% threshold for the local Whooper Swan non-breeding population - Table 8.27. However, as described in Appendix 8.5, the 1% threshold stipulated by Percival (2003) is likely to be very precautionary. The calculations of the increase in annual mortality also made strong precautionary assumptions that all the collision fatalities were adult birds, and that the collision mortality was additive not compensatory. Thus, it is considered that increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations. The collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Whooper Swan *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Whooper Swan, no classification for the *Type* effect descriptor is assigned.

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
Eurasian Teal	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Very High *Magnitude*: Negligible *Significance*: **Low**	The collision risk effect for Eurasian Teal is not significant - Table 8.27. The collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Eurasian Teal *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Eurasian Teal, no classification for the *Type* effect descriptor is assigned.
Mallard	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Very High *Magnitude*: Negligible *Significance*: **Low**	The collision risk effect for Mallard is not significant - Table 8.27. The collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Eurasian Teal *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Mallard, no classification for the *Type* effect descriptor is assigned.

<table>
<tr><th rowspan="2">Relevant KAR (Appendix 8.5)</th><th colspan="2">Collision Risk Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr>
<td>Great Cormorant</td>
<td>
<table>
<tr><td>Quality</td><td>Negative</td></tr>
<tr><td>Significance</td><td>Not significant</td></tr>
<tr><td>Extent and Context</td><td>21,382m^2 per turbine, at a height between 25 and 190m</td></tr>
<tr><td>Probability</td><td>Likely</td></tr>
<tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr>
<tr><td>Type</td><td>-</td></tr>
</table>
</td>
<td>
<table>
<tr><td>Sensitivity</td><td>Low</td></tr>
<tr><td>Magnitude</td><td>Negligible</td></tr>
<tr><td>Significance</td><td>Very Low</td></tr>
</table>
</td>
<td>The central estimates of the potential increase in Great Cormorant annual mortality due to the predicted collision risk do not exceed the 1% Significance threshold (Percival, 2003), while the upper limits of the uncertainty range exceeded the 1% threshold for the Lough Ree breeding population - Table 8.27. However, as described in Appendix 8.5, the 1% threshold stipulated by Percival (2003) is likely to be very precautionary. The calculations of the increase in annual mortality also made strong precautionary assumptions that all the collision fatalities were adult birds, and that the collision mortality was additive not compensatory. Thus, it is considered that increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations.
The collision risk represents an effect of Negligible Magnitude (Percival, 2003), which, combined with the Great Cormorant Sensitivity (i.e. 'Low' – Table 8.16), results in a Very Low Significance (Percival, 2003) for the collision risk effect for this species.
Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022).
Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Great Cormorant, no classification for the Type effect descriptor is assigned.</td>
</tr>
</table>

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
Little Egret	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Medium *Magnitude*: Negligible *Significance*: Very Low	The collision risk effect for Little Egret is not significant - Table 8.27. The collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Little Egret *Sensitivity* (i.e. 'Medium' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Little Egret, no classification for the *Type* effect descriptor is assigned.

<table>
<tr><th rowspan="2">Relevant KAR (Appendix 8.5)</th><th colspan="2">Collision Risk Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr>
<td>Eurasian Sparrowhawk</td>
<td>
<table>
<tr><td>Quality</td><td>Negative</td></tr>
<tr><td>Significance</td><td>Not significant</td></tr>
<tr><td>Extent and Context</td><td>21,382m^2 per turbine, at a height between 25 and 190m</td></tr>
<tr><td>Probability</td><td>Likely</td></tr>
<tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr>
<tr><td>Type</td><td>-</td></tr>
</table>
</td>
<td>
<table>
<tr><td>Sensitivity</td><td>Low</td></tr>
<tr><td>Magnitude</td><td>Negligible</td></tr>
<tr><td>Significance</td><td>Very Low</td></tr>
</table>
</td>
<td>The central estimates of the potential increase in Eurasian Sparrowhawk annual mortality due to the predicted collision risk do not exceed the 1% Significance threshold (Percival, 2003), while the upper limits of the uncertainty range exceeded the 1% threshold for the County Longford breeding population - Table 8.27. However, as described in Appendix 8.5, the 1% threshold stipulated by Percival (2003) is likely to be very precautionary. The calculations of the increase in annual mortality also made strong precautionary assumptions that all the collision fatalities were adult birds, and that the collision mortality was additive not compensatory. Thus, it is considered that increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations.
The collision risk represents an effect of Negligible Magnitude (Percival, 2003), which, combined with the Eurasian Sparrowhawk Sensitivity (i.e. 'Low' – Table 8.16), results in a Very Low Significance (Percival, 2003) for the collision risk effect for this species.
Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term Duration, Constant Frequency, Negative Quality, and Not significant Significance (EPA, 2022).
Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Eurasian Sparrowhawk, no classification for the Type effect descriptor is assigned.</td>
</tr>
<tr>
<td>European Golden Plover</td>
<td>
<table>
<tr><td>Quality</td><td>Negative</td></tr>
<tr><td>Significance</td><td>Not significant</td></tr>
<tr><td>Extent and Context</td><td>21,382m^2 per turbine, at a height between 25 and 190m</td></tr>
<tr><td>Probability</td><td>Likely</td></tr>
</table>
</td>
<td>
<table>
<tr><td>Sensitivity</td><td>Very High</td></tr>
<tr><td>Magnitude</td><td>Negligible</td></tr>
<tr><td>Significance</td><td>Low</td></tr>
</table>
</td>
<td>The central estimates of the potential increase in European Golden Plover winter population were significant (0.4-2.1%), with upper limits of 1.4-8.0% (Table 8.29). However, these estimates are associated with a wide range of uncertainty, mainly due to sampling effects, which reflected the large variation in flock sizes and flight durations (Appendix 8.3z). The correction for distance effects in the CRM may have resulted in an over-estimation of the European Golden Plover collision risk. Most of the collision risk was generated by records of</td>
</tr>
</table>

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
	Duration and Frequency: Long -term; constantly *Type*: -		large flocks, and it is likely that the under-detection of distant flightlines is much less of an issue for large flocks compared to small groups and individual birds. Therefore, the smaller collision risk generated by the uncorrected model may be more reliable in this case (Table 8.29). Also, the local population was estimated from Irish Wetland Bird Survey data. As many European Golden Plover occur away from wetland sites, the size of the local population used for the collision risk assessment may have been a significant under-estimate (Appendix 8.5). European Golden Plover is a quarry species, with an open season from September and January. The Irish Government does not regulate the hunting of this species (i.e. there are no bag limits), and no published data on annual hunting mortality is available. This means that there is no restriction on the number of European Golden Plover that can be shot between September and January each winter. Therefore, given this apparent lack of concern about harvest levels, presumably the Irish Government considers that low levels of mortality from anthropogenic sources are likely to be compensatory, rather than additive and are, therefore, unlikely to affect the conservation status of the wintering European Golden Plover population (Appendix 8.5). Therefore, the collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the European Golden Plover *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022).

<table>
<tr><th rowspan="2">Relevant KAR (Appendix 8.5)</th><th colspan="2">Collision Risk Effect</th><th rowspan="2">Description</th></tr>
<tr><th>EPA (2022)</th><th>Percival (2003)</th></tr>
<tr><td></td><td></td><td></td><td>Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on European Golden Plover, no classification for the Type effect descriptor is assigned.</td></tr>
<tr><td>Northern Lapwing</td><td><table><tr><td>Quality</td><td>Negative</td></tr><tr><td>Significance</td><td>Not significant</td></tr><tr><td>Extent and Context</td><td>21,382m^2 per turbine, at a height between 25 and 190m</td></tr><tr><td>Probability</td><td>Likely</td></tr><tr><td>Duration and Frequency</td><td>Long -term; constantly</td></tr><tr><td>Type</td><td>-</td></tr></table></td><td><table><tr><td>Sensitivity</td><td>Very High</td></tr><tr><td>Magnitude</td><td>Negligible</td></tr><tr><td>Significance</td><td>Low</td></tr></table></td><td>Collision risk with the proposed wind farm is estimated to be significant on the local breeding Northern Lapwing population, with central estimates of 2.5-4.2%, and upper limits of 13-21% of increased mortality (Table 8.29). The wide range of uncertainty around the estimates was due mainly to sampling effects, which reflected the low number of records that contributed to the collision risk model. The inclusion of all the flight activity in the lowest height band during the vantage point surveys over the Breeding Season 2021 will have caused some over-estimation of the collision risk (see Section 5.2 of Appendix 8.5).
There may have been some under-recording of the local population due to limited survey effort in the sections of the bogs outside the 500 m buffer. Also, the scale used to define the local population was based on the survey area; it is arguable that a larger area, including adjacent bogs to the west and south should be used to define the local population (Appendix 8.5).
Over 50% of the total flight activity included in the model was generated by a single record of a flock of 26 birds in late July (Appendix 8.3rr). This could have referred to post-breeding dispersing/migrating birds that were not associated with the local population. There were also three other records included in the collision risk model of flocks of 8-24 birds in July (Appendix 8.3rr).
Two of the records included in the collision risk model included fledged juveniles, while the age composition of many of the records (including the flock of 26 birds in late July) were not specified.</td></tr>
</table>

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
			Therefore, the precautionary assumption that all the collision fatalities generated by the predicted collision risk will be adult birds was violated. Juveniles have higher annual mortality rates, so the percentage increase in mortality generated by a collision risk will be smaller (Appendix 8.5). The collision risk was calculated using the default avoidance rate of 98%. Species-specific avoidance rates are usually higher than the default avoidance rate. However, this may not be the case for breeding Northern Lapwing because they do not appear to be displaced by turbines (Appendix 8.5). Therefore, the collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Northern Lapwing *Sensitivity* (i.e. 'Very High' – Table 8.16), results in a Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Northern Lapwing, no classification for the *Type* effect descriptor is assigned.

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
Black-headed Gull	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Low *Magnitude*: Negligible *Significance*: Very Low	The collision risk effect for Black-headed Gull is not significant - Table 8.27. The collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Black-headed Gull *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Black-headed Gull, no classification for the *Type* effect descriptor is assigned.

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
Lesser Black-backed Gull	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Low *Magnitude*: Negligible *Significance*: Very Low	The upper limit of the uncertainty range exceeds the 1% threshold (Percival, 2003) for the Lough Ree Lesser Black-backed Gull breeding population, with and without the inclusion of corrections for distance effects (Table 8.29). However, as described in Appendix 8.5, the 1% threshold stipulated by Percival (2003) is likely to be very precautionary. The calculations of the increase in annual mortality also made strong precautionary assumptions that all the collision fatalities were adult birds, and that the collision mortality was additive not compensatory. Thus, it is considered that increases in annual mortality well above the 1% threshold are likely to be required to cause significant impacts on the affected populations (Appendix 8.5). Thus, the collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Lesser Black-backed Gull *Sensitivity* (i.e. 'Low' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Lesser Black-backed Gull, no classification for the *Type* effect descriptor is assigned.

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
Common Kestrel	*Quality*: Negative *Significance*: Not significant *Extent and Context*: 21,382m^2 per turbine, at a height between 25 and 190m *Probability*: Likely *Duration and Frequency*: Long -term; constantly *Type*: -	*Sensitivity*: Medium *Magnitude*: Negligible *Significance*: Very Low	The central estimates of the potential increase in Common Kestrel annual mortality to the County Longford breeding population due to the predicted collision risk were sizeable, ranging between 1.9-3.9%, with upper limits of 3.4-6.9% (Table 8.29). The relatively narrow range of uncertainty around the estimates, reflected the high record rate, and the fact that variation in flock size and uncertainty around nocturnal flight activity are not issues (Appendix 8.5). Standard collision risk modelling techniques will tend to overestimate Common Kestrel collision risk due to the high incidence of hovering flight activity (see Appendix 8.5, Section 5.3), which, if it was accounted for in the model, it is likely that there would be a large decrease in the potential impact on mortality rates. The inclusion of all the flight activity in the lowest height band from the vantage point surveys during the Breeding Season 2021 (Appendix 8.3g) will also have caused some over-estimation of the collision risk (see Appendix 8.5, Section 5.3). A lot of the collision risk was generated in late summer, when the local Common Kestrel population was likely to have included a large component of juvenile birds. The Common Kestrel juvenile survival rate is around double the adult survival rate, and accounting for juvenile flight activity in the collision risk assessment would be likely to cause a significant decrease in the potential impact on mortality rates (Appendix 8.5). As with all the populations assessed, the mortality increases were higher when the collision risks that accounted for distance effects were used. The data used to calculate the correction factors included large components of Common Kestrel flight activity, while their size and flight behaviour makes them particularly susceptible to under-detection at long distances (Appendix 8.5, Section 5.3). The recommended avoidance rate of 95% for Common Kestrel results in a non-avoidance rate that is 2.5 times higher than for the default 98% avoidance rate. The evidence supporting the Common Kestrel avoidance rate is weak (Appendix 8.5, S Section 5.3), and there are

Relevant KAR (Appendix 8.5)	Collision Risk Effect		Description
	EPA (2022)	Percival (2003)	
			anecdotal reports of relatively high levels of Common Kestrel fatalities from post-construction monitoring of Irish wind farms, although this data has not been published (Appendix 8.5). Thus, the collision risk represents an effect of Negligible *Magnitude* (Percival, 2003), which, combined with the Common Kestrel *Sensitivity* (i.e. 'Medium' – Table 8.16), results in a Very Low *Significance* (Percival, 2003) for the collision risk effect for this species. Considering the collision risk effect will occur for the duration of the proposed wind farm lifespan (i.e. 30 years – Chapter 3 – Description of the Proposed Development), the effect is classified as of Long -term *Duration*, Constant *Frequency*, Negative *Quality*, and Not significant *Significance* (EPA, 2022). Because no effect typology defined by the EPA guidance (2022) suits the collision risk effect on Common Kestrel, no classification for the *Type* effect descriptor is assigned.

8.9.3.2.3 Collision Risk with Other Infrastructure

Beyond the turbines, the proposed wind farm includes the provision of several structures that could present collision risk and significantly affect KAR populations. Structures like the electricity substation compound), the substation control building (approximately 9.7m high), the 20 battery storage containers (each with a height of 2.8m), and the two 120m high meteorological masts, although immobile, may constitute sources for collision risk effects to KARs.

It is likely that an immobile structure (e.g. building) presents a lower collision risk to birds than a moving structure (e.g. turbine). To this effect, a CRM and collision risk assessment for potential KAR collisions with the 22 operating (i.e. moving) turbines has been undertaken. It concluded that the proposed wind farm would not give rise to likely significant effects on the KARs' populations. It is, therefore, likely that the immobile structures that are part of the proposed wind farm, including the two meteorological masts, would not present significant collision risk to the KARs.

8.9.4 Decommissioning Phase

The Decommissioning Phase of the proposed development will either encompass the replacement of the wind turbines (subject to planning permission), or the site may be fully decommissioned (except the electricity substation including all associated transmission infrastructure i.e. underground cables and OHL and amenity access tracks), by removing of above ground turbine components.

The works and activities proposed for the Decommissioning Phase of the proposed development are then likely to be of similar nature than those assessed for the Construction Phase of the proposed wind farm (i.e. habitat loss, disturbance displacement – Section 8.9.2). However, the Extent/*Magnitude*, and the Duration/Frequency of these effects is likely to be significantly lower, which is likely to also reduce significantly the significance of the potential effects on all KARs.

Therefore, effects from the works and activities associated with the Decommissioning Phase of the proposed wind farm are not considered likely nor significant.

8.9.5 Summary of Potential Significant Ornithological Effects

Following Percival (2003), "*significance* [of an effect] *should then be used to determine whether a predicted impact is acceptable of not*". To this effect, the assessment of the effects on birds during the various phases of the proposed development, concluded the proposed development would give rise to likely significant effects on the following KARs:

- **Construction Phase**
  - Contamination:
    - Construction activities pose a risk of water contamination from fuels, bentonite, and concrete washout, which could degrade wetland habitats. This may reduce food availability and habitat quality for protected bird species, representing a significant, long-term impact if not properly mitigated
  - Dust:
    - Construction activities can generate airborne dust that, if unmanaged, may settle on nearby vegetation, soils, and water bodies, degrading sensitive habitats. This can reduce foraging quality and nesting opportunities for ground-nesting and wetland-associated bird species, representing an indirect impact on avian populations.
  - Habitat loss:
    - Eurasian Teal;
    - European Golden Plover;
    - Little Grebe;
    - Mallard;
    - Northern Lapwing;
    - Northern Shoveler; and
    - Whooper Swan.
  - Disturbance/displacement:
    - <u>Breeding Season</u>
      - Northern Lapwing; and
      - Little Grebe.
    - <u>Non-breeding Season</u>
      - Northern Lapwing;
      - Little Grebe;
      - Eurasian Teal;
      - Eurasian Wigeon; and
      - Whooper Swan.
- **Operation Phase**
  - Disturbance/displacement:
    - <u>Breeding Season</u>

- Northern Lapwing; and
- Little Grebe.

- Non-breeding Season
  - Northern Lapwing;
  - Little Grebe;
  - Eurasian Teal;
  - Eurasian Wigeon; and
  - Whooper Swan.

These likely significant effects have been appraised as being of significance for which appropriate mitigation measures are required. Also, despite the assessment of effects from the habitat removal from the TDR classified the significance of such effect as Slight, mitigation measures for the avoidance of this effect will also be proposed.

8.10 CUMULATIVE EFFECTS

The assessment of impacts from the proposed development cumulatively with other plans or projects is a requirement for the impact assessment of a development (EIA Directive - 2011/92/EU as amended by 2014/52/EU).

Therefore, a search was conducted of planning applications (projects) that could act cumulatively with the proposed development using:

- Longford County Council Planning Section[13];
- Roscommon County Council ePlan[14];
- Westmeath County Council ePlan[15];
- Department of Housing, Planning and Local Government EIA portal map viewer[16];
- Department of Agriculture, Food and the Marine:
    - Felling Licence Decisions[17];
    - Afforestation Licence Decisions[18].
- An Bord Pleanála[19].
- The relevant projects with potential for cumulative effects with the proposed development are detailed in Table 7.63.

Upon review of the relevant documentation publicly available in reference of each of the projects summarised in Table 8.29, the mitigation measures included in the documentation of the projects that were associated with potentially significant effects to avian fauna were considered by the Competent Authorities as sufficient to devoid any residual effects of significance. Nevertheless, particular attention was employed on the assessment of cumulative effects from the proposed development with planning application reference 2460132 (Midlands Trail Network - Table 8.31) as this development is located in the immediate vicinity of the proposed wind farm site. However, with regards to potential disturbance effects on breeding and non-breeding birds, the Ecological Impact Assessment Report that informed the local authority granting decision considers that the stretch of the trail located in the immediate vicinity of the proposed wind farm site "*is bordered by hedgerow and treeline along its length*", not requiring mitigation (i.e. screen fencing) to prevent disturbance effects to either breeding or non-breeding birds.

Therefore, no likely significant effects are to be expected from the proposed development cumulatively with other projects.

[13] Available at https://www.longfordcoco.ie/services/planning/. Accessed March 2025
[14] Available at https://www.eplanning.ie/RoscommonCC/searchtypes. Accessed in March 2025
[15] Available at https://www.eplanning.ie/WestmeathCC/searchtypes. Accessed in March 2025
[16] Available online at http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1. Accessed in March 2025.
[17] Available at https://www.gov.ie/en/collection/f19df-felling-licence-decisions/. Accessed in March 2025.
[18] Available at https://www.gov.ie/en/collection/123b5-afforestation-licence-decisions/. Accessed in March 2025.
[19] Available at https://www.pleanala.ie/en-ie/case-search. Accessed in March 2025.

Table 8.31: Developments for Cumulative Assessment

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
Longford Co. Co. Reg. Ref 2460132	Development of a recreational tourism trail, which includes: repurposing of 5.2km on existing former rail bed; 3.1km along existing bog headlands/former high fields; 185m along pre-existing machine access routes ; construction of car and/or bicycle parking facilities at seven locations; pavilion structures, totem feature, surface water drainage, and other auxiliar works and structures.	2025	0m	▪ Works: linear development in nature and is approximately 8.3 kilometres long utilising existing rail bed infrastructure with the inclusion of landscape elements including pavilion structures, 'walker' totem, and a thematic experience comprising a framed structure which will act as a visitor periscope. It includes a maximum of 147 at parking spaces, 127 of which are existing car parking spaces with 20 proposed new car parking spaces; ▪ Potential effects (EcIA Report) – Construction: ▪ Habitats – significant effects from the loss of 'Dry calcareous and neutral grassland/Recolonising bare ground' (GS1/ED3), 'Remnant Raised Bog' (PB1), 'Woodland' (WN7), 'Scrub' (WS1), and 'Open waterbodies' (FL8); ▪ Birds – breeding birds (related with the loss of nesting habitat/destruction of nests and eggs); disturbance to breeding and non-breeding birds; ▪ Mammals – disturbance at a watercourse crossing (Bats, Otter); habitat loss (Marsh Fritillary). ▪ Operation ▪ Birds – no significant effects anticipated. ▪ Mitigation: ▪ Construction: Habitat Management and Enhancement Plan which includes: management of spoil during construction, material regrading, and scrub mowing; pre-construction survey marking areas of raised bog; restriction of vehicle movement and material storage at raised bog areas; tree re-planting of 0.5ha, construction of a settlement pond; installation of silt fences; restriction of material storage 50m from wetlands; no wastewater to be discharged on-site; vegetation clearance to be undertaken outside the breading season, or a nesting bird survey and works supervision will be carried out; breeding wader survey at Begnagh; restriction of construction works during the period November to March, inclusive, to avoid the key winter period for wildfowl, imposing the period the period between April and October, inclusive, for the majority of construction works; wintering bird survey preceding any construction works at Begnagh; potential implementation of Ecological Restriction Zones for the avoidance of disturbance to wintering birds; pre-construction Badger survey; camera monitoring of any setts encountered; restriction of works near active setts;

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				pre-construction bat activity survey at the watercourse crossing; installation of 10 new bat boxes; pre-construction Otter survey; avoidance of works at Devi's-bit Scabious locations; ▪ Operation: 1m high screen fencing (to an extent of 1,065m at Begnagh plus 520m at Knappoge) – no screening along Lanesborough to Derryarogue section of the route; signage to highlight potential wintering bird disturbance, habitats, species and general biodiversity; restriction of vegetation management during the bird breeding season; re-planting of tree and shrub to provide screening along the route; monitoring of wintering an breeding bird populations; ▪ Residual effects: upon implementation of mitigation measures, no residual effects are anticipated.
Longford Co. Co. Reg. Ref 18139	Refurbishment works on the Cloon to Lanesboro 110 kV Overhead Line (approximately 65 kilometres long).	27/09/2018	2km	▪ Works: replacement of 212 poles. 25 polesets and 1 angle mast; upgrading 21 angle masts; other associated works; ▪ Potential effects (Planning and Environmental Considerations Report - PECR): ▪ Habitats – significant effects on raised bog (total of 196m^2) and cutover bog (total of 168m^2) habitats; ▪ Mitigation: ▪ Replanting of cut vegetation; ▪ 'Residual effects: upon mitigation, negligible to low significance effects would be expected.
Longford Co. Co. Reg. Ref 19201	Redevelop the existing 110 kV Air Insulated Switchgear (AIS) substation in Lanesboro.	01/07/2020	2km	▪ Works: re-routing 11kV underground cable (trenching, 600mm wide; 1250mm deep); construction of new substation (15mx15mx54m); construction of roads and parking; other associated works; ▪ Potential Effects (PECR): ▪ Habitats – no significant effects; ▪ Mitigation measures: ▪ 'Best practice' biosecurity measures. ▪ No residual effects of significance are anticipated upon implementation of mitigation measures.
Longford Co. Co. Reg. Ref 2275 (ABP-315485-22)	Demolition and site reinstatement; followed by Development of grid services	29/09/2020	2km	▪ Works (Construction, Operation and Decommissioning Phases): Demolition and site reinstatement; followed by development of grid services within the existing power

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
	within the existing power station boundaries comprising 75MW battery storage; 200MVAR synchronous condenser; other associated works			station boundaries comprising: 75MW battery storage; 200MVAR synchronous condenser; other associated works; ▪ Potential Effects (PECR): ▪ Habitats – no significant effects; ▪ Mitigation measures: ▪ Prescription of 'Best practice' methods; ▪ No residual effects of significance are anticipated upon implementation of mitigation measures.
Longford Co. Co. Reg. Ref 17320	Increase in the capacity of the operational Ash Disposal Facility to allow for the deposition of 130,000 tonnes of dry ash over and above the 550,000 tonnes permitted until the planning application.	28/03/2018	850m	▪ Works: the development will not include any physical change to the permitted structure, just a continuation of the activity; ▪ Potential Effects (EIAR): ▪ Habitats – loss of Bog Woodland habitat (0.87ha) is not considered significant; ▪ Despite the absence of identified significant effects, mitigation measures are proposed: ▪ Vegetation clearance to be undertaken between September and February. ▪ No residual effects of significance are anticipated upon implementation of mitigation measures
Longford Co. Co. Reg. Ref 2360056	Construction of a Gas Insulated Switchgear compound (approximately 4ha)	15/09/2023	2km	▪ Works: Construction of a Gas Insulated Switchgear; redevelopment of existing substation; construction of distribution system operator compound; modify existing drainage system; Ground Investigation works (e.g. boreholes); associated works (roads, ancillary); ▪ Potential Effects (EIAR): ▪ Habitats – no habitats of significant ecological valuation will be removed, thus no significant effects on habitats are considered; ▪ Aquatics – although the risk is considered low, potential significant siltation/contamination effects are considered during construction. ▪ Mitigation measures: ▪ Spatial restriction for works and excavation storage; ▪ 'Check, Clean, Dry' protocol; ▪ Restriction on contaminant use/storage; and ▪ Retention of 0.5ha of recolonising bare ground to be seeded with "common native grassland herb species from the locality" as an enhancement measure.

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ No significant residual effects on are anticipated upon implementation of mitigation measures.
Longford Co. Co. Reg. Ref 2360124	Uprate the 110 kV Overhead Line (OHL), consisting of works to a ca. 27.6km section of the OHL at 142 supporting structures	17/11/2023	1.7km	▪ Works: Replacement of existing overhead line, 52 polesets, 4 towers, one angle mast, stay arrangements and crossarms at 27 locations, vibration dampers at 12 locations, and hardware and fittings; installation of insulators at 13 locations; reinstallation of anti-climbing guards and aircraft warning sphere; ▪ Potential Effects (PECR): ▪ Sites of Ecological Importance – Lough Ree SAC (Lake vegetation [3150], Fens [7230], Alluvial forest [91E0] and Otter [1355]): deterioration of water quality); Lough Ree SPA: deterioration of water quality (SCI collision risk with overhead lines dismissed; only effects to Wetlands [A999] considered); Royal Canal pNHA (deterioration of water quality); Lough Bannow pNHA (wet grassland/hedgerow habitats loss); Lough Ree pNHA (similar effect to those for Lough Ree SAC/SPA); ▪ Habitats – direct effects of significance on wetland/raised bog/wet grassland/scrub and hedgerow habitats (tracking of plant and machinery; habitat loss); indirect effects on wetlands similar to those accounted for aquatic ecology; no habitats of significant ecological valuation will be removed, thus no significant effects on habitats are considered. The spread of Japanese Knotweed accounted as potential effect; ▪ Aquatics – potential siltation and contamination effects are considered during construction; ▪ Protected Species – potential effects on birds (loss of nesting habitat). ▪ Mitigation measures: ▪ Silt fence installation at sensitive locations (with specified characteristics); ▪ Installation of silt traps (with specified characteristics); ▪ Primary treatment (i.e. settlement tank system) of any water pumped off to accommodate works; ▪ Delineation of valuable raised bog/wet grassland habitats and ground protection measures (detailed); ▪ Restriction of works between 1st March and 31st August; ▪ Refuelling to be restricted to construction compounds designated area; ▪ Restriction of hydrocarbon storage to designate areas ▪ Concrete batching/production not allowed onsite;

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ No residual effects are anticipated upon implementation of mitigation measures.
Longford Co. Co. Reg. Ref 22225	Integrated constructed wetland over a total area of 5.58ha to provide total treatment of ash leachate, with a closed loop design	14/12/2022	600m	▪ Works: excavation, placement and compaction of earth/soil for the creation of 2 open water cells and 3 treatment cells; road upgrading; provision of pipework and water pumps (for internal circuit only); ▪ Potential Effects (Planning Report): ▪ Lough Ree SPA: deterioration of water quality; ▪ Habitats – no negative effects are identified; ▪ Aquatics – general account of potential effects on aquatic ecology. ▪ Mitigation measures: ▪ Spatial restriction for works area; ▪ Setback distance from aquatic receptors; ▪ Refuelling and hydrocarbon storage to be restricted to designated bunded area; ▪ Instructions for clear felling (to opposite direction from drains); ▪ Use and maintenance of brash mats; ▪ Restrictions for soil storage; ▪ Restriction on concrete production onsite; ▪ Spatial and time restrictions for fertilisation
Longford Co. Co. Reg. Ref 22275	Underground electrical cable and transformer compound which will connect permitted solar farms to the national grid via the proposed transformer compound at Lough Ree Power Station	19/05/2023	1.6km	▪ Works: excavation of 10 trial pit (one 3-4m deep; nine of 1.5-2m deep); Site Investigation (SI) works; construction of transformer compound of 3,800m^2 – excavation to existing 110kv underground cable, temporary construction compound, SI works; construction of Control Module (26.6m^2); construction of transformer unit (including a 8m high lightening mast); excavation to accommodate underground cable; installation of diesel generator; associated works; no instream works required, although there are 5 watercourse crossings; vegetation clearance; ▪ Potential Effects (no EIAR or PECR/EcIA available; information from NIS) - through deterioration of water quality; disturbance/ displacement: ▪ Lough Ree SPA. ▪ Mitigation measures: ▪ Spatial restriction for works area; ▪ Silt traps and silt fencing would be provided at stream crossings; ▪ Spatial restriction for SI works (6m from watercourses); ▪ Compaction and covering of stockpiles;

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ Restriction to batching wet-cement products onsite; ▪ Restriction on weather conditions for cast-in-place concrete; ▪ Restriction on washing out any plant used in concrete transport or concreting operations; ▪ Area designation for chute cleaning; ▪ Restriction of refuelling to the construction compound; ▪ Designation of exclusion areas of 350m around any nest of Lapwing, Coot or Mallard found in the bog along the development; ▪ No effects on Lough Ree SPA are anticipated upon implementation of mitigation measures
Longford Co. Co. Reg. Ref 20263	Retention of existing extended commercial storage yard, and construction of car park and drainage system	07/04/2021	1.9km	▪ Works: laying a sealed surface across the year; installation of gullies, by-pass interceptor; construction of car park and loading, storage areas; associated works; ▪ Potential Effects (no EIAR or PECR/EcIA available; information from Screening for AA): ▪ deterioration of receiving water quality through inadequate water treatment; sedimentation during construction phase through road traffic; ▪ Assessment: because the application would provide drainage and water treatment, no effects on European sites are predicted.
Longford Co. Co. Reg. Ref 20263	Replacement of overhead line (9.5km)	27/10/2023	2km	▪ Works: Replacement (involving excavation) of existing overhead line, 21 polesets, 2 towers, stay arrangements (3) and crossarms (6), insulators at 22 locations; reinstallation of anti-climbing guards at 2 locations; vegetation cutting and dewatering; Site Investigation works; associated works; ▪ Potential Effects (PECR): ▪ Sites of Ecological Importance –Lough Ree SPA: deterioration of water quality (SCI collision risk with overhead lines dismissed; only effects to Wetlands [A999] considered). Lough Ree pNHA (similar effects to those described for Lough Ree SAC/SPA); ▪ Habitats – direct effects of significance on wetland/raised bog/wet grassland/scrub and hedgerow habitats (tracking of plant and machinery; habitat loss); indirect effects on wetlands similar to those accounted for aquatic ecology; ▪ Aquatics – potential siltation and contamination effects are considered during construction;

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ Protected Species – potential effects on Otter (through deterioration of water quality) and birds (loss of nesting habitat). ▪ Mitigation measures: ▪ Spatial restriction for works within 50m of surface water features; ▪ Silt fence installation at 8 sensitive locations (with specified characteristics) ▪ Installation of silt traps at 8 sensitive locations (with specified characteristics); ▪ Primary treatment (i.e. settlement tank system – e.g. dirtbox) of any groundwater pumped off to accommodate works; ▪ Ground protection maps use at specified locations; ▪ Restriction of hedgerow and scrub vegetation from the 1st of March until the 31st of August; ▪ Refuelling to be restricted to construction compounds designated areas; ▪ Restriction of oil storage to designate areas ▪ Concrete batching/production not allowed on works areas. ▪ No residual effects of significance are anticipated upon implementation of mitigation measures. Local scale disturbance effects to bogland, hedgerow, scrubland and wet grassland habitats are to be expected.
Longford Co. Co. Reg. Ref 16256	Development of a distillery and visitor centre (0.2814ha site)	31/01/2017	2.3km	▪ Works: no details of works are described in the Screening for AA; ▪ Potential Effects (no EIAR or PECR/EcIA available; information from Screening for AA): deterioration of receiving water quality during construction (foul water, hydrocarbons, silt, etc); ▪ Assessment: with the application of 'best practice' methods, no effects on European sites are predicted.
Longford Co. Co. Reg. Ref 186	Modifications to granted development of a distillery and visitor centre (0.3ha) (further modified with Planning Application 231, which was not accompanied by environmental assessment)	03/04/2018	2.3km	▪ Works: construction of 3 storey visitor facility extension; construction of a single storey with mezzanine distillery; demolition of existing single storey building; partial demolition of existing single storey building; install underground semi-mounded gas storage; ▪ Potential Effects (no EIAR or PECR/EcIA available; information from Screening for AA): deterioration of receiving water quality during construction (foul water, hydrocarbons, silt, etc); ▪ Mitigation - application of 'best practice' methods, which may include:

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ Construction - the installation of temporary attenuation and settlement facilities at appropriate locations; storage of hazardous substances in secure areas remote from drainage features; restriction of tree removal during the period 1st March to 31st August; ▪ Operation – storage of LPG and other hazardous materials in purposed built bunded structures; collection, storage and release of surface water arising onsite. Upon the implementation of the measures above, no effects on European sites are predicted.
Longford Co. Co. Reg. Ref 21225	Ten year permission for a solar farm (34.54ha)	20/10/2021	650m	▪ Works: removal of 10 foundations; construction of new residential development; associated works (no detailed description of construction works is included in the Screening for AA or Ecology Report); ▪ Potential Effects (PECR): ▪ Sites of Ecological Importance – Ballykenny-Fisherstown Bog SPA: there are no records of this species since 1990-91; Lough Ree SAC and SPA: as the Whooper Swan core winter foraging range is <5km (SNH, 2016), it was considered the Whooper Swan individuals that could occur at the site were not associated with the SPA population. Also, the construction phase would be of short duration, and there would be enough alternative habitat to devoid any potential disturbance/displacement of significance; the separation distance, dilution effect, and landscape slope would prevent any significant effects from siltation and contamination; no reported connectivity with any sites of National Importance; ▪ Habitats – the habitats that will lie under the solar panels are considered to be altered/enhanced, rather than destroyed; the removal of 10m of Hedgerow habitat is considered a long-term effect of slight significance; the loss of 0.022ha of Wet Willow-Alder Woodland/Bog Woodland habitat under one of the options for the grid connection works is appraised as being a long-term effect of moderate significance; ▪ Aquatics – siltation effects on receiving water courses from construction works (including the placement of culverts on drainage ditches) is considered to be of slight significance; ▪ Protected Species –effects of moderate significance on Kingfisher, Mallard, Meadow Pipit, Skylark (disturbance) and Woodcock (habitat loss - woodland);

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ Mitigation: ▪ Covering excavated material; ▪ 10m exclusion zone for construction works at natural watercourses; ▪ Fencing drainage ditches; ▪ 'Best practice' methodologies; ▪ Mitigation for the removal of the Wet Willow Alder Woodland/Bog Woodland to be defined at a later stage; ▪ Restriction of trees and hedgerow trimming between 1st of March and 31st of August; ▪ Mitigation for Meadow Pipit, Skylark, Lapwing, and Mallard to be defined at a later stage; ▪ Exclusion of vegetation clearance from March to August, inclusive (for protection of breeding Hedgehog and Pygmy Shrew); woodland felling will only occur between September and December, inclusive (for protection of Red Squirrel); Fence gap of a minimum of 200mm at the bottom, or incorporating a mammal access point (every 100m along the fence); ▪ Habitat enhancement – includes the installation of bird boxes, insect hotels, hedgerow plantation, and log piles, plantation of several types of native species, and enhancement of existing hedgerows.
Roscommon Co. Co. Reg. Ref. 19546	Upgrade of the Tarmonbarry Wastewater Treatment Plant	29/01/2020	4.4km	▪ Works: excavation (3m deep; 10m wide); importation of stone for backfilling; placement of pre-cast tanks ▪ Potential Effects (no EIAR or PECR/EcIA available; information from Screening for AA): the small scale of the works; the separation distance to the hydrological pathway (172m) and barrier (palisade fence) preclude the potential connectivity with European sites and, consequently, of likely significant effects. ▪ A 'Planner Report' has been submitted with the application, which states "The construction (…) could lead to impacts in relation to surface run-off, potential spillages and dust", but these potential effects were deemed insignificant.
Roscommon Co. Co. Reg. Ref. 19311	Convert existing Waterways Ireland storage shed to an outdoor recreational	12/09/2019	2.3km	▪ Works: alterations to existing elevators; removal of existing green area; construction of car park; associated works;

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
	centre/lake access centre facility to Lough Ree			▪ Potential Effects (no EIAR or PECR/EcIA available; information from Screening for AA): the "change of use" nature of the development, would preclude any likely significant effects on European site
Roscommon Co. Co. Reg. Ref. 18320 (ABP-302597-19)	Refurbishment of the existing circuit within County Roscommon of the existing Cloon to Lanesboro 110 kV Overhead Line	19/03/2019	2km	▪ Works: Replacement of 1 angle mast, 212 wooden polesets, crossarms of 5 structures, equipment of 20 structures; foundation upgrades on 19 towers; other associated works; ▪ Potential Effects (no EIAR or PECR/EcIA available; information from NIS): through deterioration of water quality; disturbance/ displacement; and biosecurity: ▪ Lough Ree SPA: no effects considered due to the 290m separation distance between the works and the SPA. ▪ No other effects on European sites common with the proposed development are anticipated (only Camderry Bog SAC was screened in for NIS).
Roscommon Co. Co. Reg. Ref. 23342	Uprate the existing Lanesboro - Sliabh Bawn 100kV overhead line 9.5km)	10/11/2023	5km	▪ Works: Replacement (involving excavation) of existing overhead line, 21 polesets, 2 towers, stay arrangements (3) and crossarms (6), vibration dampers (all locations) insulators at 22 locations; reinstallation of anti-climbing guards at 2 locations; vegetation cutting and dewatering; Site Investigation works; associated works; ▪ Potential Effects (PECR): ▪ Sites of Ecological Importance –Lough Ree SPA: deterioration of water quality (SCI collision risk with overhead lines dismissed; only effects to Wetlands [A999] considered); Lough Ree pNHA (similar to Lough Ree SAC and SPA); ▪ Habitats – direct effects of significance on wetland/raised bog/wet grassland/scrub habitats (tracking of plant and machinery; habitat loss; and/or accidental contamination); ▪ the internationally important FL5 and associated habitats have been historically modified and fragmented, while its trophic status is not expected to be altered (i.e. eutrophic). The potential for invasive species spread is also accounted (as a permanent, moderate effect). Nevertheless, potential effects are rated as permanent and moderate in the absence of 'best practice'; ▪ Aquatics – effects from silt-laden runoff and/or contamination on water quality and aquatic environment during construction; ▪ Protected Species - birds (loss of nesting habitat from hedgerow clearance – although no hedgerow loss was accounted in potential habitats' effects).

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
				▪ Mitigation measures: ▪ Spatial restriction for works within 50m of surface water features; ▪ Ground protection mats will be used during construction; ▪ Site clearance works to take place outside of 1st of March to 31st of August; ▪ Silt fence installation at 8 locations (with specified characteristics); ▪ Installation of silt traps at 8 sensitive locations (with specified characteristics); ▪ Refuelling to be restricted to construction compounds designated areas; ▪ Restriction of hydrocarbon storage to designated areas; ▪ Concrete batching/production not allowed on works areas. ▪ No significant residual effects are anticipated upon implementation of mitigation measures
Roscommon Co. Co. Reg. Ref. 22581	Demolish and dispose of existing structures on site consisting of 21 mushroom houses, an office building and store rooms, and permission to construct 26 houses, service road	15/11/2023	2.8km	▪ Works: no details provided; ▪ Potential Effects (no EIAR or PECR/EcIA available; information from NIS): the limited scale and proposal to discharge to public sewer would preclude any likely significant effects on European sites.
Longford Co. Co. Reg. Ref. 15/86	Wind monitoring mast at Derrynaskea (Lough Bannow Bog). This permission was granted for a period of five years.	25/08/2015	0km	Screening for Appropriate Assessment refers no impacts on avian fauna are anticipated
Roscommon Co. Co. 03/341	Wind Farm with 2 wind turbines and a meteorological tower, and a control building. An extension of duration permission was granted (Reg. Ref. 11/3055), extending it until 25/06/2013.	27/06/2003	45.7km	Minimal impact anticipated, with no requirement for mitigation
Roscommon Co. Co.	Wind Farm with 3 no. turbines with a maximum output of	19/01/2005	30.5km	EIAR assessed 3 types of impacts: - collision risk – insignificant (not modelled);

Registered Reference	Description of Development	Year of Decision	Approx. distance to proposed wind farm site	Relevant Information for Ornithological Cumulative Assessment
04/103 (Appeal Ref. 20.208733)	4.5MW (78m hub height and 72m blade diameter). This wind farm has been constructed.			- habitat loss and disturbance – not significant.
Roscommon Co. Co. 10/507 (Appeal Ref. 20.239743)	Wind Farm with 20 no. wind turbines with a total output capacity of 58MW (85m hub height and 93m rotor diameter), along with a 110kV sub-station. An extension of time was granted (Reg. Ref. 10/3002) until 18/1/2012. This wind farm has been constructed and is operational since March 2017 (operation for 25 years).	27/03/2012	8 km	EIAR concluded: – no impacts to wintering birds; and - loss of feeding and breeding habitat. However, by minimising the duration of disturbance and habitat loss period, it concluded these effects were "Not significant"
Roscommon Co. Co. 11/126	Wind Farm with 2 no. 2.3MW wind turbines along with a sub-station. The turbines have a stated hub height of 85m and up to 82m rotor diameter.	03/01/2012	14.1 km	Not assessed

8.11 MITIGATION MEASURES

Upon the assessment of potential effects on birds, the proposed development is considered likely to affect significantly the populations of eight bird species during the breeding and non-breeding seasons, by means of habitat loss (Construction Phase), disturbance/displacement (Construction and Operation phases) - Section 8.9.5 - for which appropriate mitigation measures should be implemented.

It is important to note the dynamic context of the proposed wind farm site, mainly due to the continuing hydrological management of the site (Section 7.3.1.1.3.6), and because of the natural habitat succession that occurs at cutover bog habitats upon the termination of peat extraction activities augmented by the implementation of the Derryaroge, Derryadd and Lough Bannow Bogs Rehabilitation Plans (Appendix 7.4).

8.11.1 Construction Phase

8.11.1.1 General

The proposed development has been designed to incorporate current industry best practice with regards to construction and operation of wind farms, which is described in detail in Chapter 3 (Description of the Proposed Development) of this EIAR.

Best practice measures incorporated into the design aim to avoid significant effects on the surrounding biodiversity. A CEMP has been developed to provide a framework for how significant effects on the environment will be avoided during the construction phase.

A suitably qualified Ecological Clerk of Works (ECoW) with extensive experience in ornithology, will be appointed by the Contractor and will be required full time on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this Chapter are implemented correctly during the construction phase.

Regular toolbox talks with construction staff on disturbance to relevant bird species during construction will be organised. These will be of mandatory presence to staff members and will be run at the beginning of each season: in February, in preparation to the breeding season; and in August, in preparation to the non-breeding season. These toolbox talks will include the description of the main ecological features staff should note, particularly the identification of KARs and signs of proximity to sensitive locations (e.g. raising awareness to alarm calls during the breeding season; description of ground-nesting species), and the processes of reporting any findings to the ECoW.

8.11.1.2 Specific Mitigation Measures

Table 8.32 includes the specific mitigation measures to reduce the significance of the effects summarised in Section 8.9.5. It should be noted that the areas proposed for habitat management are separated from the turbines by a minimum of 500m, avoiding the attraction of birds to areas liable to collision risk.

8.11.2 Operation Phase

Although the future amenity use of the proposed wind farm site was not considered to differ significantly from the baseline conditions and, therefore, was not included as a potential source

of likely significant effects to ornithological resources, mitigation for the prevention of disturbance to breeding and non-breeding birds is proposed (screen fencing - Table 8.32).

Also, some of the habitat management actions prescribed in Table 8.32 are likely to extend beyond the Construction Phase period. These mitigation measures are also to reduce the significance of the disturbance/displacement effects appraised for the Operation Phase (Section 8.9.3.1).

During the Operation Phase of the proposed wind farm, Bord na Móna will assign an appropriately experienced ecologist to carry the prescribed habitat management actions (Table 8.32) during this period.

8.11.3 Decommissioning Phase

The expected life span of the proposed wind farm is at least 30 years. The decommissioning works will comprise the removal of all above ground turbine components of the wind farm, which effects on birds are not considered to be likely nor significant. Nevertheless, to assure compliance with the Wildlife Act (as amended), as well as the Article 5 of the Birds Directive (2009/147/EC), the decommissioning works will not be carried out within the period from the 1st of March to the 31st of August (Table 8.32).

Table 8.32: Proposed Ornithological Mitigation Measures for the Proposed Wind Farm

Phase	Potential Effect	Proposed Mitigation Measure	Further description
Proposed Wind Farm			
Construction Phase	Dust generation and movement associated with excavation, vehicle traffic, access track construction, and material handling near aquatic feature	Integrated dust suppression and control strategy	▪ Water bowsers will be used to suppress dust on exposed soils and haul roads, especially during dry and windy periods; ▪ Works will be phased to minimise cumulative dust generation, thereby reducing the risk of impacts on habitat used by sensitive bird species.; ▪ Spoil and loose material will be covered where feasible; ▪ Fencing will be established near to intercept dust and sediment; ▪ Speed limits and designated access routes will be enforced; ▪ Dust levels will be periodically monitored to assess the effectiveness of dust control measures.
	Contamination		▪ Use of Drip Trays and Absorbent Mats: Drip trays and absorbent mats will be placed beneath stationary plant, fuel storage areas, and refuelling operations to capture any hydrocarbon drips or leaks, reducing the risk of soil or water contamination. ▪ Controlled Vehicle and Machinery Movement: All vehicles and machinery will be restricted to predefined, hard-surfaced or reinforced access routes. This will help prevent unnecessary disturbance to soils and vegetation, reduce sediment mobilisation, and limit the potential for spreading contaminants beyond the working area. ▪ Designated Containment for Hazardous Materials: Bentonite slurry used in trenchless drilling and any concrete washout materials will be managed within sealed, bunded containment areas. These will be located away from sensitive habitats and watercourses to prevent leachate or overflow entering the environment. ▪ Spill Response Preparedness: Spill kits and absorbent materials will be readily available at key locations across the site. These will be used to immediately contain and clean up any accidental spills involving hydrocarbons, bentonite slurry, or concrete residues, reducing the potential for environmental harm.

Phase	Potential Effect	Proposed Mitigation Measure	Further description
			▪ Ongoing Site Monitoring and Maintenance: Regular inspections will be conducted throughout the construction period to ensure all containment and mitigation measures remain intact and effective. Any signs of failure, such as leakage or bund overflow, will be addressed immediately through corrective actions
	Habitat Loss; Disturbance/displacement	Restriction of period for vegetation clearance	▪ The vegetation clearance during the Construction Phase of the proposed wind farm will be timed to avoid the breeding birds nesting season, from 1st of March to 31st of August, if possible;
		Pre-construction Survey	▪ If it will not be possible to avoid the breeding bird nesting season, the ECoW will undertake a pre-construction survey of all the areas for vegetation clearance; ▪ The ECoW will particularly search for 'Confirmed' breeding activity (Table 8.4) within the areas to be cleared of vegetation, with particular regard for ground-nesting species; ▪ If any active nest is found, the nest will be clearly marked, and a protection zone with a radius equal to the respective MAD extent Table 8.20 will be clearly demarked, if possible; ▪ Where avoidance of the nest is not possible, the nest will only be removed once the chicks have fledged, or the ECoW has confirmed the nesting has failed; ▪ The ECoW will keep a log of the pre-construction survey findings, number of nests, their locations (on a map, or with coordinates), species, and actions undertaken for the protection of nests found (e.g. demarcation of a protection zone, approximate dimension of the protection zone).
		Interruption of works	▪ In the event of any bird nest(s) being found within the works areas during the Construction Phase, the finding will be immediately reported to the ECoW; ▪ The works will immediately cease, and the ECoW will survey the nest(s) (avoiding disturbance); ▪ The nest will be clearly marked, and a protection zone with a radius equal to the respective MAD extent. Table 8.20 will be clearly demarked, if possible; ▪ The ECoW will report the survey findings to the competent authority and the developer will engage with NPWS; ▪ The ECoW will log the finding in the logbook.
		Development of grassland habitat (Section 8.9.2.1.1) - ~100ha	▪ Measure included as enhancement in Chapter 7 - Biodiversity ▪ A total of approximately 100ha will be managed for grassland habitat creation (Figure 7.25), in line with McCorry *et al.* (2012):

Phase	Potential Effect	Proposed Mitigation Measure	Further description
			▪ Any scrub will be cleared from these areas. No vegetation will be cleared outside the areas in Figure 7.25: ▪ Scrub clearance will be undertaken yearly, in September, extending into the Operation Phase; ▪ In the first year, the scrub clearance will be undertaken with the use of an excavator (for larger shrubs/trees), and chainsaw (form smaller plants); ▪ Felled scrub will be placed in existing onsite drains, and on the boundaries of the plots; ▪ The clearance works will be carried out under the supervision of the ECoW/Suitably qualified Ecologist. The ECoW/Suitably qualified Ecologistwill identify the plants to be removed, direct the excavator/chainsaw operator, and the staff transporting the felled scrub to the drains and boundaries; and ▪ The ECoW/Suitably qualified Ecologist will also confirm the requirement of the excavator use in subsequent years, having in consideration that manual/chainsaw clearance would be a preferable method to avoid ground disturbance.
		Development of Hedgerows (~1,300m)	▪ Measure included as enhancement in Chapter 7 - Biodiversity ▪ Hedgerows (Figure 7.24) will be planted with native shrub and tree species, i.e. Blackthorn, Grey Alder, Grey Willow , Elder, Hawthorn, Holly, Hazel; ▪ The new linear habitat will have a total extension of 1,337m; ▪ These linear habitats are managed and maintained until the end of the Construction Phase, or until the planted shrubs and trees will be considered as fully established by the ECoW/Suitably qualified Ecologist (if it extends into the Operation Phase); ▪ No fertilisers will be used.
		Development of woodland habitat (~3.20ha)	▪ Measure included as additional mitigation in Chapter 7 - Biodiversity ▪ An area of 3.23ha in the Lough Bannow bog is selected for the management of 'Oak-ash-hazel woodland' habitat: ▪ Only Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*), and Hazel (*Corylus avellana*) trees will be planted; ▪ All planting material must be derived from seed sources within Ireland and accompanied by a Plant Passport attesting the good health status of the plant(s), compliant to the EU Plant Health Regulation (2016/2031). This

Phase	Potential Effect	Proposed Mitigation Measure	Further description
			measure is of particular importance in view of the control of the Ash dieback disease (DAFM, 2022); ▪ However, if it is not possible t source planting material from within Ireland, acceptable plant origins must follow the order of preference set by the Department of Agriculture, Food and the Marine (DAFM, 2024b, sec. 2.7.1); ▪ The planting material (bare-rooted trees - whips) will be 0.45 to 100cm tall; ▪ The planting procedure will be a simple process, consisting of: ▪ Digging a hole sufficiently large and deep (i.e. planting depth is indicated by the soil on the root collar) as to allow the whole root of the plant to be spread out evenly. Topsoil will be placed aside; and ▪ Place the soil over the roots ensuring no roots or bark are damaged. ▪ If the location of the hole for plantation is occupied by ruderal scrub species (e.g. Holly, Bramble), these plants will be cleared before the tree plantation; ▪ No other trees and/or vegetation will be cleared to accommodate the tree plantation; ▪ No herbicides and/or fertilisers will be used.
Operation Phase	Disturbance/displacement	Grassland, Hedgerow and Woodland habitat management	▪ As mentioned in the description of the habitat management measures above, some of the habitat management actions are likely to extend beyond the Construction Phase (particularly the management of grassland habitats). Where this will be the case, Bord na Móna will assign an appropriately experienced ecologist to carry out the habitat management actions for the duration of the Operation Phase of the proposed wind farm.
		Screen fencing	▪ Visual screening fences will be installed at selected locations along the amenity roads and tracks (illustrated in Figure 8.11), to prevent disturbance to breeding and non-breeding birds using the site during the operation phase (occasional movement of people, dogs); ▪ The screen fences will be specifically targeted to stretches of the tracks holding no screening vegetation (e.g. hedgerows); ▪ The screening fence will be approximately 1m high, mounted with Willow and Chainlink; ▪ The screening fence will be regularly inspected regularly by a Suitably qualified Ecologist, who will determine necessary maintenance actions to be employed (e.g. erection of fallen posts; reinstating of damaged mounted panels).

Phase	Potential Effect	Proposed Mitigation Measure	Further description
Decommissioning Phase	-	Restriction of period for decommissioning works	▪ The Decommissioning Phase of the proposed wind farm will be timed to avoid the breeding birds nesting season, from 1st of March to 31st of August.
Proposed TDR			
Construction Phase	Habitat Loss (TDR – Section 8.9.2.2.1)	Restriction of period for vegetation clearance	▪ The vegetation/tree clearance for the works at the POIs of the TDR will be timed to avoid the breeding birds nesting season, from 1st of March to 31st of August.

7°54'0"W

53°39'40"N

606000

612000

768000

Legend

- Proposed wind farm site boundary
- Turbine Layout
- Proposed Internal Wind Farm Roads
- Proposed Additional Amenity Links
- Proposed Amenity Pathway
- Screening Fence

0 1 2
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	07/05/2025	First issue	S.P	I.H
Rev	Date	Description	By	Chkd.

Client:

Bord na Móna

Project:

Derryadd Wind Farm

Title:

Figure 8.11:
Locations for the Installation of Screen Fencing

Scale @ A3:	1:35,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	I.Heanue	May 2025

TOBIN

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Map Ref:	Draft:
11399-094..ApX-Scr..Fen-P.APP.BO-TOB-A	A

8.11.4 Bird Monitoring Programme

A Bird Monitoring Programme will be undertaken at the proposed wind farm site. The monitoring programme is presented in full in Appendix 8.6, and described below.

The programme has been carefully developed to ensure that the proposed development can proceed while safeguarding local and migratory bird populations. It is designed to understand, mitigate, and monitor potential effects on birds and outlines a detailed plan for both the construction and operation phases of the proposed development at the wind farm site. The overarching objective of the programme is to understand bird behaviour, identify potential risks, and ensure appropriate protections are in place, with clear objectives and targeted monitoring actions tailored to each phase.

The design of the programme has been informed by the desktop studies, and the bird breeding and non-breeding season surveys used here for the ornithological impact assessment in this chapter of the EIAR. As outlined above, the desktop studies included a review of data from sources like NPWS, BirdWatch Ireland, and NBDC to identify protected species, and previously published ecological assessments, scientific literature, and publicly available environmental impact reports. The desk study informed the design of field surveys at the proposed wind farm site which were carried out in accordance with best-practice methodologies from recognised authorities including SNH.

The objectives of the programme are to:

- Prevent disturbance to breeding birds during the construction phase;
- Monitor how birds use the site and interact with turbines during operation;
- Detect both short- and long-term changes in bird populations, particularly among sensitive or protected species;
- Assess collision risks and document any bird fatalities;
- Report findings at key intervals to inform mitigation and adaptive management over time.

Pre-Construction Phase Monitoring: Protecting Nesting Birds

Before any work begins, construction activities are scheduled to avoid the bird nesting season (from March 1st to August 31st) the most sensitive time of year for many species. However, if construction does overlap with this period in future seasons, a dedicated pre-construction survey will be triggered.

This involves four site visits between April and July, where a qualified ornithologist will conduct breeding bird transects both on-site and within a 500-metre radius of the site boundary. If breeding activity is detected, nest locations will be mapped, and a 500-metre no-work buffer will be enforced. These areas will be physically marked and communicated to all staff through toolbox talks and on-site mapping to ensure strict compliance.

This action ensures that no construction will proceed in areas where birds are nesting, reducing the risk of disturbance during critical breeding periods.

Post-Construction Monitoring: Long-Term Environmental Monitoring

Once the wind farm becomes operational, a robust, long-term monitoring regime begins, continuing across the first 15 years of the wind farm's life (in years 1, 2, 3, 5, 10, and 15). A variety of complementary surveys will be carried out to monitor bird behaviour, assess potential turbine interactions, and evaluate any population changes or displacement effects.

1. Vantage Point (Flight Activity) Surveys

These surveys are conducted monthly in designated operational years. Observers stationed at key vantage points record bird flight paths, height, and behaviour near turbines. This helps determine if birds are avoiding or flying dangerously close to turbine blades — vital for understanding collision risk.

2. Breeding Bird Surveys

A suite of breeding bird surveys — including raptors, woodcock, waders, and the breeding bird census surveys — is carried out to track any shifts in nesting behaviour or territory usage caused by the wind farm and supporting infrastructure. These surveys help detect subtle displacement effects that may not be immediately obvious.

3. Winter Bird Surveys

To capture seasonal variation, winter surveys including I-WeBS counts, winter transects, and Hen Harrier roost monitoring (despite no records of roosting Hen Harrier during the field study – Section 8.8.2.21) are conducted during the same operational years. These are especially important for species like Whooper Swan and Hen Harrier, which are of European conservation concern and use the site outside the breeding season.

4. Fatality Monitoring

A detailed collision monitoring programme is also in place. Trained dogs are used to search for bird carcasses around turbines, increasing the likelihood of detection. Carcass removal trials are conducted to understand scavenger interference, and all findings are calibrated to estimate actual fatality rates. This ensures any bird deaths linked to turbine operation are documented and used to guide mitigation if necessary.

Reporting and Adaptive Management

At the end of each monitoring year, a comprehensive report will be submitted to the NPWS and the planning authority, no later than March 31st. These reports include all survey data, analysis of bird-turbine interactions, flight maps created with GIS software, and recommendations for mitigation where needed. This transparent reporting structure supports accountability and allows for adaptive management over time, should changes be required.

8.12 RESIDUAL EFFECTS

The proposed development has been assessed as potentially giving rise to the unmitigated likely significant effects on eight KARs (Section 8.9.5), from habitat loss (Construction Phase), and disturbance/displacement (Construction and Operation Phase). With the implementation of the mitigation measures described in Section 8.11, it is considered that the significance of the effects mentioned above will be significantly reduced. In addition to these effects, there is also the potential for airborne dust and contaminant-related impacts during the Construction Phase on the habitats that may be used by bird species. However, with the implementation of the proposed mitigation measures, the potential effects will be minimised, ensuring they do not result in significant harm. Furthermore, the habitat management measures (Table 8.32) will create a favoured roosting habitat for the mentioned KARs (Eurasian Teal, European Golden Plover, Little Grebe, Mallard, Northern Lapwing, Northern Shoveler, Eurasian Wigeon, and Whopper Swan), which is likely to become scarce in the future (Section 8.9.5).

Therefore, upon the implementation of the aforementioned mitigation measures, it is considered that any effects from habitat loss, and disturbance/displacement from the proposed development, alone and/or cumulatively with other projects, is either unlikely or not significant

8.13 CONCLUSION

This chapter presents an evaluation of the potential effects of the proposed development on birds, and details appropriate mitigation measures to avoid or reduce the significance of potential effects. The residual effects assessment, post implementation of the proposed mitigation measures, concludes that the proposed development, either individually or cumulatively with other projects, will not result in significant effects on any of the identified KARs.

Overall, it can be concluded, the proposed development will not have significant effects on birds at any geographic scale.

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