

Ballyfeeny Green Energy Project



Environmental Impact Assessment Report Volume II

Chapter 6 – Biodiversity

September 2025

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Acronyms

Term	Meaning
EIAR	Environmental Impact Assessment Report
GCR	Grid Connection Route
TDR	Turbine Delivery Route
EIA	Environmental Impact Assessment
LA	Local Authority
AA	Appropriate Assessment
NIS	Natura Impact Statement
QIs	Qualifying Interests
SCIs	Special Conservation Interests
CEMP	Construction Environmental Management Plan
SHMP	Species and Habitat Management Plan
WFD	Water Framework Directive
INIS	Inis Environmental Consultants
GSI	Geological Survey of Ireland
NGO's	Non-governmental Organisations
IES	Institute of Environmental Sciences
CIEEM	Chartered Institute of Ecology and Environmental Management
PEA	Preliminary Environmental Assessments
HRA	Habitat Regulations Assessment
EclA	Ecological Impact Assessment
AECOW	Association of Environmental Clerks of Works
ECOW	Environmental Clerks of Works
CV's	Curriculum Vitae
EU	European Union
EC	European Commission
FPO	Flora Protection Order
EPA	Environmental Protection Agency
NWPS	National Parks and Wildlife Services
NRA	National Road Authority
NBAP	National Biodiversity Action Plan
CDP	County Development Plan
LCAP	Local Authority Climate Action Plan
DAU	Development Applications Unit
IFI	Inland Fisheries Ireland
BCI	Bat Conservation Ireland
IPCC	Irish Peatlands Conservation Council.
ZoI	Zone of Influence
S-P-R	Source – Pathway – Receptor
SCI	Special Conservation Interests
SPA	Special Protection Area
SAC	Special Area of Conservation
COs	Conservation Objectives
NBDC	National Biodiversity Data Centre
BWI	Bird Watch Ireland
CRM	Collision Risk Modelling
KERs	Key Ecological Receptors

Term	Meaning
IBA	Important Bird Area
NHA	National Heritage Area
pNHA	Proposed National Heritage Area
BAP	Biodiversity Action Plan
WD4	Conifer Plantation
GA1	Improved Agricultural Grassland
BL3	Buildings and Artificial surfaces.
GS4	Wet Grassland
WS5	Recently-felled woodland
WS1	Scrub
WD1	Mixed broadleaved woodland
GA2	Amenity Grassland
WN2	Oak-Ash-Hazel woodland
ED4	Active quarries and mines
ED2	Spoil and bare ground
ED3	Recolonising bare ground
GS2	Dry meadows and grassy verges
WN6	Wet willow-alder-ash woodland
FL8	Other artificial lakes and ponds
WL1	Hedgerows
WL2	Treelines
FW4	Drainage ditch
FW1	Eroding/upland rivers
GA2	Amenity Grassland
LHB	Lesser Horseshoe Bat
IWEA	Irish Wind Energy Association
SNH	Scottish Natural Heritage
RCDP	Roscommon County Development Plan
TRP	Threat Response Plan
BoCCI	Birds of Conservation Concern in Ireland
INNS	Invasive non-native species
ESB	Electrical Supply Board
CM	Construction Management
EcoCoW	Ecological Clerk of Works
COMAH	Control of Major Accident Hazards
EIS	Environmental Impact Statement
T01	Turbine 1
T02	Turbine 2
T03	Turbine 3
T04	Turbine 4
T05	Turbine 5
T06	Turbine 6
SE1	Site Entrance 1
SE2	Site Entrance 2
SE3	Site Entrance 3
SE4	Site Entrance 4
SE5	Site Entrance 5
SE6	Site Entrance 6
BESS	Battery Energy Storage System

6. Biodiversity

6.1 Introduction

This Chapter assesses the likely significant direct and indirect effects of the proposed Project on the surrounding biodiversity, for terrestrial and aquatic ecology, including ornithology during the construction, operational and decommissioning phases of the proposed Project.

The proposed Project includes six no. turbines and all associated infrastructure including Turbine Foundations, Turbine Hardstands, Site Access Tracks, Wind Farm Internal Cabling, Grid Connection Route (GCR), Relay Tower, Onsite Substation and works required along the public road network for the two Turbine Delivery Route (TDR) options to facilitate the delivery of turbine components. A full description of the proposed Project is provided in **Chapter 2 - Project Description**.

The Applicant is in receipt of a notification of opinion by the Local Authority on design flexibility. The notification is provided in **Appendix 1.5 – DFR-25-1 Notification of Opinion by Local Authority**. This opinion from the Local Authority (LA) confirmed that it was *‘appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application’*.

Chapter 1 – Introduction, Section 1.6 Approach to Design Flexibility, outlines with respect to the notification of opinion by the Local Authority, the Applicant in this EIAR, proposes to assess three distinct Technology Options within the range outlined by the Local Authority and in accordance with the design flexibility parameters sought. **Chapter 1 – Introduction Table 1-3**, outlines the options and associated parameters that are used in the EIAR, comprising three potential turbines classified as Technology Option 1, 2 and 3. Further detail on the assessment of the Technology Options is provided in **Section 6.3.5**.

The potential for likely significant effects of the proposed Project, on the integrity of any European Sites has been assessed within the accompanying **EIAR Volume 6 - Appropriate Assessment Screening (AA)** and **Natura Impact Statement (NIS)**. The AA/NIS identifies the potential for connectivity and therefore potential impact to all surrounding and adjacent European Sites and their Qualifying Interests (QIs) and Special Conservation Interests (SCIs).



Figure 6-1: Site Location (Ref: EIAR Figure 6-1 (Volume 4))

This Chapter is supported by the following technical appendices:

- **Appendix 2.1 - Construction Environmental Management Plan (CEMP);**
- **Appendix 6.1 - Statements of Authority;**
- **Appendix 6.2 - Desk Study and NBDC data tables;**
- **Appendix 6.3 - Statutory Sites;**
- **Appendix 6.4 - Habitats;**
- **Appendix 6.5 - Ornithology;**
- **Appendix 6.5A - Ornithology Redacted;**
- **Appendix 6.6 - Bats;**
- **Appendix 6.7 - Mammals and Other Receptors;**
- **Appendix 6.8 - Aquatic Ecology;**
- **Appendix 6.8A - Fisheries;**
- **Appendix 6.9 - Collision Risk Model;**
- **Appendix 6.10 - Species & Habitat Management Plan (SHMP);**
- **Appendix 8.4 - Water Framework Directive (WFD) Assessment;**

This Chapter is supported by the following Chapters:

- **Chapter 2 - Project Description;**
- **Chapter 3 - Consideration of Alternatives;**
- **Chapter 7 - Land, Soils & Geology;**
- **Chapter 8 – Water, Hydrology (Flood Risk Assessment) & Hydrogeology;**
- **Chapter 9 – Air Quality & Climate;**
- **Chapter 10 – Noise & Vibration;**
- **Chapter 16 – Cumulative Effects**, which considers other plans and projects that may act cumulatively with the proposed Project; and
- **Chapter 17 – Interrelated Effects**, which address the interactions between effects on different environmental aspects.

6.1.1 Statement of Authority

This EIAR Chapter has been prepared by Inis Environmental Consultants Ltd. (INIS), based on field data collected by INIS ecologists who are experienced in undertaking field surveys in relevant habitats and for relevant species.

The contributors to this Chapter are listed below. Dr Alex Copland is the lead author for the final report and was supported at various stages of drafting and review by Cillian Burke, Conor Daly, Andrew Whitfield, Daniel Connell and Howard Williams, with GIS support from Peter O'Connor:

Dr Alex Copland PhD BSc MEnvSc MCIEEM (Technical Director, INIS), has over 30 years of professional experience working in both statutory and private companies, in third-level research institutions and with environmental NGOs. He is a full member of the Institute of Environmental Sciences (IES) and the Chartered Institute of Ecology and Environmental Management (CIEEM). He is proficient in experimental design and data analysis and has managed several large-scale, multi-disciplinary ecological projects, managing staff and resources to meet budgetary constraints and the successful delivery of projects on time. These have included research and targeted management work for species of conservation concern, ecological assessments (including fieldwork and reporting) for large-scale infrastructure projects (including Strategic Infrastructure Developments) and delivering successful planning outcomes, the design and delivery of practical conservation actions with a range of stakeholders and end-users, education and interpretation on the interface between people and the environment and the development of coordinated, strategic plans for birds and biodiversity. He has written numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds and habitats in Ireland. In relation to windfarms, Alex has overseen the delivery of technical (ecology) inputs into eight windfarm EIAR Chapters in Ireland, totalling nearly 100 turbines and a generation capacity exceeding 350MW. He also sits on the Editorial Panel of the scientific journal, *Irish Birds*, which publishes original ornithological research relevant to Ireland's avifauna, and CIEEM's *Irish Policy Group*.

Cillian Burke BSc (Ecologist, INIS), prepared the first draft of this EIAR and supporting amendments during the review process. He is an Ecologist with a BSc (Hons) in Environmental Science from the Galway University. Cillian has five years' experience in undertaking multi-disciplinary surveys including habitat classification, ornithology vantage point (VP) surveys, breeding wader surveys, Ecological Clerk of Works (EcoCoW) and bat

surveys. He has co-authored ecological reports including Screenings for AA, AA/NIS, EIARs, EclAs, and Species and Habitat Management Plans (SHMP), including large-scale wind farm projects ranging from six turbine wind farms outputting 25.2MW in Co. Clare and 11 turbine wind farms outputting 62MW in Co. Clare. He is a Qualifying member of CIEEM.

Conor Daly MSc BSc (Hons.) ACIEEM (Ecologist, INIS), contributed to the writing of this EIAR and also conducted VP, breeding raptor and Breeding wader surveys as part of the 2023 breeding season surveys. Conor was awarded a MSc in Biodiversity and Conservation and an Honours BSc (Hons) in Zoology. Conor has conducted bird, mammal, habitat and entomological surveys for renewable energy projects, conservation monitoring projects and private developments since 2021. Over his four years as an ecologist, Conor has written Preliminary Environmental Assessments (PEA), Appropriate Assessment (AA) Screening, NIS and EIAR reports. During his employment with Inis, Conor has been involved in conducting a range of reports, including AA Screenings, NIS, and Environmental Impact Assessment (EIA) Screenings and reports.

- Reviewed and contributed to the EIAR and NIS text for a 11-turbine windfarm in Co. Clare, with a generating output of c.62MW;
- Coordinated, drafted, reviewed and edited EIAR and NIS text for a 146B application for a 22-turbine windfarm and 32km grid connection in Co. Tipperary, with a generating output of 92.4MW;
- Reviewed and contributed to the EIAR and NIS text for a 11-turbine windfarm in Co. Kilkenny, with a generating output of c.66MW; and
- Supported drafting a Biodiversity EIAR and NIS text for a 6-turbine windfarm in Co. Clare, with a generating output of 25.2MW

Andrew Whitfield MA BA CEnv CEcol (Associate Consultant), has over 30 years of experience in undertaking and co-ordinating ecological and environmental impact assessments across a wide variety of infrastructure projects. These include projects of varying type and scale, ranging from new nuclear power generation facilities and wind farm developments to major road and rail construction schemes. Andrew has undertaken Habitat Regulations Assessments (HRA) of various plans and projects including transport improvement options for the Scottish Government, water supply options for Greater London, and the Heads of the Valleys Road improvements. Andrew has extensive experience of undertaking Phase 1 habitat surveys, surveys for Otter, Water Vole, Badger and Red Squirrel, amphibian surveys, and butterfly and dragonfly surveys. He has given evidence at

approximately 20 planning inquiries/hearings in the UK, Ireland and Africa. Andrew led the technical review of this EIAR Chapter.

In recent years, Andrew has contributed to the preparation of EIARs and NIS for windfarm developments in Ireland as follows:

- Coordinated, reviewed and edited EIAR and NIS text for a 11-turbine windfarm in Co. Clare, with a generating output of c.62MW;
- Coordinated, reviewed and edited EIAR and NIS text for a 8-turbine windfarm in Co. Waterford, with a generating output of 30.4MW;
- Coordinated and contributed to the EIAR and NIS text for a 11-turbine windfarm in Co. Kilkenny, with a generating output of c. 66MW; and
- Drafted the Biodiversity EIAR and NIS text for a 6-turbine windfarm in Co. Clare, with a generating output of 25.2MW.

Mr. Daniel Connell MSc BSc MCIEEM AEnvCoW, supported and reviewed the early drafts of this report. He has 12 years' combined experience in Ecology and Consultancy within Ireland, and more than 10 years' experience in Environmental Journalism for both ENGOS and National Press in Ireland and the UK. He holds an honours degree in Natural Sciences, from University of Galway and studied for a Masters in Biodiversity, Wildlife and Ecosystem Health at The University of Edinburgh. He has extensive experience in the preparation of Ecological Impact Assessment (EcIA), Appropriate Assessment (AA) Screening, Natura Impact Statements (NIS), Environmental Impact Assessment (EIA) and Preliminary Ecological Appraisal (PEA) reports across a range of projects and plans, including development plans, industrial, transport, residential, and renewable energy developments. Daniel is a full member of CIEEM and the Association of Environmental Clerks of Works (AECOW).

Howard Williams BSc CEnv CBiol MRSB MIFM (Principal Ecologist and Managing Director, INIS), provided technical support and review during the production of this EIAR Chapter. He is a Chartered Environmentalist and Chartered Biologist who has authored and managed Ecological Impact Assessments (EcIA), Construction Environmental Management Plans and Article 6 Appropriate Assessments (AA) for more than 50 wind farm projects. He is currently advising on 900MW of onshore and offshore renewable energy projects and has advised on 800MW of successful renewable energy projects over the past 25 years. Howard is an expert in the field of avian ecology and has extensive knowledge and experience of prescribing management for a range of terrestrial and aquatic protected species.

Mr. Peter O Connor MSc BA (GIS Manager, INIS), is the lead GIS Specialist at INIS and is responsible for the oversight and generation of all INIS GIS related outputs. This includes elements of constraints design, such as the use of survey data and aerial imagery in a constraints led design process- in addition to the design and implementation of all Biodiversity related mapping outputs. He has developed bespoke survey templates in Qfield which have allowed INIS to transition to digital field work collection for all surveys. He manages the GIS team and is involved in the training and upskilling of staff members. Peter has prepared GIS mapping (including viewshed analyses) for six windfarms in Ireland, with a combined total of 62 turbines and generating output of c. 294MW. Peter has experience in the design, and production of Viewshed Analysis of Vantage Points to inform Collision Risk Modelling. This involves using high resolution Radar Topographic imagery from Earth Observation Satellites to perform 3D analysis of the Vantage Points. He has over eight years' experience in producing EIAR Biodiversity Chapter supporting Figures (Map books and Appendices) and Appropriate Assessment supporting maps where he is responsible for all data capture, and integration into project mapping of field data (Habitats, Aquatics, Birds, Bats, Mammals, Invasive Species, etc.). Peter has extensive experience in using ArcGIS Pro, QGIS and Qfield software, utilising advanced GIS tools for spatial analysis, developing mobile applications for field work and online mapping applications using ArcGIS Experience Builder and Dashboards. Peter led the production of figures, calculations and all other GIS inputs to this EIAR Chapter.

Statements of Authorities and Curriculum Vitae (CV's) for the Inis Ecology Team are provided in **Appendix 6.1 – Statements of Authority**.

6.2 Legislation, Policy & Guidance

6.2.1 Legislation

The key International and Irish legislation for an ecological assessment includes the following:

- Wildlife Acts 1976-25;
- The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) as amended;
- The Birds Directive (Council Directive 2009/147/EC) as amended;
- The European Communities (Birds and Natural Habitats) Regulations 2011 - 2025, S.I. 447/2011(transposes EU Birds directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EEC);
- The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009) and as amended;
- European Union Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 to 2018;
- European Union (Invasive Alien Species) Regulations 2024. S.I. No. 374/2024;
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy as amended;
- EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the EIA Directive);
- The Wildlife Acts 1976-2023 (as amended) (the “Wildlife Acts”);
- The Convention on the Conservation of Migratory Species of Wild Animals 1979 (the “Bonn Convention”);
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (the “Bern Convention”);
- The Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1971 (the “Ramsar Convention”);
- Planning and Development Act 2000 - 2025, as amended; and
- Flora (Protection) Order (FPO), 2022.

6.2.2 Guidance

The Chapter has been prepared in accordance with current key industry standard best practice guidance including the following:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- European Commission (2017) Environmental Impact Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report. (Directive 2011/92/EU as amended);
- Kelleher C., Marnell F. and Mullen E. (2022). Bat Mitigation Guidelines for Ireland V2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland (Kelleher *et al.*, 2022);
- NatureScot (2021). Bats and onshore wind turbines - survey, assessment and mitigation;
- National Parks and Wildlife Services (NPWS) (2019). Status of Protected EU Habitats and Species in Ireland (NPWS, 2019a, b, c);
- Kelly et al. (2013a) The economic cost of invasive and non-native species in Ireland and Northern Ireland, A report prepared for the N.I. Environment Agency and NPWS;
- Kelly, et al. (2013b) Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland, A report prepared for the N.I. Environment Agency and NPWS;
- O'Flynn et al. (2014) Ireland's invasive and non-native species – trends in introductions, NBDC Series No. 2;
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Best Practice Guidelines for the Irish Wind Energy Industry (Irish Wind Energy Association, 2012);
- Wind energy development and Natura 2000 (European Commission, 2011);
- OPR Practice Note PN01. Appropriate Assessment Screening for Development Management (OPR, 2021a);
- OPR Practice Note PN02. Environmental Impact Assessment Screening (OPR, 2021b);

- Wind Turbine/Wind Farm Development Bat Survey Guidelines. Version 2.8, December 2012. Bat Conservation Ireland, www.batconservationireland.org Bat Conservation Ireland (2012);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority (NRA, 2008a);
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes. National Roads Authority (NRA, 2008b);
- Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. National Road Authority (NRA, 2006);
- Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (NRA, 2005);
- The Good Roads Guide: Nature Conservation Advice in Relation to Otters Design Manual for roads and Bridges (DMRB Vol 10 S. 4 Part 4 HA 81/99) (Highways Agency, 1999);
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater Coastal and Marine version 1.3 (CIEEM, 2024);
- Guidelines For Ecological Report Writing. Chartered Institute of Ecology and Environmental Management (CIEEM, 2017a);
- Guidelines for Preliminary Ecological Appraisal: Vol. 2nd ed. Chartered Institute of Ecology and Environmental Management (CIEEM, 2017b);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition), Bat Conservation Trust (Collins, 2023); and
- Bats and onshore wind turbines: survey, assessment, and mitigation (Scottish Natural Heritage, 2021).

6.2.3 Policy

The overarching planning policy relevant to the proposed Project is detailed in **Chapter 4 – Planning and Policy**. A Planning Statement has been provided with the planning application documents.

Planning policy occurs at the national and local levels and has relevance to environmental design and assessment. A summary of the national policy on Biodiversity referred to in this Chapter is provided below;

- Project Ireland 2040 was published in 2018 and incorporates the National Development Plan 2021-2030 and the National Planning Framework. It provides an

overarching framework for the social, economic, and cultural development of the country, including the provision of more renewable energy developments such as the proposed Project;

- National Heritage Plan was published in February 2022 and is set to run in Ireland up to 2030. The aim of the Heritage Plan is to provide a “*framework for the protection, conservation, promotion and management of Ireland’s heritage for the next decade and beyond*”;
- National Biodiversity Action Plan (NBAP) 2023-2030 emphasises the requirement for National, Regional and Local Governments to ensure that the conservation and sustainable use of biodiversity for human well-being is at the forefront of their work;
- The All-Ireland Pollinator Plan 2021-2025 promotes the importance of native pollinator species and habitats in Ireland.
- The Biodiversity Sectoral Climate Change Adaptation Plan sets out a long-term goal for adaptation to climate change, including flood risk management, along with a set of objectives and adaptation actions aimed at achieving those objectives; and
- Climate Action Plan 2023 – Changing Ireland for the Better commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. Among the critical measures in the plan is to increase the proportion of renewable electricity to up to 80% by 2030, making wind farm projects imperative to achieving this aim.

Locally, the Roscommon County Development Plan (CDP) 2022 to 2028, the following Strategic Aims in relation to biodiversity states:

- Strategic Aim No. 11: Protect and enhance the natural assets of County Roscommon, including clean water, biodiversity, landscape, green infrastructure, heritage and agricultural land; and
- Strategic Aim No. 14: To protect, conserve and enhance the built and natural heritage and the landscape of County Roscommon for future generations, and reinforce the distinctive character of the county through ensuring that recognised sites and species of environmental importance are conserved and managed appropriately.

The Roscommon Heritage Strategy 2025-2029 is currently at draft stage. One strategic objective of this draft plan is to support the preparation and implementation of a Roscommon Biodiversity Action Plan. In the absence of the Roscommon Biodiversity Action Plan, the

Roscommon CDP 2022 - 2028 includes the following Objectives which relate specifically to the conservation of biodiversity in the County:

- *“CAEE 8.7: Ensure that proposals for renewable energy developments are considered in the context of relevant EU and national legislation, including in respect of environmental protection. No renewable energy developments will be considered in designated Natura 2000 sites or their surrounding buffer areas;*
- *CAEE 8.8: Ensure that renewable energy developments do not undermine the preservation and conservation of the natural and built environment and that an appropriate balance is achieved between renewable energy development and preservation of the natural environment;*
- *NH 10.1: Ensure the protection, conservation and enhancement of the biodiversity of the county;*
- *NH 10.4: Proposals where woodland, tree or hedgerow removal is proposed will be required to demonstrate a sufficient level of protection to Annex IV species, such as bats and Otter, in accordance with the Habitats Directive;*
- *NH 10.6: Require all new development in the early pre-planning stage of the planning process to identify, protect and enhance ecological features by making provision for local biodiversity (e.g. through provision of Swift boxes, bat roost sites, green roofs, etc.) having regard to the recommendations outlined in the Habitat Mapping in Co. Roscommon, 2011 and the County Roscommon Swift Survey, 2000;*
- *NH 10.13: Encourage the retention of hedgerows and other distinctive boundary treatments in rural areas and prevent the loss and fragmentation where practically possible. Where removal of hedgerows, stone wall or other distinctive boundary treatment is unavoidable, mitigation by provision of the same type of boundary will be required;*
- *NH 10.14: Promote and encourage planting of native hedgerow species in new development; and*
- *NH 10.24: Ensure, where the presence of invasive species is identified on any proposed development site, that robust treatment measures are detailed to demonstrate how these species will be appropriately managed and controlled.”*

The County Roscommon Local Authority Climate Action Plan (LCAP) 2024-2029, aligns with and supports the aims and achievements of climate related ambitions including the Roscommon CDP 2022-2028. The Roscommon LACP 2024-2029 includes the following Environmental Governance Principles which relate specifically to the conservation of biodiversity in the county and are supported by the proposed Project:

- “EG 1: Promote Climate Action projects that support and maximise environmental co-benefits, such as biodiversity protection and enhancement; improved air, water or soil quality; or enhanced recreation, amenity and cultural heritage value, to ensure win-win benefits are gained,”

6.3 Methodology

6.3.1 Consultation

Scoping and consultation have been carried out in support of the proposed Project and in line with the EIA Directive, together with the EPA Guidelines and with due regard for the Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017).

Data Requests

Correspondence inquiring about the presence of vulnerable terrestrial and aquatic species, and habitats on or near the Project, were made to the relevant State Agencies and organisations with sensitive data for species of conservation interest. Letters of consultation regarding these matters were sent out by Inis in May 2022 to the Development Applications Unit (DAU), NPWS, Inland Fisheries Ireland (IFI) and Bat Conservation Ireland (BCI).

Scoping and Consultation

Consultation requests were also issued by Inis in June 2022, to help inform the scope of the surveys required for the proposed Project. Responses received from IFI (June 2022) and NPWS (via the DAU) in July 2022. A request was also made to BCI in June 2022; no response was received.

An EIA Scoping Report was issued to 48 Statutory and non-statutory stakeholders via email in September 2024, of which 11 responded. The Irish Peatlands Conservation Council (IPCC) and An Coimisiún Pleanála (previously An Bord Pleanála) were included as stakeholders for the EIA Scoping Report. All scoping consultation responses are provided in **Appendix 1.3 – Scoping Consultation Responses**.

Where responses were received in 2022 and 2024 relevant to biodiversity, these are summarised in **Table 6-1**.

Table 6-1: Consultation responses relevant to the biodiversity environment

Stakeholder Details	Stakeholder Comment	How comments have been addressed in this Chapter of the EIAR
NPWS Data request in relation to rare/protected species including sensitive data sent on 31/05/2022	Response received 24/06/2022 (areas searched: M98, M97, N07, N08). The response highlighted the following: • Curlew – records of nest locations or estimated centres of territory: Hectad N08: two records in 2020; three records in 2019; one record in 2017; one record in 2016; one record in 2015 • Peregrine nest sites – as recorded during the 2017 National Peregrine Survey (with information as to whether they were recorded as nest sites in the previous National Survey in 2002). Hectad M98: One occupied nest site (not known in 2002).	Field surveys were undertaken for rare/protected species (Section 6.4 Baseline Environment) and are considered within Section 6.6 Assessment of Effects .
DAU in NPWS An email requesting any observations regarding biodiversity on the Project was sent to the Manager at the DAU on 02/06/2022	Response received 14/07/2022. The DAU made no site-specific comment on this referral but did indicate the expected standards of data and post-construction measures required to be part of the impacts assessment (EIAR and AA).	The guidance and standards indicated within the response were adhered to throughout the survey and assessment stages of the Project.
DAU in NPWS EIA Scoping Report was issued to the Manager at the DAU in September 2024	Response received 19/11/2024. The DAU responded to state that there were <i>“not in a position to make specific nature conservation comment on this particular referral at this time.”</i>	

Stakeholder Details	Stakeholder Comment	How comments have been addressed in this Chapter of the EIAR
IFI An email requesting any observations regarding biodiversity on the Project was sent to IFI on 02/06/2022. The EIA Scoping Report was issued to IFI in September 2024.	The initial response (received 13/06/2022) was generic to Wind Farm Scoping within the Shannon River Basin District, and detailed surveys and assessments required to inform an EIAR. A response was received to the EIAR Scoping Report on 21/10/2024. This contained largely similar information to the previous consultation response, but was specific to the Project, including specific reference to rivers/ watercourses present in the general area of the wind farm Site. This response is summarised as follows: • The Scramoge River, Culliagh Stream and Feorish River are all salmonid watercourses with good stocks of wild brown trout, they also support coarse fish species; • Waterbodies must be assessed in terms of aquatic biodiversity with particular emphasis on fish, the food of fish, spawning grounds and fish habitat in general; • An invasive species survey should be commissioned. A biosecurity plan should be produced for the scheme construction; • Concerns about soils, their structure and types around all the turbines, associated access tracks and site development, the stability of the soils and the impact that works on both the turbines and access roads will have either directly or by vibrations.	The actions were taken into consideration and addressed within Section 6.6 Assessment of Effects and Section 6.7 Mitigation Measures. Aspects relating to the water environment, site drainage and soils are also considered in Chapter 7 – Land, Soils and Geology and Chapter 8 – Water, Hydrology and Hydrogeology.

Stakeholder Details	Stakeholder Comment	How comments have been addressed in this Chapter of the EIAR
	• IFI strongly recommends that specialist personnel are employed to assess soil strength and suitability of the ground at each site and along any proposed access road; • Use of sedimentary rocks, such as shale, in road construction should be avoided; • Proposals regarding the use of borrow pits will need to be thoroughly assessed in terms of dewatering and drainage during construction and post construction to prevent any risk of pollution; • Site drainage and settlement measures during both construction (with particular attention to the road construction phase) and operation; • Drainage from disturbed and stockpiled soils will have to be considered in advance; • Stripping of topsoil should be minimised to the works footprint, retaining riparian zones where present; • Attention should be paid to the hydrology of any site where excavations including excavations for roads or infrastructure are being undertaken; • Constructing and designing silt traps particular attention should be paid to rainfall levels and intensity; • Consideration must be given to the disposal of all waste materials; • Details in relation to site offices and the services necessary for the site offices should form part of the EIAR; • Method statements and timings of all instream construction works and those in close proximity to a watercourse should be agreed with IFI prior to any commencement of works;	

Stakeholder Details	Stakeholder Comment	How comments have been addressed in this Chapter of the EIAR
	• Instream works in the River Scramoge, Feorish, Cullaigh Stream or other salmonid streams and construction and associated works with a high risk of suspended solids pollution should not take place between October and 30th April in order to protect spawning and juvenile Trout; • The EIAR should indicate proposals to monitor the impact on all watercourses within the Site; • For small streams, a distance of at least 15m should be considered as a bare minimum for a riparian zone. In relation to turbine construction this should not be permitted within 50m of a watercourse; • The discharge of polluting or deleterious matter to any watercourse except under and in accordance with a licence may be an offense under the Fisheries Acts and/or under the Water Pollution Acts; • At all times the precautionary principle should be applied throughout for the entire development; and • All works should adhere to IFI's Guideline documents on road construction and Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016). A full summary of the responses to the IFI is available in Appendix 1.3 – Scoping Consultation Responses	

6.3.2 Study Area

The appraisal of ecological baseline information contained within this Chapter is based on a study area that incorporates the land within the Site boundaries and wider Zone of Influence (Zol); see **Figure 6-2**. The Zol is defined as *'the area over which ecological features may be affected by biophysical changes as a result of the proposed Project and associated activities'* (CIEEM, 2024).

The Zol will extend beyond the Site due to ecological and hydrological links beyond the Site boundary. The Zol will encompass different areas in respect of each ecological feature, depending on its location and sensitivity, and the spatial extent of the relevant biophysical change. These biophysical changes will also differ depending on the phase of the development (construction, operation, and decommissioning) and their associated activities and subsequent impacts.

In order to determine the Zol, the spatial and temporal extent of biophysical changes likely to be generated by the different phases of the development with the potential to lead to effects upon ecological features were predicted. Most of the activities and resultant biophysical changes are unlikely to have an effect beyond the Site boundaries. The exceptions to this include activities associated with the construction and decommissioning of the wind turbines and associated infrastructure that may cause potential disturbance effects to species residing beyond the Site, habitat degradation where downstream hydrological connectivity with the Site exists, and potential mortality of mobile species such as bats, which could collide with the operational turbines when passing through the Site.

Taking this into consideration, the Zol, and the study area, is broadly considered as the geographical area over which the Project could affect the receiving environment in a way that could have significant effects on ecological receptors. It is recommended that this is established on a case-by-case basis using the Source-Pathway-Receptor (S-P-R) model. The likely effects of the Project on ecological receptors have been appraised using the S-P-R model, where:

- A 'Source' is defined as the individual element of the Project that has the potential to impact on an ecological receptor or a designated site, its qualifying features and its conservation objectives;
- A 'Pathway' is defined as the means or route by which a source can affect the ecological receptor; and
- A 'Receptor' is defined as the ecological receptor of local importance or higher. Including the SCIs of the Special Protection Area (SPA) or QIs of a Special Area of Conservation

(SAC) for which Conservation Objectives (COs) have been set for the European or National sites being screened.

Following the guidance set out by the NRA (NRA, 2009) and the Office of the Planning Regulator (OPRb, 2021), the proposed Project has also been evaluated based on an identified Zol with regards to the potential S-P-R model for the development.

The likely Zol for mobile species (e.g., Otter *Lutra lutra*) and static species and habitats is considered differently. Mobile species have a 'range' for commuting to foraging habitats, including ex-situ of the Statutory Sites for which they are designated. The ranges of mobile species vary considerably, from a few metres to hundreds of kilometres (e.g., in the case of migratory wetland birds). Whilst static species and habitats are generally considered to have Zol's in close proximity to the Project, they can be significantly affected at considerable distances from an effect source; for example, where an aquatic habitat or species is located many kilometres downstream from a pollution source.

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Figure 6-2: Survey Area of the Wind Farm Site Boundary (Ref: EIAR Figure 6-2 (Volume 4))

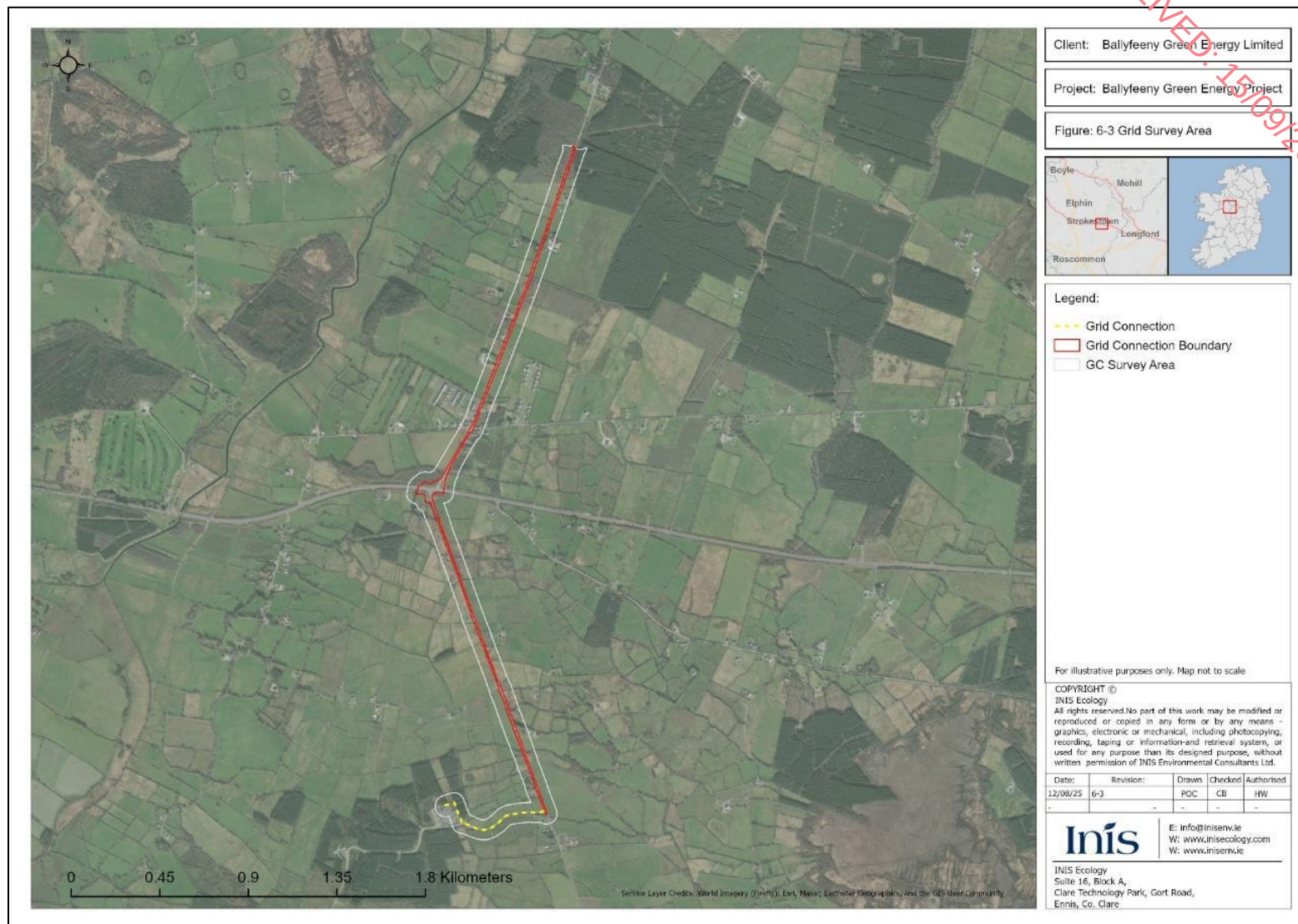


Figure 6-3: Survey Area of the Grid Connection Route Boundary and Grid Connection Route with substation (Ref: EIAR Figure 6-3 (Volume 4))

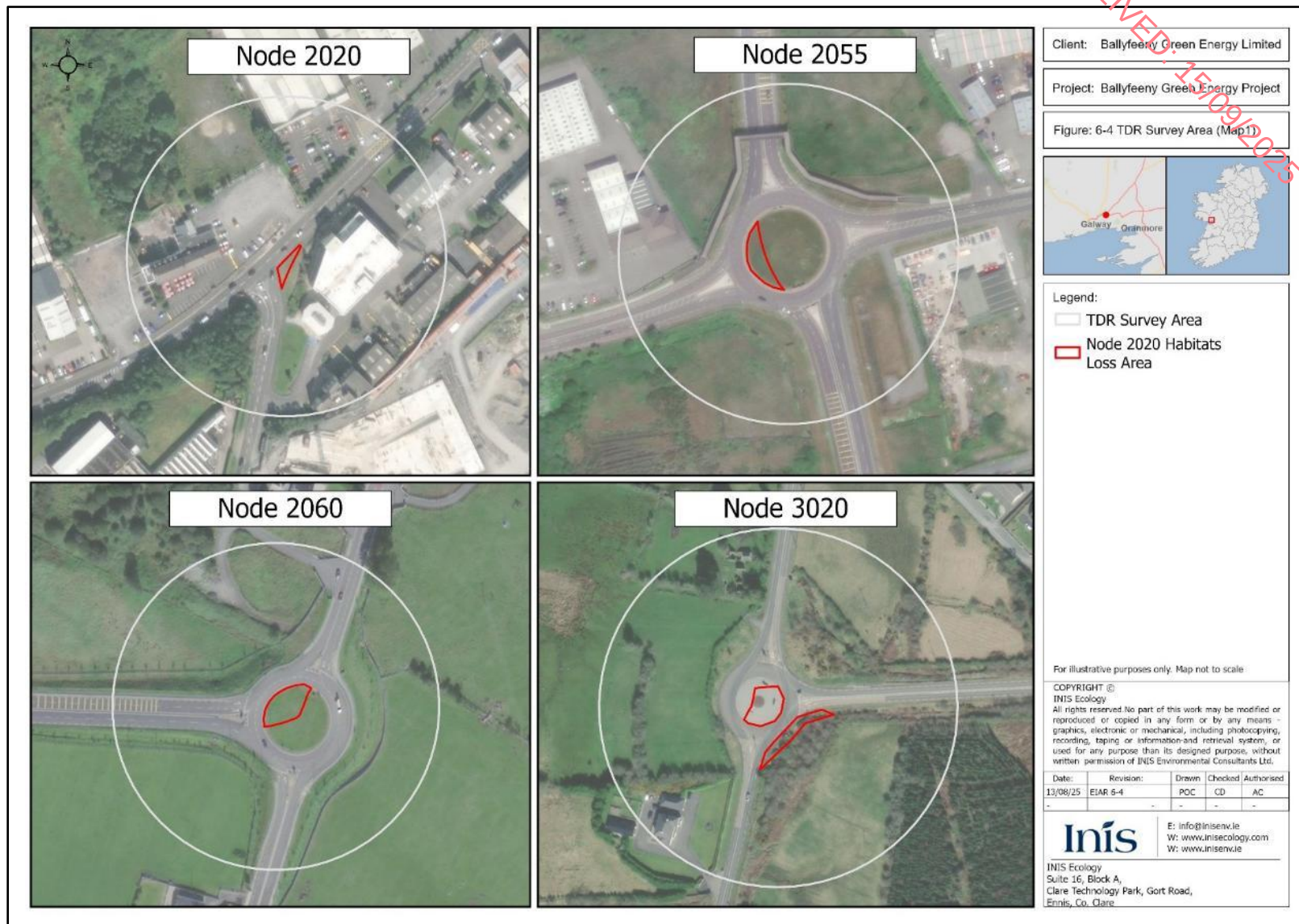


Figure 6-4: Survey Area of TDR nodes Map 1 (Ref: EIAR Figure 6-4 (Volume 4))

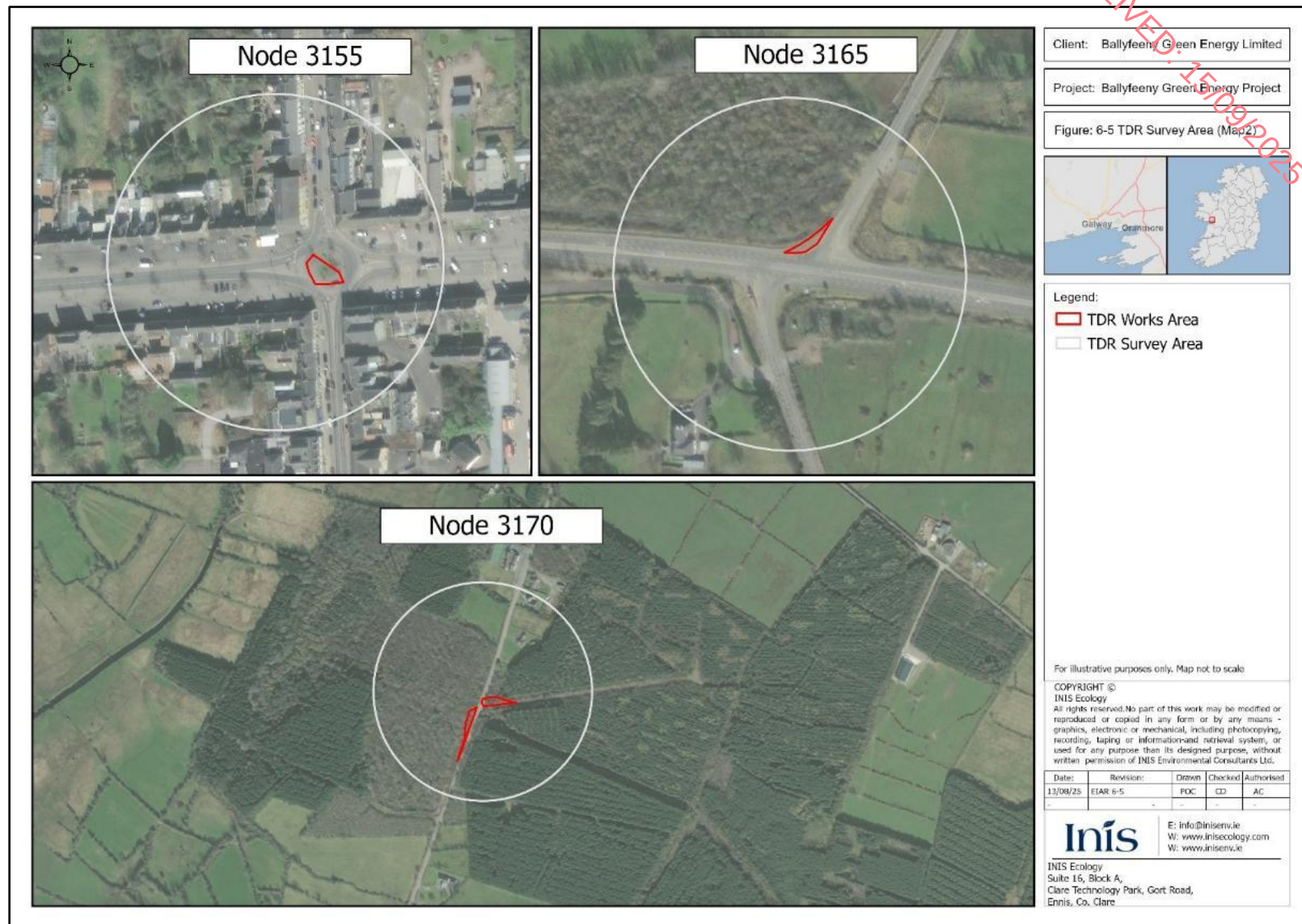


Figure 6-5: Survey Area of TDR nodes Map 2 (Ref: EIAR Figure 6-5 (Volume 4))

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6.3.3 Desk Study

The desk study for this assessment included a comprehensive review of available published data. A search of the following websites has been undertaken:

- NPWS website, including:
 - Status of Protected Habitats and Species Map Viewer[1];
 - Protected Flora Order 2022 Map Viewer – Vascular Plants[2];
 - Flora Protection Order Map Viewer - Bryophytes[3];
 - Review of NPWS Article 17 reporting[4];
- National Biodiversity Data Centre (NBDC) website (accessed 06/06/2025);
- EPA website (accessed 06/06/2025);
- IFI website (accessed 06/06/2025);
- BirdWatch Ireland (BWI) website (accessed 06/06/2025);
- Irish Birding website (accessed 06/06/2025);
- BCI website (accessed 06/06/2025);
- BCI database of bat records (received 22/07/2025); and
- Butterfly Conservation Ireland website (accessed 06/06/2025).

Additional sources of relevant data included the websites of An Coimisiún Pleanála (previously An Bord Pleanála) and relevant Local Authorities (including Roscommon County Council) to review ecological data associated with other plans and projects occurring in the wider area, in addition to assessing such plans or projects in relation to cumulative and in-combination effects.

Websites of relevant government departments and agencies were also reviewed, particularly in relation to current legislative requirements and guidance around EIARs and ecological assessments, such as the National Biodiversity Plan, local county development plans, etc.

For full detail of the results and data generated from the Desk Study, please see **Appendix 6.2 – Desk Study and NBDC data tables**.

6.3.4 Field Work

Overview

A range of field surveys within the Study Area were undertaken for the proposed Project between 2022 and 2024. The scope of these surveys was informed by the desk study and through the outcome of the scoping and consultation process. **Table 6-2** summarises the field surveys that were undertaken. Field survey results are detailed in **Section 6-3**.

Table 6-2: Field Survey Details

Survey	Survey Date	Survey Area	Relevant Guidelines	Relevant Appendix
Flora and Habitats				
Habitat Survey including Invasive Alien Plant Species (IAPS)	Wind farm Site: July 2023 and September 2024 GCR and TDR: May 2024	All areas within 50m of wind farm Site boundary, the GCR and the relevant nodes on the TDR.	CIEEM, 2024 Smith <i>et al.</i> , 2011 Fossitt, 2000	Appendix 6.4
Birds				
Vantage Point Survey (to record flightlines of all target species)	Monthly; October 2022 to August 2024 inclusive	All area within 500m of the proposed turbine locations	NatureScot, 2017	Appendix 6.5
Breeding Waders	Breeding season (April to June) 2023 and 2024	500m buffer of the Site boundary	Goodship & Furness, 2022; NatureScot, 2017; Gilbert <i>et al.</i> , 2021; O'Brien & Smith, 1992	Appendix 6.5
Breeding Raptors	Breeding season (April to July) 2023 and 2024	2km buffer of the Site boundary	NatureScot, 2017; Hardey <i>et al.</i> , 2013	Appendix 6.5

Survey	Survey Date	Survey Area	Relevant Guidelines	Relevant Appendix
General breeding and wintering birds	Breeding season (April to June) 2023 and 2024; winter season (November 2022 to February 2023; November 2023 to February 2024).	Suitable habitat in line with CBS guidance. Transects located at least 1 km from each other.	BirdWatch Ireland, 2012	Appendix 6.5
Breeding Barn Owl	Breeding season (April to July) 2023 and 2024	2km buffer of the Site boundary	TII, 2017, Shawyer, 2011; Lusby & O'Clery, 2014; NatureScot, 2017	Appendix 6.5
Wintering Hen Harriers (Roosts)	Monthly visits October 2022 to March 2023 and October 2023 to March 2024	2km buffer of the Site boundary	NatureScot, 2017; Gilbert <i>et al.</i> , 2021	Appendix 6.5
Wintering wetland birds	Monthly visits October 2022 to March 2023 and October 2023 to March 2024	5km buffer of the Site boundary	NatureScot, 2017; BirdWatch Ireland, 2012	Appendix 6.5
Bats				
Preliminary Roost Assessments	February 2023 and March 2024	500m buffer for wind farm Site boundary.	NatureScot, 2021	Appendix 6.6
Bat Activity Surveys (Static bat detectors)	May to September 2023	Within the proposed Site boundary, covering the six turbine locations and the	NatureScot, 2021	Appendix 6.6

Survey	Survey Date	Survey Area	Relevant Guidelines	Relevant Appendix
		habitats within the proposed wind farm Site.		
Transect Survey	May to October 2023	Within the proposed Site boundary.	NatureScot, 2021; Collins, 2016	Appendix 6.6
Emergence Survey	July/August 2023	At sites identified with suitable roosting potential arising from the Preliminary Roost Assessment.	Collins, 2016.	Appendix 6.6
Mammals and Other Receptors				
General Mammals	November 2023 and January 2024	All suitable habitat within 50m of wind farm Site boundary, The GCR and the relevant nodes on the TDR.	NRA, 2008; NRA, 2009	Appendix 6.7
Otters	Wind farm Site: October 2023, November 2023 & January 2024 GCR:	All watercourses with 150m buffered upstream/downstream of the Redline boundary (including GCR)	Highways Agency, 1999; NRA, 2008	Appendix 6.7 and Appendix 6.8
Badger	October 2023 and January 2024	All suitable habitat within 50m of Site Boundary, The GCR and the relevant nodes on the TDR	NRA, 2005	Appendix 6.7

Survey	Survey Date	Survey Area	Relevant Guidelines	Relevant Appendix
Amphibians (Common Frog and Smooth Newt)	July 2023 and September 2024	Suitable habitats within the Project (e.g. ponds, drainage ditches and natural pools)	IWT, 2013	Appendix 6.7
Common Lizard	July 2023 and September 2024	Suitable basking spots (exposed rocks) within suitable habitats.	IWT, 2013	Appendix 6.7
Marsh Fritillary	April and September 2023	All suitable habitat within 50m of Site boundary	Marsh Fritillary Monitoring Scheme (NBDC, 2015)	Appendix 6.7
Freshwater Aquatic Receptors				
Fisheries Assessment (electro-fishing and/or habitat appraisal)	August 2023	Electrofishing and fisheries habitat appraisal on 13 riverine sites in the vicinity of the Project.; fisheries habitat appraisal only on two lacustrine sites in the vicinity of the Project.	CEN, 2003; CFB, 2008	Appendix 6.8
White-clawed Crayfish	August 2023	Completed at 15 aquatic survey sites in the vicinity of the Project.	Reynolds <i>et al.</i> , 2010; Gammell <i>et al.</i> , 2021; Peay, 2003.	Appendix 6.8
eDNA analysis	August 2023	Feorish River, downstream of the Project and Pond site	Nisbet & Bruce, 2018	Appendix 6.8

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Survey	Survey Date	Survey Area	Relevant Guidelines	Relevant Appendix
		217.46m north of the Site boundary.		
Macrophytes and aquatic bryophytes	August 2023	Completed at 15 aquatic survey sites in the vicinity of the Project.	Cheal <i>et al.</i> , 1993	Appendix 6.8
Biological Water-quality sampling) Q-sampling)	August 2023	Q-sampling at 13 riverine sites in the vicinity of the Project.; Lacustrine macro-invertebrate community appraisal At two lacustrine sites in the vicinity of the Project.	Feeley <i>et al.</i> , 2020	Appendix 6.7

6.3.5 Approach to Project Design

As set out in **Chapter 1 - Introduction**, under Section 32I of the Planning and Development Act 2000 (as amended), the Applicant is in receipt of an opinion on flexibility, relating to 3 no options of Turbines. This opinion from the Local Authority confirmed that it was 'appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application'.

The differences in the three Technology Options are listed in **Chapter 1 - Introduction, Table 1-3**.

As the differences in Technology Options relate only to minor differences in the turbine rotor diameter, hub height and total tip height, as such, there will be no difference in likely significant effects arising from the proposed Project on European sites from the three Technology Options.

In relation to habitat loss, the full extent of habitats losses, particularly in relation to removal of trees and shrubs/hedgerows for bat buffers, the assessment of effects is considered for each of the three Technology Options in **Section 6-8**.

In undertaking the Collision Risk Modelling (CRM) for bird species, Inis has taken the approach of modelling each of the three Technology Options. The assessment of effects in **Section 6-6**, describes the model output for each of the three Technology Options, together with a conclusion of the significance of effects for each option. The relevant appendix is **Appendix 6.9 – Collision Risk Model Technical Appendix**.

For other Key Ecological Receptors (KERs), the three Technology Options are not considered likely to give rise to any difference in the significance of effects capable of being assessed (i.e. As the differences in Technology Options relate only to minor differences in the turbine rotor diameter, hub height and total tip height, as such, there will be no difference in likely significant effects arising from the proposed Project).

6.3.6 Approach to Impact Assessment

Best Practice guidance derived from combination of NRA guidance (NRA, 2009) and methodology developed by Percival (2007) was used to evaluate the sensitivity of ecological receptors, the magnitude of impacts and the resultant significance of likely or potential effects to relevant aspects of Biodiversity as a result of the proposed Project.

Potential impacts on receptors were assessed using the Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2024) and the EPA Guidelines (EPA, 2022). Reference was also made to Wray et al. (2010) and Collins (2023) with regards to the evaluation of bat roosts and commuting routes/foraging areas.

Determining the Importance of the Biodiversity Resources

The importance of the habitats and species present were evaluated using the guidance document '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal, and Marine*' published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2024) and '*Guidelines for Assessment of Ecological Impacts of National Road Schemes*' published by the NRA (NRA, 2009). These documents outline an accepted approach for the evaluation of potential impacts from such developments. A summary of criteria used to inform importance is provided in **Table 6-5**.

In line with recommendations from the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* published by the NRA (NRA, 2009), receptors of Local Importance (Higher Value) or higher are scoped in as KER requiring assessment for likely significant effects. Any exceptions to this are supported with rationale for not being brought forward (e.g. a habitat in the survey area but outside the Redline Boundary where there are no likely significant effects).

Determining the Sensitivity of Biodiversity Receptors

Guidance from EPA, 2022, Percival 2007 and NRA 2009 has been used to evaluate the sensitivity of bird species to the proposed Project. This rating system has also been used as a general guide for other biodiversity receptors throughout this Chapter (see **Table 6-3**).

Table 6-32: Assigning ecological value/sensitivity to an Ecological Receptor.

Value of ecological features	Example criteria
International importance (Very High Sensitivity)	• European Site' including Special Area of Conservation (SAC), SCI, SPA or proposed Special Area of Conservation. • Proposed SPA or Important Bird Area (IBA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network. • A sustainable area of a habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of the larger whole. • Sustainable population of an internationally important species or site supporting such a species (or supplying a critical element of their habitat requirement) i.e.: IUCN Red List species that is listed as critically endangered, endangered, or vulnerable. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Biosphere Reserve (UNESCO Man & The Biosphere Programme). Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988). • Sites that support 1% or more of a biogeographic population of a species.
National importance (High Sensitivity)	• Nationally Statutory Sites (National Heritage Area (NHA) or pNHA, Statutory Nature Reserve of National Park) • Refuge for Fauna and Flora protected under the Wildlife Acts. • Undesignated site fulfilling the criteria for designation as a NHA).

Value of ecological features	Example criteria
	• Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive. • Sustainable population of a nationally important species or site supporting such a species (or supplying a critical element of their habitat requirement), i.e.: Refuge for fauna and flora protected under the Wildlife Acts. Resident or regularly occurring populations (assessed to be important in an Irish context) of the following: • Species protected under the Wildlife Acts. • Species listed on the relevant Red Data list. • Sites supporting 1% or more of a national population.
County importance (Medium Sensitivity)	• Area of Special Amenity/ area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Population of a species listed in a Regional BAP or relevant Natural Area on account of its regional rarity or localisation; or • Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species, viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level. • Resident or regularly occurring populations (assessed to be important at the County context) of the following: • Species protected under the Wildlife Acts. • Species listed on the relevant Red Data list. • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive. • Sites supporting 1% or more of a regional population.

Value of ecological features	Example criteria
Local Importance (Higher Value) (Low Sensitivity)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP (if available). - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive. - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. - Species protected under the Wildlife Acts. - Species listed on the relevant Red Data list. - Sites containing semi natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality. - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value) (Low Sensitivity)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; and/or - Sites of features containing non-native species that are of some importance in maintaining habitat links.

Determining Magnitude of Impacts to Biodiversity Receptors (Percival 2007)

A definition of terms used in respect of magnitude of impacts for bird species evaluations is outlined in **Table 6-4**. This rating system has also been used as a general guide for magnitude quantification of impacts for other ecological receptors throughout this report.

Table 6- 434: Determining Magnitude of Impacts (Percival 2007)

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

Determining Significance of Effect to Birds (Percival 2007 & EPA, 2022 combined)

The Percival significance matrix (**Table 6-5**) used for bird species evaluations is provided in the table below. This matrix has also been used as a guide for determining the significance of effects in relation to other ecological receptors throughout this report. The Equivalent EPA significance ratings have been applied to the table by the authors.

Table 6-55: Determining the Significance of Impacts (Percival 2007 with equivalent EPA Significance Ratings).

Significance		Sensitivity			
		Very High	High	Medium	Low
Magnitude	Very High	Very high/ Very significant	Very high/ Very significant	High/ Significant effects	Medium/ Moderate effects
	High	Very high/ Very significant	Very high/ Very significant	Medium/ Moderate effects	Low/ Slight effects
	Medium	Very high/ Very significant	High/ Significant effects	Low/ Slight effects	Very low/ Not Significant
	Low	Medium/ Moderate effects	Low/Slight effects	Low/Slight effects	Very low/ Not Significant
	Negligible	Low/ Slight effects	Very low/ Not Significant	Very low/ Not Significant	Very low/ Not Significant

Note: 'Very Low' significance (as per Percival 2007) is considered equivalent to the EPA, 2022 definitions for 'Not Significant', or 'Imperceptible' effects depending on the context of the magnitude of the impact or the sensitivity of the receptor. This is determined by the authors based on their professional ecological judgement and experience. Similarly, the significance of effects where the magnitude is Negligible is determined by the authors based on the context of the impact and their professional ecological judgement and experience.

The susceptibility of different bat species to such impacts depends on multiple factors; notably their tendency to fly at rotor blade height. A general assessment of vulnerability of bat species to collisions with wind turbines, based on best available scientific information, is provided in **Table 6-6**. NatureScot (2021) provides a generic assessment of bat collision risk for UK species, based on species behaviour and flight categorisation as well as evidence of casualty rates in the UK and Europe. This bat species collision risk assessment is considered to represent best available information for use in an Irish context. This species collision risk categorisation is used in combination with relative abundance to indicate the potential vulnerability of bat populations. Relative abundances for Irish species were determined in accordance with guidance provided by Wray et al. (2010) in combination with available population data.

Table 6-6 Estimated turbine collision risk for bat species

Relative abundance	Collision risk for UK and Irish bat species		
	Low	Medium	High
Common (100,000 plus)	Brown Long-eared Bat	No species in Ireland	Common Pipistrelle Soprano Pipistrelle
Rare (10,000 – 100,000)	Daubenton's Bat Natterer's Bat Whiskered Bat Lesser Horseshoe Bat	No species in Ireland	Nathusius's Pipistrelle Leisler's Bat
Rarest (under 10,000)	No species in Ireland	No species in Ireland	No species in Ireland

*Population vulnerability: yellow = low, orange = medium, red = high. Species of particular relevance as outlined in **Appendix 6.6 – Bats**, to the Project are indicated in bold.*

NatureScot (2021) sets clear criteria in assigning site specific risk level for bat species based on habitat features, project size and activity levels as provided in **Section 6.3.4, Tables 6-7 and 6-8** summarise the SNH criteria for assessing risk of collision.

Project size (**Table 6-7**) for the NatureScot (2021) assessment is based upon the number and size of turbines in the project and the presence of turbines in the wider landscape, with the following criteria:

- Small:
 - Small scale development (≤ 10 turbines);
 - No other wind energy developments within 10km; and
 - Comprising turbines < 50 m in height.
- Medium:
 - Larger developments (between 10 and 40 turbines);
 - May have some other wind farm developments within 5km; and
 - Comprising turbines 50-100m in height.
- Large:
 - Largest developments (> 40 turbines);
 - Other wind energy developments within 5km; and
 - Comprising turbines > 100 m in height.

The scores in **Table 6-8** are a product of multiplying site risk level and the activity category, with a **Low** risk being scored between 0 and 4; **Medium** risk between 5 and 12 and **High** risk being between 15 and 25.

Table 6-7: Habitat risk, Project size and resultant Project Site Risk for bat species (NatureScot, 2021)

	Project Size			Habitat Description
	Small	Medium	Large	
Habitat Risk Low	1	2	3	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features
Habitat Risk Moderate	2	3	4	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
Habitat Risk High	3	4	5	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway. Close to key roost and/or swarming site.

Table 6-8: Stage 2 risk assessment to bats for wind farm projects (NatureScot, 2021)

Activity Category	Site Risk Level					
	Nil (0)	Low (1)	Low-Moderate (2)	Moderate (3)	Moderate-High (4)	High (5)
Nil (1)	Low 0	Low 1	Low 2	Low 3	Low 4	Medium 5
Negligible (2)	Low 0	Low 2	Low 4	Medium 6	Medium 8	Medium 10
Low (3)	Low 0	Low 3	Medium 6	Medium 9	Medium 12	High 15
Moderate (4)	Low 0	Low 4	Medium 8	Medium 12	High 15	High 18
High (5)	Low 0	Medium 5	Medium 10	High 15	High 20	High 25

6.3.7 Determining the Significance of Effects

EPA/EIAR Guidance Definitions of Effects

Table 6-9, Table 6-10 and Table 6-11 outline the EPA, 2022, evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. These criteria are included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022)

Table 6-96: Quality of Effects (EPA, 2022)

Quality of Effect	Description
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity; or improving the reproductive capacity of an ecosystem or removing nuisances or improving amenities).
Neutral Effect	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effect	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).

Table 6-107: Duration of Effects (EPA, 2022)

Duration of Effect	Description
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.

Table 6-118: Significance of Effects (EPA, 2022)

Significance of Effect	Description
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

For the purpose of this assessment, effects rates as '**Significant**' or above are considered to be Significant in EIA terms. Effects identified as '**Moderate**' significance or below are considered Not Significant in EIA terms.

6.3.8 Assumptions and Limitations

Whilst Desk Study data sets are useful in providing supplementary ecological information for a site, it should be acknowledged that such data sets (e.g. the NBDC records) are dependent on the submission of records to the relevant organisation. As such, a lack of records for a particular species does not necessarily mean that the species is absent from the Site and/or wider search area. Similarly, records of a particular species do not necessarily mean that the species is still present within the Site and/or wider search area.

It should be noted that ecological features are transient, and that the distributions of habitats and species may be subject to change. As such, in line with CIEEM guidance, the ecological survey data presented in this report has been collected within five years of planned submission and within three years where species populations are rapidly changing (CIEEM, 2025). The data presented in this report is considered valid for at least two years (CIEEM, 2019), after which it may be

necessary for further field surveys to be undertaken. Pre-application surveys normally remain valid for two more survey periods, and should be repeated if the application is going to be delayed beyond the start of a third survey period, unless it is clearly evident that there has been no substantive change in number, distribution or activity since the original survey was undertaken (NatureScot, 2024).

The information provided in this Chapter accurately and comprehensively describes the ecological baseline of the proposed Project and provides a prediction of the likely ecological effects of the proposed Project, along with prescriptions for mitigation and enhancement as necessary. The specialist studies, analysis, reporting, and assessment methodologies have all been undertaken in accordance with the appropriate guidelines. No significant limitations in relation to the scope, scale, or context of the impact assessment have been identified.

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

The ecological data presented in this report was collected in optimal weather conditions. In some months, VP surveys were surveyed twice in one month to compensate for months when no survey work took place at a given VP, typically due to local weather conditions being unsuitable to allow the necessary visibility conditions for an accurate VP flight activity survey; this is in-line with best practice guidance.

In summary, it is considered that no significant constraints exist, and the survey data provides accurate detail on the baseline biodiversity in relation to data within the Project and environs.

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6.4 Baseline Environment

6.4.1 Statutory Sites

European Sites

Relevant European sites of nature conservation importance, including SPAs, SACs and Ramsar sites, with possible links to the Project were identified and assessed (see **Figure 6-6** and **Appendix 6.3 – Statutory Sites**). These European sites and their hydrological catchments are also detailed in the AA Screening and NIS (**EIAR Part 2, Volume 6**).

A precautionary approach was adopted when identifying relevant European sites, assessing all European sites within the Zol of the Project as well as more distant sites where potential hydrological linkage exists (OPR, 2021). Physical distance considered for mobile QIs/SCIs to interact with the proposed Project considered the further foraging or commuting range for the relevant species. Hydrological pathways were considered in a worst-case scenario where watercourses may carry significant levels of contaminant as far as the first lentic body encountered. A total of six SACs and two SPAs were identified as within a potential Zol for the Project (see **Table 6-12**).

Following the examination of potential connectivity to European Sites (as detailed in **Appendix 6.3 – Statutory Sites** and summarised in **Table 6-12**), five European Sites (Annaghmore Lough (Roscommon) SAC, Clooneen Bog SAC, Lough Forbes Complex SAC, Brown Bog SAC and Corbo Bog SAC) were shown to have no connectivity to the Project and were considered to be outside the Zol and therefore there is no potential for likely significant effects to these European Sites as a result of the proposed Project. These sites are not considered further.

The following three European Sites were identified as being within the Zol of the proposed Project (due to hydrological and/or other ecological connectivity) and therefore are considered further in this assessment:

- Lough Ree SAC [000440];
- Ballykenny-Fisherstown Bog SPA [004101]; and
- Lough Ree SPA [004064].

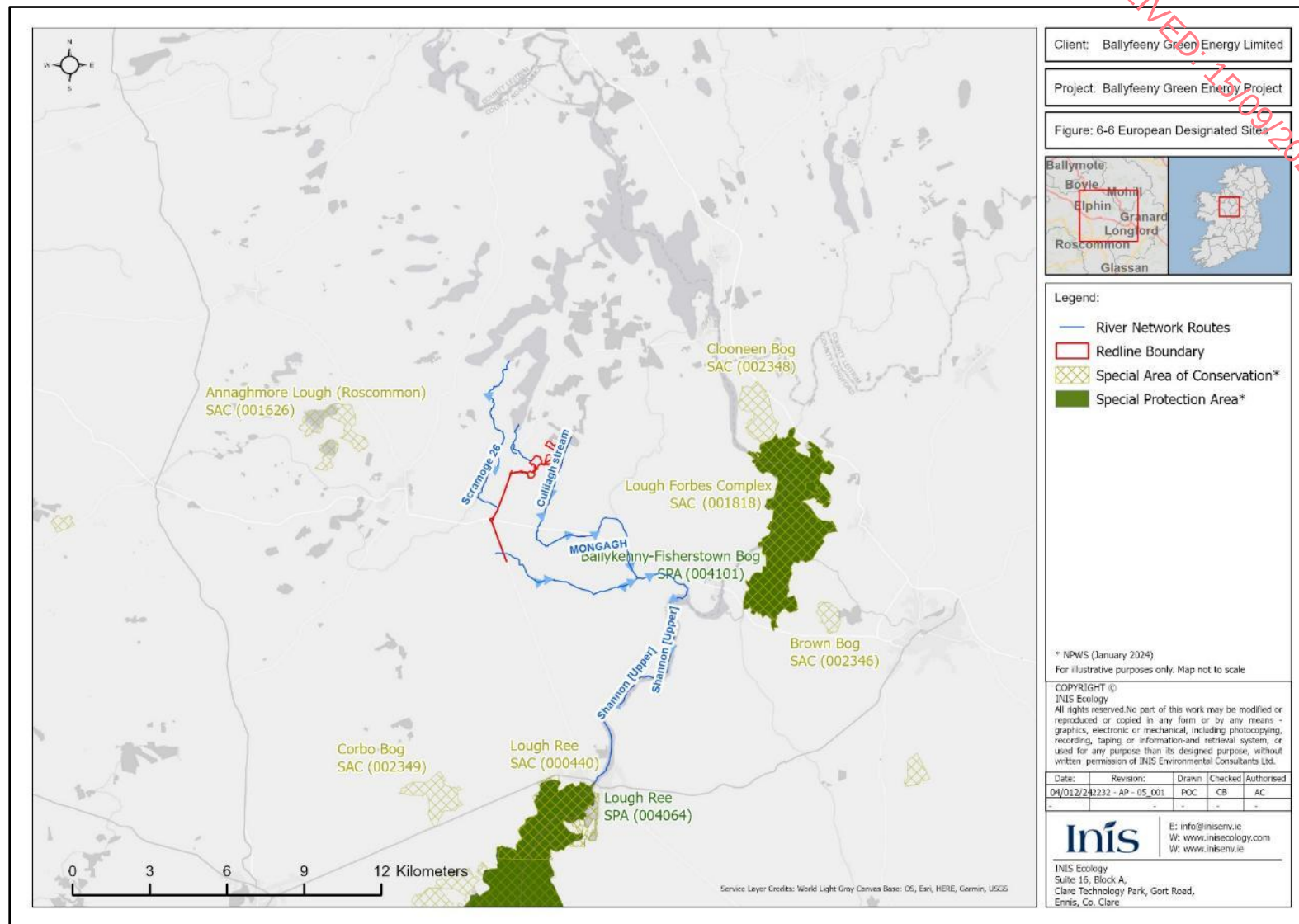


Figure 6-6: European Sites with Zol of the Project

Table 6-1219: Distance and connectivity between European sites and the Project, and consideration for impact assessment for those sites as KERs.

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
SACs					
Annaghmore Lough (Roscommon) SAC [001626]	NPWS (2019) Conservation Objectives: Annaghmore Lough (Roscommon) SAC 001626. Version 1.	Alkaline fens [7230]	5.6km	No hydrological connection. This SAC is located upstream of the proposed Project. No physical connection. These QIs are unlikely to be present ex-situ of the SAC. Neither QI is mapped within the footprint of or indirectly connected to the Projects potential sources. Therefore, this site is not considered a KER, as	No

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Greyer's Whorl Snail <i>Vertigo geyser</i> [1013]		neither of its QIs are considered likely receptors for impacts as a result of the project.	
Clooneen Bog SAC [002348]	NPWS (2024) Conservation Objectives: Clooneen Bog SAC 002348. Version 2.	Active raised bogs [7110] *	7.3km	No hydrological connection This SAC is located upstream of the Feorish and Shannon Upper confluence, which is downstream of the Project.	No
		Degraded raised bogs still capable of natural regeneration [7120]		No physical connection. These QIs are unlikely to be present ex-situ of the SAC. None of the QIs are mapped within the footprint of or indirectly connected to the Projects potential sources.	
		Depressions on peat substrates of the Rhynchosporion [7150]		Therefore, this site is not considered a KER, as none of its QIs are considered likely receptors for impacts as a result of the project.	

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Bog woodland [91D0] *			
Lough Forbes Complex SAC [001818]	NPWS (2016a) Conservation Objectives: Lough Forbes Complex SAC 001818. Version 1.	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]	7.3km	No hydrological connection. The Forbes Complex SAC/pNHA is 3.4km upstream of the confluence that connects the wind farm element of the Project and continuing downstream to the Lough Ree SAC. As such, there is a pathway for mobile QIs to interact with worst-case scenario Project sources and be potential receptors. However, none of the QIs for this SAC/pNHA are mobile and are unlikely to be present ex-situ of the SAC. No physical connection. These QIs are unlikely to be present ex-situ of the SAC. None of the QIs are mapped within the footprint of or indirectly connected to the Projects potential sources. Therefore, this site is not considered a KER, as	No
		Active raised bogs [7110] *			
		Degraded raised bogs still capable of natural regeneration [7120]			
		Depressions on peat substrates of the Rhynchosporion [7150]			

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *		none of its QIs are considered likely receptors for impacts as a result of the project.	
Brown Bog SAC [002346]	NPWS (2016b) Conservation Objectives: Brown Bog SAC 002346. Version 1.	Active raised bog [7110] *	11.4km	No hydrological connection. This SAC is located upstream of the Feorish and Shannon Upper confluence, which is downstream of the Project.	No
		Degraded raised bogs still capable of natural regeneration [7120]		No physical connection. These QIs are unlikely to be present ex-situ of the SAC. None of the QIs are mapped within the footprint of or indirectly connected to the Projects potential sources.	
		Depressions on peat substrates of the Rhynchosporion [7150]		Therefore, this site is not considered a KER, as none of its QIs are considered likely receptors for impacts as a result of the project.	

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
Lough Ree SAC [000440]	NPWS (2016c) Conservation Objectives: Lough Ree SAC 000440. Version 1.	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]	8.5km	No. All QI habitats for Lough Ree SAC have been considered in this screening assessment. This site is connected downstream of a potential surface run-off source from the proposed wind farm Site and grid connection works source. Based on the extent of downstream dissolution in play (18.6km at its closest point), in-situ Qis are unlikely to receive any extent of effect as a result of the Project. Only one of the QI habitats (Alkaline Fens) is mapped ex-situ of the SAC and is downstream of surface run-off source mentioned above. However, this location is more than 8.7km downstream from the nearest source, no significant pollutant or contamination event is expected to occur that would result in significant effect on this Ex-situ habitat. As such, no habitats listed for this site are considered to experience likely significant effect. Therefore, even in a worst-case scenario, this site is not considered a KER for these QIs.	Yes

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]		Yes – hydrological connection. This site is 22.1km downstream from the proposed wind farm Site via the Culliagh Stream and 18.6km from the GCR via the Bellmount. There is potential hydrological connectivity between the Project and the Lough Ree SAC. Yes – physical connection. The mobile QI Otter has a foraging range greater than the distance between the Project GCR is 8.9km upstream of the River Shannon (Upper)_100 which is 8.9km upstream of the Lough Ree SAC. This places the receiving environment of the Project within the foraging range of ex-situ Otter (13.2km ± 5.3km, Reid et al, 2013). Therefore, potential ex-situ connectivity is considered. Therefore, under the Precautionary principle, this site is considered a KER as this QI is considered for potential ex-situ effects.	
		Degraded raised bogs still capable of natural regeneration [7120]			
		Alkaline fens [7230]			
		Limestone pavements [8240] *			
		Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles			
		Bog woodland [91D0] *			

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Otter <i>Lutra lutra</i> [1355]			
Carbo Bog SAC [002349]	NPWS (2015) Conservation Objectives: Corbo Bog SAC 002349. Version 1.	Active raised bogs [7110] * Degraded raised bogs still capable of natural regeneration [7120]	8.4km	No hydrological connection. This SAC is located upstream of the Feorish and Shannon Upper confluence, which is the worst case scenario course point for the Project. As such, no contamination type pathways are likely to occur via the hydrological network No physical connection. These QIs are unlikely to be present ex-situ of the SAC. Therefore, this site is not considered a KER, as none of its QIs are considered likely receptors for effects as a result of the Project.	No

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Depressions on peat substrates of the Rhynchosporion [7150]			
SPAs					
Ballykenny-Fisherstown Bog SPA [004101]	NPWS (2022a) Conservation Objectives: Ballykenny-Fisherstown Bog SPA 004101. Version 1.	Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> [A395]	7.4km	Yes - hydrological connection. The Ballykenny-Fisherstown Bog SPA is 3.4km upstream of the confluence that connects the wind farm element of the Project and continuing downstream to the Lough Ree SAC. However, there is no pathway for in-situ impacts as this site is not hydrologically downstream of the proposed Project. Yes - physical connection. This site is 7.4km east (in a straight line) of the wind farm Site. This QI has a foraging range of 8km (SNH, 2016). In addition, Kilglass Lough (c. 1km from the proposed Project) is considered a	Yes

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
				habitat area used by this QI species (NPWS, 2025). It is therefore screened in for further assessment for ex-situ effects on Greenland White-fronted Goose. Therefore, under the precautionary principle, this site is considered a KER, as this QI is considered for potential ex-situ effects.	
Lough Ree SPA [004064]	NPWS (2022b) Conservation Objectives: Lough Ree SPA 004064. Version 1.	Little Grebe <i>Tachybaptus ruficollis</i> [A004]	8.6km	Yes - hydrological connection. SCIs of this European site are recorded in the wider receiving environment, including within the Kilglass Lough. Therefore, there is potential for ex-situ effects. Specifically, ex situ effects in the form of disturbance/displacement, pollution/contamination to foraging habitats. Hence, this site is considered for potential ex-situ effects. This site is connected downstream of a potential surface run-off source from the proposed wind farm Site and Grid Connection works source. Based on the extent of downstream dissolution in	Yes
		Whooper Swan <i>Cygnus cygnus</i> [A038]			
		Teal <i>Anas crecca</i> [A052]			
		Mallard <i>Anas platyrhynchos</i> [A053]			
		Tufted Duck <i>Aythya fuligula</i> [A061]			
		Common Scoter <i>Melanitta nigra</i> [A065]			

Designated site [code]	Conservation Objectives Version	QIs [code]/SCIs [code]	Distance to Project (km) from the nearest point	Connectivity with the Project	KER
		Goldeneye <i>Bucephala clangula</i> [A067]		play (18.6km at its closest point), this SPA is unlikely to receive any extent of effect as a result of the Project. No – physical connection. These SCIs were recorded in the wider receiving environment. Although these species have wide ranges of commuting habitat between large suitable foraging habitat in winter, and there is potential for ex-situ mortality, disturbance and displacement effects, given the distance between this site and the SPA, any such effects are not likely to be significant effect based on the flight activity recorded and the separation distance from the SPA site boundary. Therefore, this site is considered a KER as these SCIs are considered for ex-situ contamination/pollution effects.	
		Coot <i>Fulica atra</i> [A125]			
		Golden Plover <i>Pluvialis apricaria</i> [A140]			
		Lapwing <i>Vanellus vanellus</i> [A142]			
		Common Tern <i>Sterna hirundo</i> [A193]			
		Wigeon <i>Mareca penelope</i> [A855]			
		Shoveler <i>Spatula clypeata</i> [A857]			
		Wetland and Waterbirds [A999]			

National Statutory Sites

Seven NHAs and 16 pNHAs were identified for assessment in relation to the proposed Project (see **Figure 6-7** and **Table 6-13**). No other relevant Nationally Designated Sites were identified.

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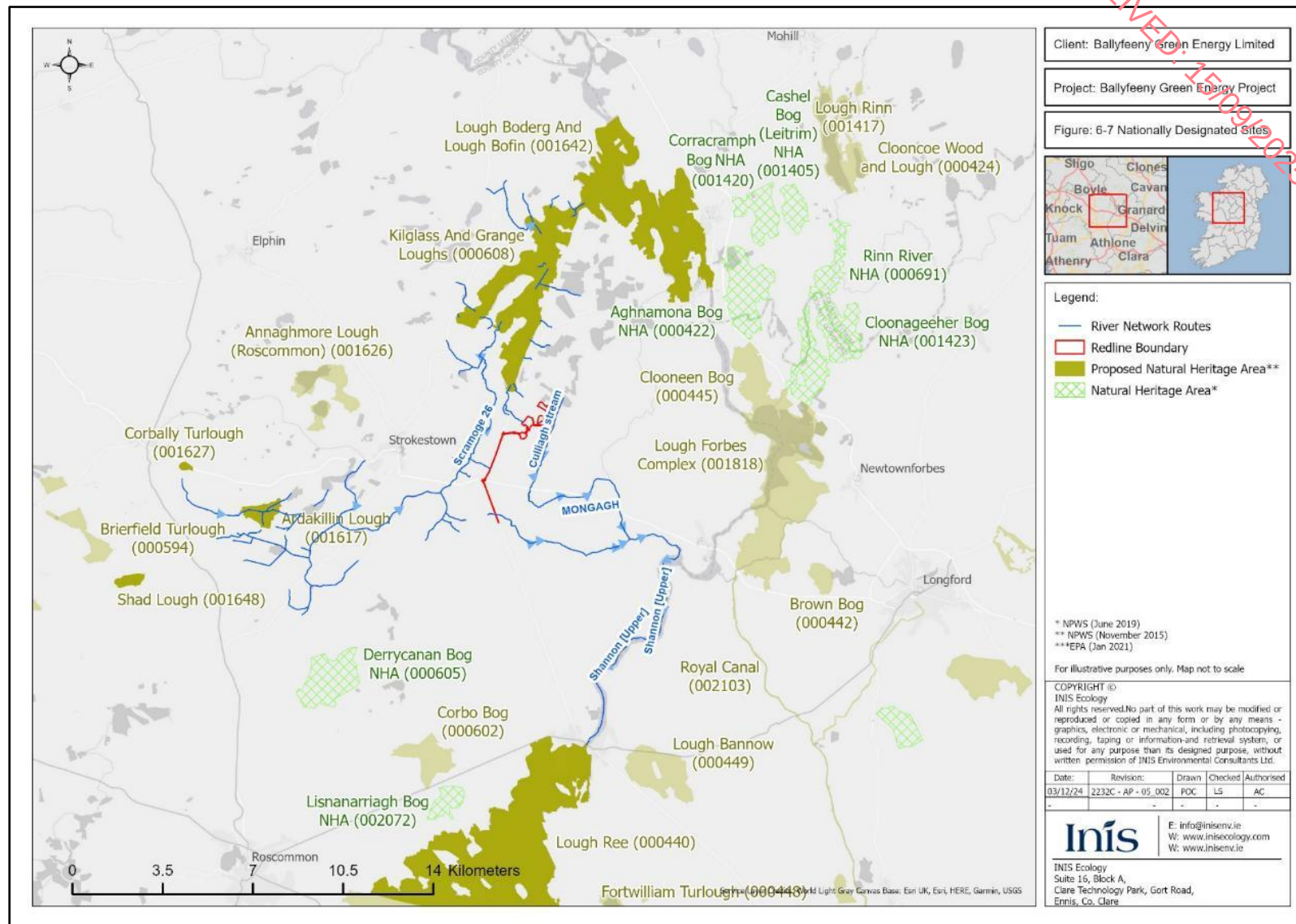


Figure 6-7: Nationally Designated Sites (Ref: EIAR Figure 6-7 (Volume 4))

Table 6-1310: Distance and connectivity between National sites and the Project, and consideration for impact assessment for those sites as KERs.

Site Code	Site Name	Distance to Project (km)	Connectivity	KER
NHAs				
000605	Derrycanan Bog NHA	6.9km	No hydrological or physical connection.	No
000422	Aghnamona Bog NHA	7.8km	No hydrological or physical connection.	No
000691	Rinn River NHA	9.1km	No hydrological or physical connection.	No
002072	Lisnabarriagh Bog NHA	10.2km	No hydrological or physical connection.	No
001420	Corracramph Bog NHA	10.2km	No hydrological or physical connection.	No
001423	Cloonageeher Bog NHA	10.8km	No hydrological or physical connection.	No
001405	Cashel Bog NHA	11.6km	No hydrological or physical connection.	No
pNHAs				
000608	Kilglass and Grange Loughs pNHA	1km	Yes, hydrological and physical connection	Yes
001626	Annaghmore Lough (Roscommon) pNHA	5.6km	No hydrological or physical connection.	No
001642	Lough Boderg and Lough Bofin pNHA	6.2km	Yes, hydrological and physical connection for Greenland White-fronted Goose. Habitats in the	Yes

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Site Code	Site Name	Distance to Project (km)	Connectivity	KER
			area are within foraging ranges of Greenland White-fronted Goose (which can forage up to 8km from roosting areas (SNH, 2016)).	
000445	Clooneen Bog pNHA	7.2km	No hydrological or physical connection.	No
001818	Lough Forbes Complex pNHA	7.2km	No hydrological or physical connection.	No
001617	Ardakillin Lough pNHA	7.9km	Yes, physical connectivity for QI Waterfowl only; no hydrological connectivity. Wind farm element is 8.96km from this site. Grid connection 7.9km at its closest point.	Yes
000602	Corbo Bog pNHA	8.3km	No hydrological or physical connection.	No
000440	Lough Ree pNHA	8.5km	Yes, hydrological; no physical connectivity	
002103	Royal Canal pNHA	9.1km	No hydrological or physical connection.	No
000449	Lough Bannow pNHA	10.2km	No hydrological or physical connection.	No
001627	Corbally Turlough pNHA	11.2km	No hydrological or physical connection.	No

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Site Code	Site Name	Distance to Project (km)	Connectivity	KER
000442	Brown Bog pNHA	11.3km	No hydrological or physical connection.	No
001648	Shad Lough pNHA	13.3km	Yes, physical connectivity for mobile Qis (Otter only); no hydrological connectivity. The mobile QI Otter has a foraging range greater than the distance between the Project site and Shad Lough pNHA (13.2km $\pm$ 5.3km, Reid et al., 2013). Therefore, potential ex-situ connectivity is considered.	Yes
001417	Lough Rinn pNHA	14.0km	No hydrological or physical connection.	No
000594	Brierfield Turlough pNHA	14.4km	No hydrological or physical connection.	No
000424	Clooncoe Wood and Lough pNHA	14.8km	No hydrological or physical connection.	No

Five pNHAs were identified to be within the Zol for the proposed Project and are taken forward for further assessment:

- Kilglass And Grange Loughs pNHA;
- Lough Boderg And Lough Bofin pNHA;
- Ardakillin Lough pNHA;
- Lough Ree pNHA; and
- Shad Lough pNHA.

6.4.2 Important Bird Areas

IBAs are internationally recognised sites of significant importance to bird species.

One IBA was identified within the Zol of the Project (Lough Ree IBA). The proposed Project does not overlap with Lough Ree IBA. However, Lough Ree IBA is located approximately 11.8km from the proposed Project. This IBA overlaps with Lough Ree SPA. No other relevant IBAs were identified. Given Lough Ree SPA is located within the Zol of the proposed Project due to hydrological connectivity, Lough Ree IBA is therefore carried forward for consideration under the auspices of Lough Ree SPA as a KER.

6.4.3 Habitats

A total of 23 habitat types, comprising 141.58ha in total, were recorded within the proposed wind farm Site and along the GCR. All habitats present within the survey area and the area occupied by each habitat type are presented in **Figure 6-8** and detailed in **Appendix 6.4 - Technical Appendix Habitats**. The dominant habitats present include Conifer plantation (WD4), Improved agricultural grassland (GA1), Wet grassland (GS4) and Buildings and artificial surfaces (BL3) which make up 33.61%, 22.62%, 10.49% and 8.49% the total area respectively. A total of 14,681m of linear habitats were recorded within the Project boundary (**see Appendix 6.4 – Technical Appendix Habitats**). Dominant habitats include hedgerows, treelines and drainage ditches.

A total of 15 habitat types, comprising 77.37ha in total, occur along the TDR. A further six linear habitat types, comprising 3,689m also occur along the TDR. All habitats present within the survey area and the area and length occupied by each habitat type are presented in **Appendix 6.4 – Technical Appendix Habitats** and **Figures 6-4-4-9 to 6-4-4-15** in the same Appendix.

Consideration of all habitats occurring within the wind farm Site (including GCR) and along the TDR for their presence, importance and sensitivity was undertaken to determine which habitats need to be considered as KERs (see **Table 6-14** for a summary of the habitat assessment; full details are presented in **Appendix 6.4 – Technical Appendix Habitats**). A total of 16 habitats and habitat mosaics have been taken forward for assessment as KERs for the Project (see **Table 6-14**).

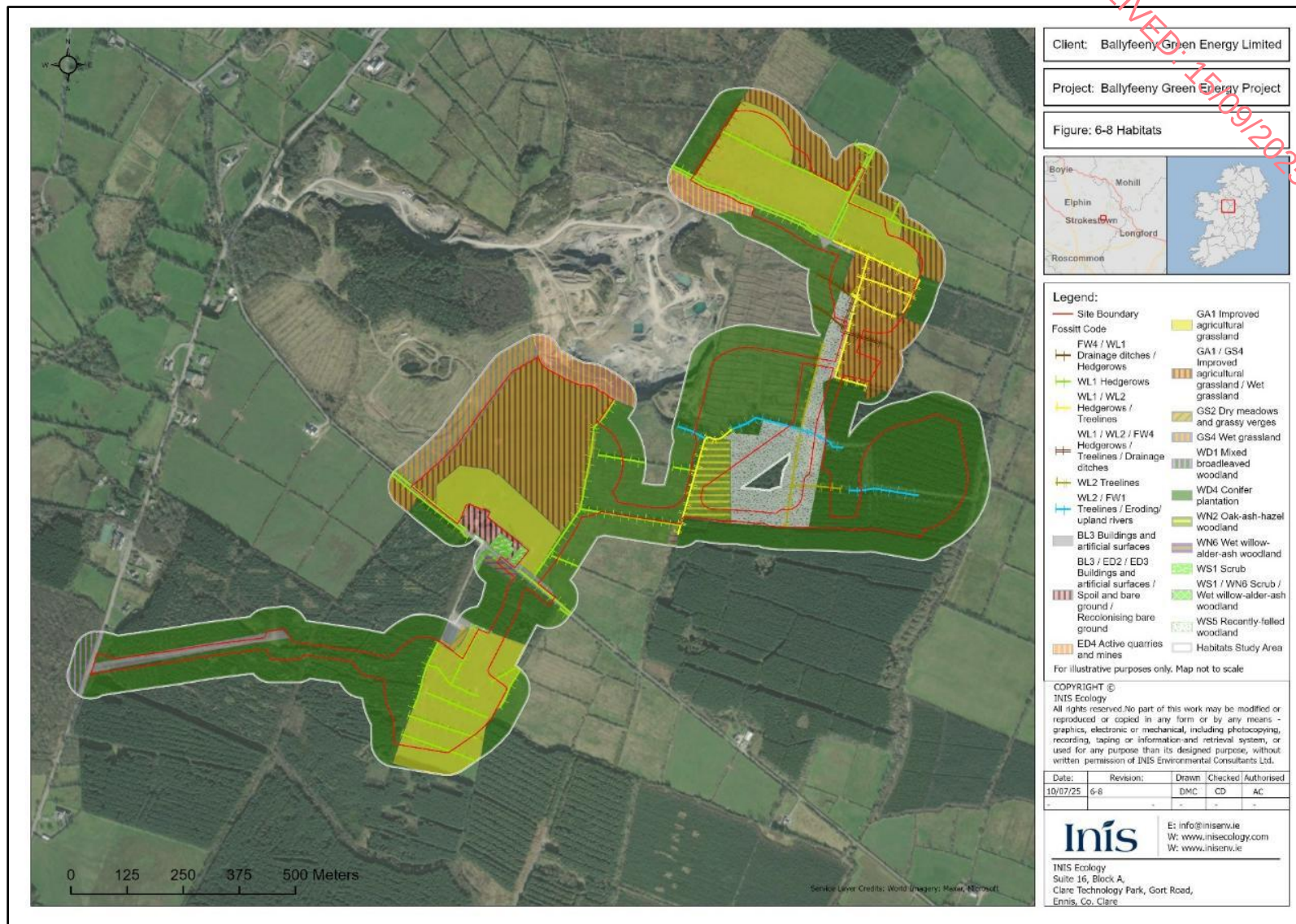


Figure 6-8: Habitats within the Wind Farm Site Boundary (plus 50m buffer) (Ref: EIAR Figure 6-8 (Volume 4))

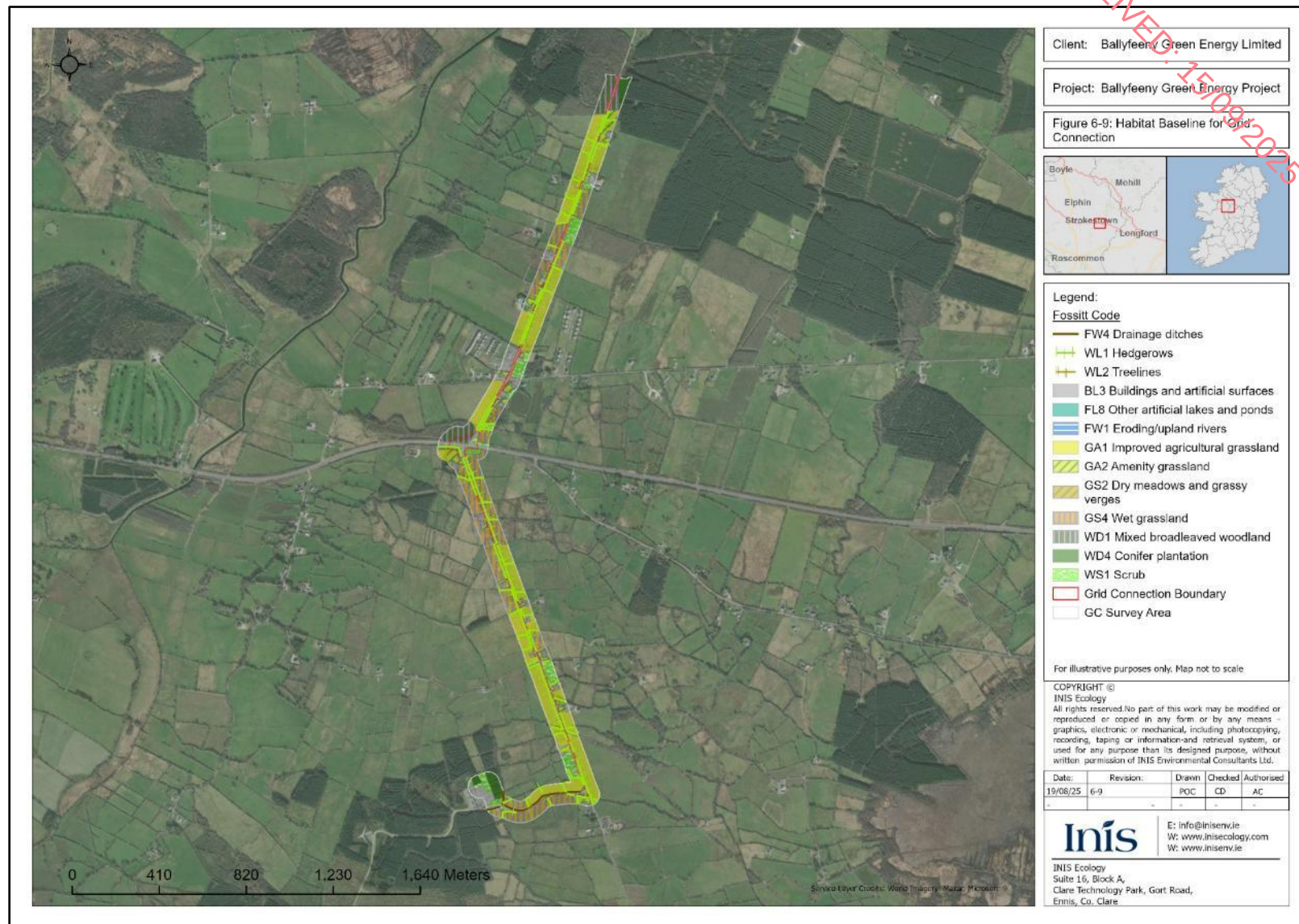


Figure 6-9: Habitats within the Grid connection Boundary (plus 50m buffer) (Ref: EIAR Figure 6-9 (Volume 4))

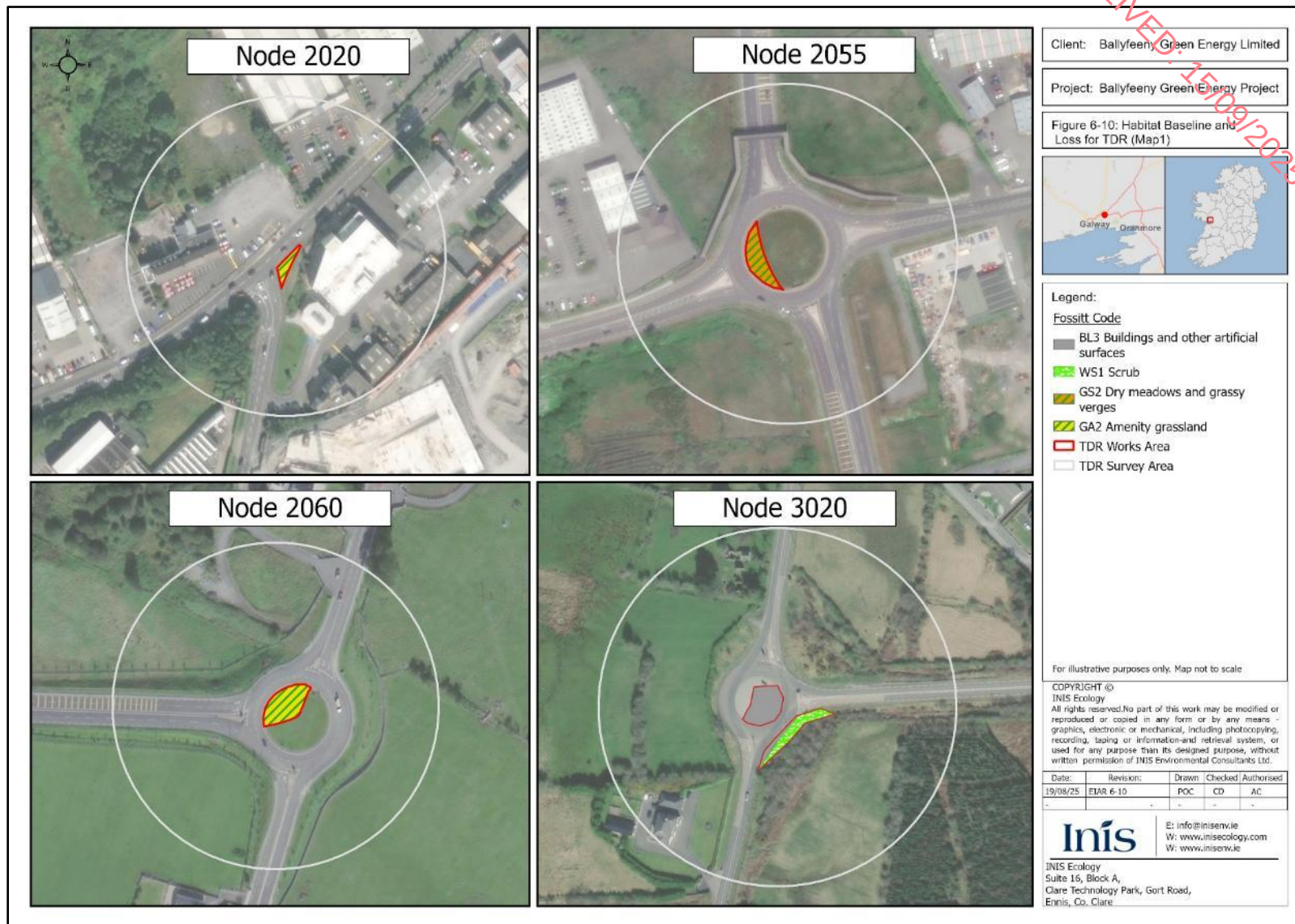


Figure 6-10: Habitat loss set within the TDR survey Boundary (Map 1) (Ref: EIAR Figure 6-10 (Volume 4))

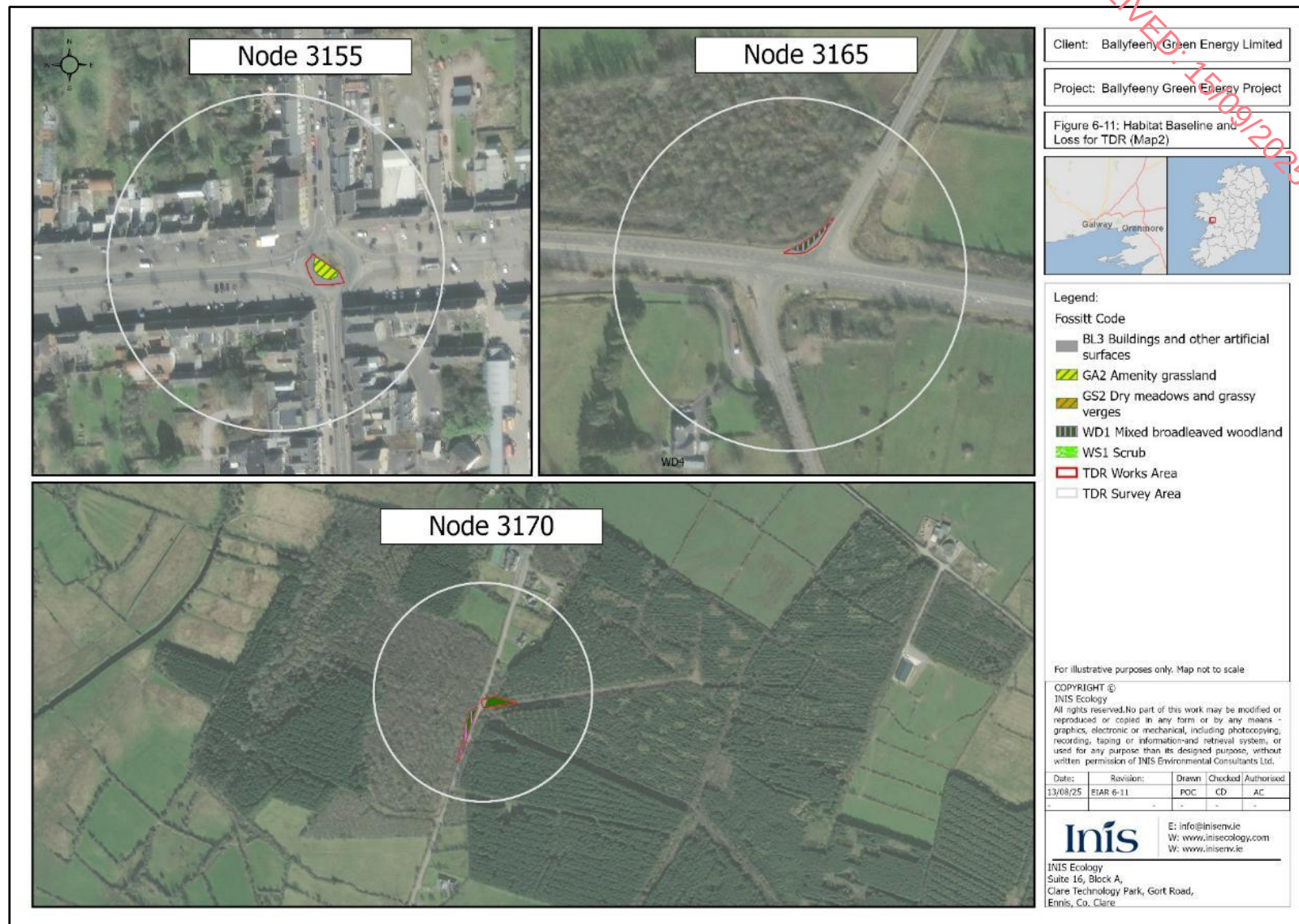


Figure 6-11: Habitat loss set within the TDR survey Boundary (Map 2) (Ref: EIAR Figure 6-11 (Volume 4))

Table 6-14: Summary of habitat importance and identification of KERs.

Habitat	Importance	KER (yes/no)	Rationale
Active quarries and mines (ED4)	National Importance	No	This habitat was recorded to be actively used by Peregrines, an Annex I species of the EC Birds Directive. However, the quarry is not located within the Redline Boundary and therefore no habitat loss will occur
Amenity grassland (GA2)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Building and artificial surfaces (BL3)	Local Importance (Lower Value)	No	This habitat is common and widespread through the receiving environment and is of little importance to local biodiversity.
Building and artificial surfaces/Amenity grassland (BL3/GA2)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Buildings and artificial surfaces/Spoil and bare ground/Recolonising bare ground (BL3/ED2/ED3)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Conifer plantation (WD4)	Local Importance (Lower Value)	No	Conifer plantation of low biodiversity value. This aligns with the geographic valuation: "Sites or features containing non-native species that are of some importance in maintaining habitat links".
Drainage ditch (FW4)	Local Importance (Higher Value)	Yes	This habitat has level of high ecological value to birds, mammals (including bats), amphibians and reptiles for foraging and commuting purposes.
Drainage ditch/Hedgerows (FW4/WL1)	Local Importance (Higher Value)	Yes	This mosaic habitat has a high level of ecological value to birds and mammals (including bats) for foraging and commuting purposes.

Habitat	Importance	KER (yes/no)	Rationale
Dry meadows and grassy verges (GS2)	Local Importance (Lower Value)	No	This habitat is common and widespread through the receiving environment and is of little importance to local biodiversity.
Dry meadows and grassy verges/Scrub (GS2/WS1)	Local Importance (Lower Value)	No	Although this mosaic habitat has some ecological value, its occurrence on the Project (TDR) is subject to very high levels of disturbance and would be of little value to biodiversity
Eroding/upland rivers (FW1)	Local Importance (Higher Value)	Yes	This habitat has level of high ecological value to birds, mammals (including bats), amphibians and reptiles for foraging and commuting purposes.
Flower beds and borders (BC4)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Hedgerows (WL1)	Local Importance (Higher Value)	Yes	This habitat has a high level of high ecological value to birds and mammals (including bats) for foraging, nesting, roosting and commuting purposes.
Hedgerows/Treelines (WL1/WL2)	Local Importance (Higher Value)	Yes	This habitat has a high level of high ecological value to birds and mammals (including bats) for foraging, nesting, roosting and commuting purposes.
Hedgerows/Treelines/ Drainage ditch (WL1/WL2/FW4)	Local Importance (Higher Value)	Yes	This habitat has a high level of high ecological value to birds and mammals (including bats) for foraging, nesting, roosting and commuting purposes.
Improved agricultural grassland (GA1)	Local Importance (Lower Value)	No	Improved grassland of low biodiversity value. This habitat is highly modified, common and widespread throughout the receiving environment and provides limited habitat to local biodiversity

Habitat	Importance	KER (yes/no)	Rationale
Improved agricultural grassland/Wet grassland (GA1/GS4)	Local Importance (Lower Value)	No	This habitat is of limited biodiversity value, due to the influence of agricultural management.
Mixed broadleaved woodland (WD1)	Local Importance (Higher Value)	Yes	Mixed broadleaved woodland is recognised as a habitat of high ecological value, supporting protected and notable species of flora and fauna, namely birds and mammals.
Oak-ash-hazel woodland (WN2)	Local Importance (Higher Value)	Yes	This habitat is of high ecological value, supporting protected and notable species of flora and fauna, namely birds and mammals
Other artificial lakes and ponds (FL8)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Recently-felled woodland (WS5)	Local Importance (Higher Value)	Yes	This habitat is of potential value to certain notable species, namely bird species and mammals.
Recolonising bare ground (ED3)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Scrub (WS1)	Local Importance (Higher Value)	Yes	Scrub is a habitat of high ecological value, supporting protected and notable species of flora and fauna.
Scrub/Treelines (WS1/WL2)	Local Importance (Higher Value)	Yes	This mosaic habitat has a high level of ecological value to birds and mammals (including bats) for foraging and commuting purposes.
Scrub/Wet willow-alder-ash woodland (WS1/WN6)	Local Importance (Higher Value)	Yes	Mosaics of mixed broadleaved woodlands are recognised as a habitat of high ecological value, supporting protected and notable species of flora and fauna, namely birds and mammals.

Habitat	Importance	KER (yes/no)	Rationale
Spoil and bare ground (ED2)	Local Importance (Lower Value)	No	This habitat is of little importance to local biodiversity.
Stone walls and other stonework (BL1)	Local Importance (Lower Value)	No	This habitat has potential ecological value to support a limited range of species, such as lichens, mosses and ferns.
Treelines (WL2)	Local Importance (Higher Value)	Yes	This habitat has a high level of high ecological value to birds and mammals (including bats) for foraging, nesting, roosting and commuting purposes.
Treelines/Eroding/upland rivers (WL2/FW1)	Local Importance (Higher Value)	Yes	This mosaic habitat has a high level of high ecological value to birds and mammals (including bats) for foraging and commuting purposes.
Wet grassland (GS4)	Local Importance (Higher Value)	Yes	Wet grassland is of potential value to certain species, particularly birds, mammals and amphibians. This habitat is common and widespread through the receiving environment
Wet willow-alder-ash woodland (WN6)	Local Importance (Higher Value)	Yes	Mixed broadleaved woodland is recognised as a habitat of high ecological value, supporting protected and notable species of flora and fauna.

6.4.4 Ornithology

Based on the assessments provided in **Appendix 6.6 – Ornithology**, a summary of avian KERs for the Project are presented in **Table 6-15**. A total of 20 species have been brought forward for assessment, based upon their status in relation to the Project. This list includes species that occur within a Zol for the Project on each particular species and includes a number of species that have been brought forward as KERs for the Project based on the Precautionary Principle.

Table 6-15: Summary of bird species brought forward as KERs for assessment

Species	Assessment	KER	Rationale
Buzzard	Local Importance (Higher Value)	Yes	High Buzzard activity was recorded within and surrounding the Project during the winter and breeding seasons
Sparrowhawk	Local Importance (Lower Value)	No	Negligible presence (limited to the edges of the 500m VP survey area) and its BoCCI green-list status.
Kestrel	County Importance	Yes	Recorded within the wind farm Site boundary during both winter and breeding seasons; high quality nesting and foraging habitats were identified within the vicinity of the Site.
Peregrine	National Importance	Yes	Confirmed nest site during the breeding seasons 2023 and 2024 within Zol; suitable breeding and hunting habitat for Peregrine within and surrounding the Site boundary,
Hen Harrier	County Importance	Yes	Low activity within the vicinity of the Project, and absence of Hen Harrier within the Site boundary makes this unlikely to be significantly affected by the Project but retained as KER on a precautionary basis.
Barn Owl	County Importance	Yes	Barn Owl activity been confirmed in close proximity to the wind farm Site boundary.

Species	Assessment	KER	Rationale
Curlew	Local Importance (Lower Value)	No	Due to the absence of sightings within the Site boundary and low level of baseline activity recorded.
Lapwing	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site; Wintering population only.
Redshank	Local Importance (Lower Value)	No	Due to the absence of sightings within the Site boundary and low level of baseline activity recorded.
Snipe	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Woodcock	County Importance	Yes	Several sightings of Woodcock showing evidence of probably breeding within Zol of the wind farm Site; suitable breeding and foraging habitat for Woodcock within and surrounding the wind farm Site.
Common Scoter	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Coot	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Cormorant	Local Importance (Lower Value)	No	Lack of suitable breeding or foraging habitat within the Site boundary;
Gadwall	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.

Species	Assessment	KER	Rationale
Goldeneye	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the Site boundary.
Golden Plover	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Great Crested Grebe	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Grey Heron	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Kingfisher	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Little Egret	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Mallard	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Mute Swan	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Moorhen	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.

Species	Assessment	KER	Rationale
Shoveler	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Teal	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Tufted Duck	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Wigeon	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Whooper Swan	Local Importance (Higher Value)	Yes	SCI of Lough Ree SPA; Wide commuting ranges and the presence of suitable habitat (Kilglass Lough) close to the wind farm Site.
Black-headed Gull	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Common Gull	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Great Black-backed Gull	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.
Herring Gull	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat availability within the proposed Site boundary.

Species	Assessment	KER	Rationale
Lesser Black-backed Gull	Local Importance (Lower Value)	No	Lack of suitable breeding or foraging habitat within the Site boundary;
Goldcrest	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
House Martin	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
House Sparrow	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
Linnet	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
Meadow Pipit	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
Raven	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
Redwing	Local Importance (Higher Value)	Yes	High Redwing activity was recorded within and surrounding the wind farm Site during the winter seasons.
Spotted Flycatcher	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
Starling	Local Importance (Higher Value)	Yes	High Starling activity was recorded within and surrounding the wind farm Site, particularly during the winter seasons.
Stock Dove	Local Importance (Lower Value)	No	Due to the low levels of activity within the proposed Site boundary.
Willow Warbler	Local Importance (Higher Value)	Yes	High Willow Warbler activity was recorded within and surrounding the wind farm Site during the breeding seasons.

6.4.5 Bats

Based on the assessments provided in **Appendix 6.6 – Bats**, a summary of bat KERs for the Project are presented in **Table 6-16**. A total of five species and *Myotis* sp. have been brought forward for assessment, based upon their status in relation to the Project. Due to the similar ecological requirements and nature of *Myotis* species, and low levels of activity recorded, *Myotis* species will be assessed collectively.

Table 6-16: Bat species brought forward as KERs for assessment

Species	Assessment	KER	Rationale
Lesser Horseshoe Bat	Local Importance (Lower Value)	No	Lesser Horseshoe Bats were not recorded during the active surveys. No records obtained via static deployment. No suitable roosting features available within 500m of the Site boundary. No desktop study records of LHB within 5km of the site as per records obtained from BCI. Therefore, LHB are not considered a KER.
Myotis spp. (Whiskered Bat, Daubenton's Bat, Natterer's Bat)	Local Importance (Lower Value)	Yes	Included as activity of the species is confirmed within the proposed Site boundary, albeit at low levels.
Leisler's Bat	Local Importance (Higher Value)	Yes	Although no roosts were located, there was high Leisler's activity recorded within and surrounding the Site boundary, including foraging and commuting behaviour; susceptible to collision risk with turbines.
Common Pipistrelle	Local Importance (Higher Value)	Yes	Although no roosts were located, there was high Common Pipistrelle activity recorded within and surrounding the Site boundary, including foraging and commuting behaviour; susceptible to collision risk with turbines.

Species	Assessment	KER	Rationale
Soprano Pipistrelle	Local Importance (Higher Value)	Yes	Although no roosts were located, there was high Soprano Pipistrelle activity recorded within and surrounding the Site boundary, including foraging and commuting behaviour; susceptible to collision risk with turbines.
Nathusius Pipistrelle	Local Importance (Lower Value)	Yes	Included as activity of the species is confirmed within the proposed Site boundary, albeit at low levels.
Brown Long-eared Bat	Local Importance (Lower Value)	Yes	Included as activity of the species is confirmed within the proposed Site boundary, albeit at low levels.

6.4.6 Mammals and Other Receptors

Based on the assessments provided in **Appendix 6.7 – Mammals and Other Receptors**, a summary of KERs for the Project are presented in **Table 6-17**. A total of three species have been brought forward for assessment, based upon their status in relation to the Project. This list includes several species that have been brought forward as KERs for the Project based on the precautionary principle.

Table 6-17: Mammals and other species brought forward as KERs for assessment

Species	Assessment	KER	Rationale
Otter	International Importance	Yes	QI of Lough Ree SAC; Wide commuting ranges within Zol of the Project, particularly downstream.
Badger	Local Importance (Lower Value)	No	Due to the absence of any records within the proposed Site boundary.
Hedgehog	Local Importance (Lower Value)	No	Due to the absence of any records within the proposed Site boundary.

Species	Assessment	KER	Rationale
Red Squirrel	Local Importance (Lower Value)	No	Due to the absence of any records within the proposed Site boundary.
Pine Marten	Local Importance (Higher Value)	Yes	Recorded within the vicinity of the Site boundary; retained as KER on a precautionary basis.
Irish Hare	Local Importance (Lower Value)	No	Due to the absence of any records within the proposed Site boundary.
Common Frog	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat within the proposed Site boundary.
Smooth Newt	Local Importance (Higher Value)	Yes	Recorded within the vicinity of the Site boundary; retained as KER on a precautionary basis.
Common Lizard	Local Importance (Lower Value)	No	Due to the low levels of activity and limited habitat within the proposed Site boundary.
Marsh Fritillary	Local Importance (Lower Value)	No	Due to the absence of any records of Marsh Fritillary or its larval foodplant within the proposed Site boundary.

6.4.7 Aquatic Ecology

Based on the assessments provided in **Appendix 6.8 – Aquatics**, a summary of KERs for the Project are presented in **Table 6-18**. A total of three species have been brought forward for assessment, based upon their status in relation to the Project. This list includes several species that have been brought forward as KERs for the Project based on the precautionary principle.

Table 6-18: Freshwater aquatic receptors brought forward as KERs for assessment

Receptor	Assessment	KER	Rationale
Watercourses/ waterbodies	National Importance	Yes	Kilglass Lough is brought forward for assessment due to its designated status
Watercourses/ waterbodies	Local Importance (Higher Value)	Yes	Culliagh Stream, Feorish River, Bellmount Stream, Curraghroe Stream, Ballymartin 26 and a pond just west of the wind farm Site (Onsite Substation) are brought forward for assessment due to supporting aquatic species.
Salmon	Local Importance (Lower Value)	No	Due to the absence of any records within the downstream aquatic ecology survey locations.
Lamprey	Local Importance (Higher Value)	Yes	Lamprey ammocoetes were recorded downstream of the wind farm Site in the Culliagh Stream.
European Eel	Local Importance (Lower Value)	No	Due to the absence of any records, including eDNA analysis, within the downstream aquatic ecology survey locations.
White-clawed Crayfish	Local Importance (Lower Value)	No	Due to the absence of any records, including eDNA analysis, within the downstream aquatic ecology survey locations.
Invasive aquatic species	Adverse Indicator	No	Asian Clam and Quagga Mussel were recorded using eDNA sampling, downstream of the wind farm Site; and are retained for assessment as they propose a potential threat to KERs related to this Project.
Macro-invertebrate species	Local Importance (Lower Value)	No	Due to the absence of any records of rare or protected macro-invertebrate species at the downstream aquatic ecology survey locations.

6.5 Embedded Mitigation

Through the development of the proposed Project, measures have been adopted as part of the evolution of the design to avoid or reduce adverse effects on the environment. This has included an iterative process where a constraints-led design was employed, whereby ecological information was incorporated into the design process to avoid impacting potentially important ecological features where possible. These measures are referred to as ‘embedded mitigation’ and are effectively built into the impact assessment.

This iterative approach is recommended as Best Practice in the design of wind farms (IWEA, 2012) and follows Natural Heritage Policy Objective 10.13 (Encourage the retention of hedgerows) in the Roscommon CDP 2022 - 2028.

Embedded mitigation relevant to biodiversity is set out below. Where additional mitigation measures are proposed, these are detailed after the impact assessment (**Section 6.7**).

Refer to **Chapter 3 - Consideration of Alternatives** for a detailed account of the iterative design process.

6.5.1 Water features

A 50m buffer, with the exception of water crossings and some other minor works, was applied to watercourses shown on the 1:50,000 OSI maps at the design phase in accordance with the Irish Wind Energy Industry Best Practice Guidelines (IWEA, 2012). The guidelines state construction works should be kept 50m from watercourses where reasonably possible, with the exception of crossings which should be minimised. Additionally, 10m design buffers were applied to land drains and other hydrologically and hydrogeologically sensitive features. These constraints informed the micro-siting of Turbines, Access Tracks, spoil storage areas, and the Relay Tower to avoid where possible direct interaction with groundwater and surface water features. This approach reduces the risk of hydrological and hydrogeological impacts, including flow alteration and contamination.

6.5.2 Bat Ecology

For low-risk sites, such as the proposed Project, Best Practice Guidance (SNH, 2021) recommends a buffer distance of 50m between a turbine blade tip and the nearest woodland, including hedgerows. This buffer creates a clearance setback of 50m between the arc of the blade’s sweep and the woodland/hedgerow which could be used by bats without risk of collision

with the turbine blades. Based on the SNH buffer formula and proposed turbine dimensions, with sufficient curtilage proposed in line with the turbine blade length assessments, where possible this has been accounted for in the turbine placement rather than vegetation clearance.

6.5.3 Ornithology

In line with initial assessment of ecological constraints associated with the Project, records of any protected species present or recorded breeding within the given distances between breeding sites and the works area, would entail the application of species-specific buffer zones to be established around the expected location of the nest. The baseline avifaunal surveys commenced before the final design process, as two years of baseline data was collected in line with current guidelines. This indicated that a seasonal restriction and buffer zone is required during the construction phase for a confirmed Peregrine nesting site. Data on habitats and species were available early in the design phase allowing where required and supporting the consideration of alternatives and selection of final design.

6.5.4 Habitats, Trees and Hedgerows

The layouts considered not only land use but also the potential habitats of the site both in terms of the turbine layouts but also the consideration of internal and hardstand layouts and footprints. Site Access tracks were designed to offset from existing hedgerow and treelines to protect the root structures where possible, in line with the NRA (2006) Guidelines for the protection and preservation of tree, hedgerows and scrub, BS 5837 (2005), and the Objectives of Roscommon CDP 2022 - 2028, particularly in relation to the protection of hedgerows (Objective NH10.13).

6.6 Assessment of Effects

Predicted effects during construction, operational and decommissioning phases of the proposed Project are detailed in this Section. The 'Do Nothing' scenario, which presents an outline of the evolution of the baseline in the absence of the Project, is also discussed.

This assessment has focused on likely significant effects. All effects outlined in the following sections are presented before the incorporation of any additional mitigation. As per EPA Guidelines, receptors discussed in the following sections refer to "*any element in the environment which is subject to impacts*".

6.6.1 'Do Nothing' Scenario

If the proposed Project does not go ahead then the land in the vicinity of the site will continue to be used for commercial forestry production and improved agricultural grassland. The 'do-nothing' approach would result in water quality, hydrological regimes and the aquatic ecology of the receiving watercourses remaining consistent with the emergent baseline (i.e. pre-development). The majority of the biological water quality samples ($n=15$ sites) achieved poor or occasionally moderate status (i.e. $\geq Q2-Q3$) water quality (**Appendix 6.7 – Mammals and Other Receptors, Table 4.4**). Agricultural and afforestation pressures would continue to pose a threat to water quality within the wider catchment in the absence of the proposed Project.

If the proposed Project were not to proceed, the opportunity to capture part of Roscommon's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions". The RCDP 2022-2028 supports the concept of generating renewable energy at 'local' level and the significant contribution that wind energy can make as a clean sustainable solution to energy requirements.

6.6.2 Construction Phase

Construction activities of the proposed Project which have the potential to impact on the surrounding biodiversity, for terrestrial and aquatic ecology, including ornithology are listed below.

- Turbine construction including the Turbine Foundations and Turbine Hardstands;
- Construction of the Onsite Substation;
- Provision of 2 no. Temporary Construction Compounds;
- Installation of Wind Farm Internal Cabling;
- Installation of GCR cabling;
- Installation of Relay Tower;
- Construction of the Site Access Tracks; and
- Localised temporary accommodation works (such as widening and stoning of public road verges, relocation of utilities, hedge/tree trimming) for the TDR;

Construction activities are expected to last approximately 18 months.

The three Technology Options considered in the EIAR present no variation to the scale or magnitude of predicted impacts as a result of the Construction Phase. As such impacts on KERs described below assign the same magnitude, character and likelihood for significant effect across the three Technologies.

Statutory Sites

The proposed Project is not located within the boundaries of any European or Nationally designated statutory site. There will be no direct effects on any designated site as a result of the construction of the proposed Project.

European Sites

In accordance with best practice guidance, and in compliance with Article 6(3) of the Habitats Directive, this Chapter is accompanied by AA (AA Screening and NIS) [EIAR Volume 6].

As per EPA guidance (2022), 'a biodiversity section of an EIAR should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement' but should 'incorporate their key findings as available and appropriate'. As such, this section provides a summary of the key assessment findings regarding relevant European sites with features of ecological interest.

Relevant European sites within the Zol were initially screened for connectivity with the Project. Connectivity with a European site was evaluated using a conceptual site model which identifies potential impact source-pathways between the Project and the European site. The conceptual model (based on source-pathway-receptor connectivity) is a standard tool used in environmental assessment. For an effect to be likely, all three elements (source, pathway, and receptor) of this mechanism must be in place.

Three European sites were screened in for further assessment (refer to **Section 6.4.1, Table 6-12**) as being within the Zone of likely impact on ecological features:

- Lough Ree SAC [000440];
- Ballykenny-Fisherstown Bog SPA [004101]; and
- Lough Ree SPA [004064].

Lough Ree SAC (000440)

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This site is 11.7km from the proposed wind farm Site and 8.5km from the GCR. The only QI for this SAC that has been brought forward for assessment is Otter, as a physical pathway exists between the Project and Lough Ree SAC for Otter to occur within the defined ZOI of the Project. Otters associated with the SAC have a **Very High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Low** resulting in an impact significance rating of **Low**.

The effect arising from the Project on Otter relates to the potential for pollutants arising from works associated with the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into watercourses where Otter may be foraging. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Ballykenny-Fisherstown Bog SPA (004101)

Ballykenny-Fishertown Bog SPA is located 7.4km from the proposed wind farm Site, therefore disturbance occurring during construction may affect the core foraging range of Greenland White-fronted Goose, which is a SCI of this SPA, as such this would be rated as having a **Very High** sensitivity. However, the intervening distance, which is at the extreme range of Greenland White-fronted Goose for assessing connectivity (of 5-8km; NatureScot, 2016), coupled with the absence of any records of Greenland White-fronted Goose in this area for many years, including the site synopsis for Kilglass And Grange Loughs pNHA and Ballykenny-Fisherstown Bog SPA acknowledging no sightings since well before 2009 (NPWS, 2009; NPWS, 2012), means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

The construction phase could give rise to a potential **Adverse** (via disturbance and / or displacement, if the SCI were present), **Short-Term, Not Significant** effect. In EIA terms, this is considered to be **Not Significant**.

Lough Ree SPA (004064)

Lough Ree SPA is located 11.8km from the wind farm Site and 8.5km from the GCR. A number of SCI species of the Lough Ree SPA may be present downstream due to the occurrence of suitable foraging habitats (Golden Plover, Lapwing, Mallard, Teal, Whooper Swan and Wigeon). These SCI species for Lough Ree SPA have a **Very High** sensitivity. However, the intervening

distance means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

The effect arising from the Project on these SCI species for Lough Ree SPA relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into wetland habitats (including wet grassland) where these bird species may be foraging. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

National Sites

Six Nationally Designated sites (see **Table 6-13, Section 6.5.2**) were identified as being within the Zone of likely impact on ecological features:

- Kilglass and Grange Loughs pNHA;
- Lough Boderg and Lough Bofin pNH;
- Ardakillin Lough pNHA;
- Corbally Turlough pNHA;
- Lough Ree pNHA; and
- Shad Lough pNHA.

Kilglass And Grange Loughs pNHA (000608)

Kilglass and Grange Loughs pNHA is located directly 1km north of the wind farm Site boundary and approximately 1.8km downstream of the wind farm Site boundary via the Ballymartin Stream. The site is noted for wetland habitats, invertebrates and wintering birds, and has been brought forward for assessment as both a hydrological and a physical pathway exist between the Project and pNHA. The species and habitats associated with the pNHA have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Low**, resulting in an impact significance rating of **Low**.

The effect arising from the Project on the wetland habitats, invertebrates and birds relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into those wetland habitats downstream of the Project.

In addition, disturbance occurring within the proposed Project during construction may affect foraging ranges of the wintering bird species associated with this pNHA. Although this represents

a potential **Adverse** effect, the separation distance between the Kilglass and Grange Loughs pNHA is greater than the disturbance distances (Livesey *et al.*, 2016) associated with the bird species listed for this site (which includes Greenland White-fronted Goose, although these have not been recorded at the site for many years). This, coupled with the **Short-Term** nature of the effect, means that the overall evaluation of this effect is a **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Lough Boderg And Lough Bofin pNHA [001642]

Lough Boderg and Lough Bofin pNHA is located 6.2km northeast of the Site boundary and is hydrologically connected by a short channel to Kilglass and Grange Lough pNHA approximately 10.1km downstream of the proposed Project via the Ballymartin Stream. The site is noted for woodland and wetland habitats and the occurrence of Greenland White-fronted Goose and has been brought forward for assessment as both hydrological and a physical pathway exist between the Project and pNHA. The species and habitats associated with the SAC have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Low**, resulting in an impact significance rating of **Low**.

The effect arising from the Project on the wetland habitats and birds relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into those wetland habitats downstream of the Project.

In addition, disturbance occurring within the proposed Project during construction may affect foraging ranges of the Greenland White-fronted Goose associated with this pNHA. However, the intervening distance, which is at the extreme range of Greenland White-fronted Goose for assessing connectivity (of 5-8km; NatureScot, 2016), coupled with the absence of any records of Greenland White-fronted Goose in this area for many years, means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

Although a potential **Adverse** effect exists, the lack of Greenland White-fronted Goose records, coupled with the **Short-Term** nature of the effect, means that the overall evaluation of this disturbance effect is **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Ardakillin Lough pNHA (001617)

Ardakillin Lough pNHA is located 7.8km west of the Project. The site is noted for wetland habitats and wintering birds and has been brought forward for assessment as a physical pathway exists between the Project and pNHA. The species and habitats associated with the pNHA have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

The effect arising from the Project relates to disturbance occurring during construction, which may affect foraging ranges of the wintering bird species associated with this pNHA. Although this represents a potential **Adverse** effect, the separation distance between Ardakillin Lough pNHA is greater than the disturbance distances associated with the bird species listed for this site. This, coupled with the **Short-Term** nature of the effect, means that the overall evaluation of this effect is **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Lough Ree pNHA [000440]

Lough Ree pNHA is located 8.6km south of the GCR and 11.8km South of the wind farm Site (straight-line distance). This site is connected hydrologically downstream (18.7km). The QIs and SCIs of this pNHA correspond to its SAC and SPA equivalents (NPWS, 2016; NPWS, 2022). Despite the sensitivity of the species and habitats within the pNHA considered to be **High**, the magnitude of any effects is considered to be **Negligible** (due to the distance being well outside of disturbance distances of avian species listed as SCIs), this results in an impact significance rating of **Very Low**.

As with the SAC and SPA, the effect arising from the Project on habitats and species associated with Lough Ree pNHA relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into watercourses. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Shad Lough pNHA (001648)

Shad Lough pNHA is located 13.3km southwest of the Project. The only QI for this pNHA that has been brought forward for assessment is Otter, as a physical pathway exists between the Project and Shad Lough pNHA for Otter to occur within the defined Zol of the Project. Otters associated

with the pNHA have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Very Low**.

The effect arising from the Project on Otter relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into watercourses where Otter may be foraging. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Habitats

As outlined in **Section 6.5**, the Embedded Mitigation for the proposed Project guided areas of habitat loss away from the more ecologically important or sensitive habitats such as mixed broadleaved woodland, oak-ash-hazel woodland and hedgerows and treelines. As a result, habitats that will be directly affected by the Project (including those associated with the GDC and TDR), plus other associated infrastructure, are predominantly habitats of **Local Importance (Lower Value)**, e.g. Conifer plantation (WD4), Improved agricultural grassland (GA1), Buildings and artificial surfaces (BL3) and mosaics of agricultural grasslands. In the absence of mitigation, the extents of permanent habitat loss during the construction of the Project are as indicated in **Table 6-19**.

Note that the Technology Options 1, 2 or 3 result in small changes to the extent of effects as indicated in **Table 6-19**. Technology Options 1 & 2 result in the same extent of permanent land take within the overall Project Site, whilst Technology option 3 results in slightly different habitat loss metrics. For Technology Options 1 & 2 the total area of habitat to be lost during construction of the Project is 17.20ha, along with 1,645m of linear habitat; for Technology Option 3 the total area of habitat loss is 18.10ha, with 1,659m of linear habitat. The different options present no variation to the scale, magnitude and therefore significance of predicted impacts.

Table 6-19: Calculated habitat loss within the wind farm Site, GCR and TDR during the construction of the Project in the absence of mitigation

Habitat type	Pre-construction extent within the Project Site (ha/m)	Extent of permanent land take (ha/m)	Percentage of habitat loss
Project with Technology Options 1 & 2			

Habitat type	Pre-construction extent within the Project Site (ha/m)	Extent of permanent land take (ha/m)	Percentage of habitat loss
Conifer plantation (WD4)	33.15ha	9.32ha	28.11%
Improved agricultural grassland (GA1)	29.56ha	3.99ha	13.50%
Wet grassland (GS4)	15.09ha	<0.01ha	<0.01%
Building and artificial surfaces (BL3)	11.38ha	-	0
Improved agricultural grassland/Wet grassland (GA1/GS4)	7.69ha	2.59ha	33.68%
Recently-felled woodland (WS5)	4.63ha	0.89ha	19.22%
Scrub (WS1)	3.70ha	0.01ha	0.27%
Mixed broadleaved woodland (WD1)	2.46ha	-	0
Amenity grassland (GA2)	2.38ha	-	0
Oak-ash-hazel woodland (WN2)	1.48ha	0.39ha	26.35%
Active quarries and mines (ED4)	0.60ha	<0.01ha	<0.01%
Buildings and artificial surfaces/ Spoil and bare ground/ Recolonising bare ground (BL3/ED2/ED3)	0.57ha	<0.01ha	<0.01%
Dry meadows and grassy verges (GS2)	0.45ha	-	0
Wet willow-alder-ash woodland (WN6)	0.19ha	0.01ha	5.26%
Scrub/ Wet willow-alder-ash woodland (WS1/WN6)	0.03ha	-	0
Other artificial lakes and ponds (FL8)	0.01ha	-	0
Hedgerows (WL1)	11,459m	873m	7.62%
Hedgerows/Treelines (WL1/WL2)	1,207m	23m	1.91%

Habitat type	Pre-construction extent within the Project Site (ha/m)	Extent of permanent land take (ha/m)	Percentage of habitat loss
Treelines (WL2)	736m	427m	58.01%
Drainage ditch (FW4)	507m	-	0
Treelines/Eroding/upland rivers (WL2/FW1)	405m	279m	68.89%
Drainage ditch/Hedgerows (FW4/WL1)	374m	15m	4.01%
Hedgerows/Treelines/Drainage ditch (WL1/WL2/FW4)	168m	28m	16.67%
Project with Technology Option 3			
Conifer plantation (WD4)	33.15ha	9.72ha	29.32%
Improved agricultural grassland (GA1)	29.56ha	3.99ha	13.50%
Wet grassland (GS4)	15.09ha	<0.01ha	<0.01%
Building and artificial surfaces (BL3)	11.38ha	0.46ha	3.44%
Improved agricultural grassland/Wet grassland (GA1/GS4)	7.69ha	2.59ha	33.68%
Recently-felled woodland (WS5)	4.63ha	0.93ha	20.09%
Scrub (WS1)	3.70ha	0.01ha	0.27%
Mixed broadleaved woodland (WD1)	2.46ha	-	0
Amenity grassland (GA2)	2.38ha	-	0
Oak-ash-hazel woodland (WN2)	1.48ha	0.39ha	26.35%
Active quarries and mines (ED4)	0.60ha	<0.01ha	<0.01%

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Habitat type	Pre-construction extent within the Project Site (ha/m)	Extent of permanent land take (ha/m)	Percentage of habitat loss
Buildings and artificial surfaces/ Spoil and bare ground/ Recolonising bare ground (BL3/ED2/ED3)	0.57ha	<0.01ha	<0.01%
Dry meadows and grassy verges (GS2)	0.45ha	-	0
Wet willow-alder-ash woodland (WN6)	0.19ha	0.01ha	5.26%
Scrub/ Wet willow-alder-ash woodland (WS1/WN6)	0.03ha	-	0
Other artificial lakes and ponds (FL8)	0.01ha	-	0
Hedgerows (WL1)	11,459m	876m	7.64%
Hedgerows/Treelines (WL1/WL2)	1,207m	24m	1.99%
Treelines (WL2)	736m	427m	58.02%
Drainage ditch (FW4)	507m	-	0
Treelines/Eroding/upland rivers (WL2/FW1)	405m	289m	71.36%
Drainage ditch/Hedgerows (FW4/WL1)	374m	15m	4.01%
Hedgerows/Treelines/Drainage ditch (WL1/WL2/FW4)	168m	28m	16.67%

Habitats onsite are largely dominated by Conifer plantation (WD4), Improved agricultural grassland (GA1) and mosaics of both Improved agricultural grassland (GA1) and Wet grassland (GS4) within which the turbines will be constructed. These habitats are highly modified and of low ecological value, with habitats of greater ecological value (e.g., Oak-ash-hazel woodland (WN2), hedgerows (WL1) and treelines (WL2)) covering smaller areas within the Project, however, hedgerows and treelines are predominant linear habitat features within the Project that

will be subject to habitat loss (**Figure 6-12**). As outlined in **Section 6.5**, the Project includes mitigation to minimise loss and disturbance of habitats, with particular emphasis on avoiding the loss, alteration, fragmentation and/or disturbance of more ecologically important habitats within and adjacent to the Project.

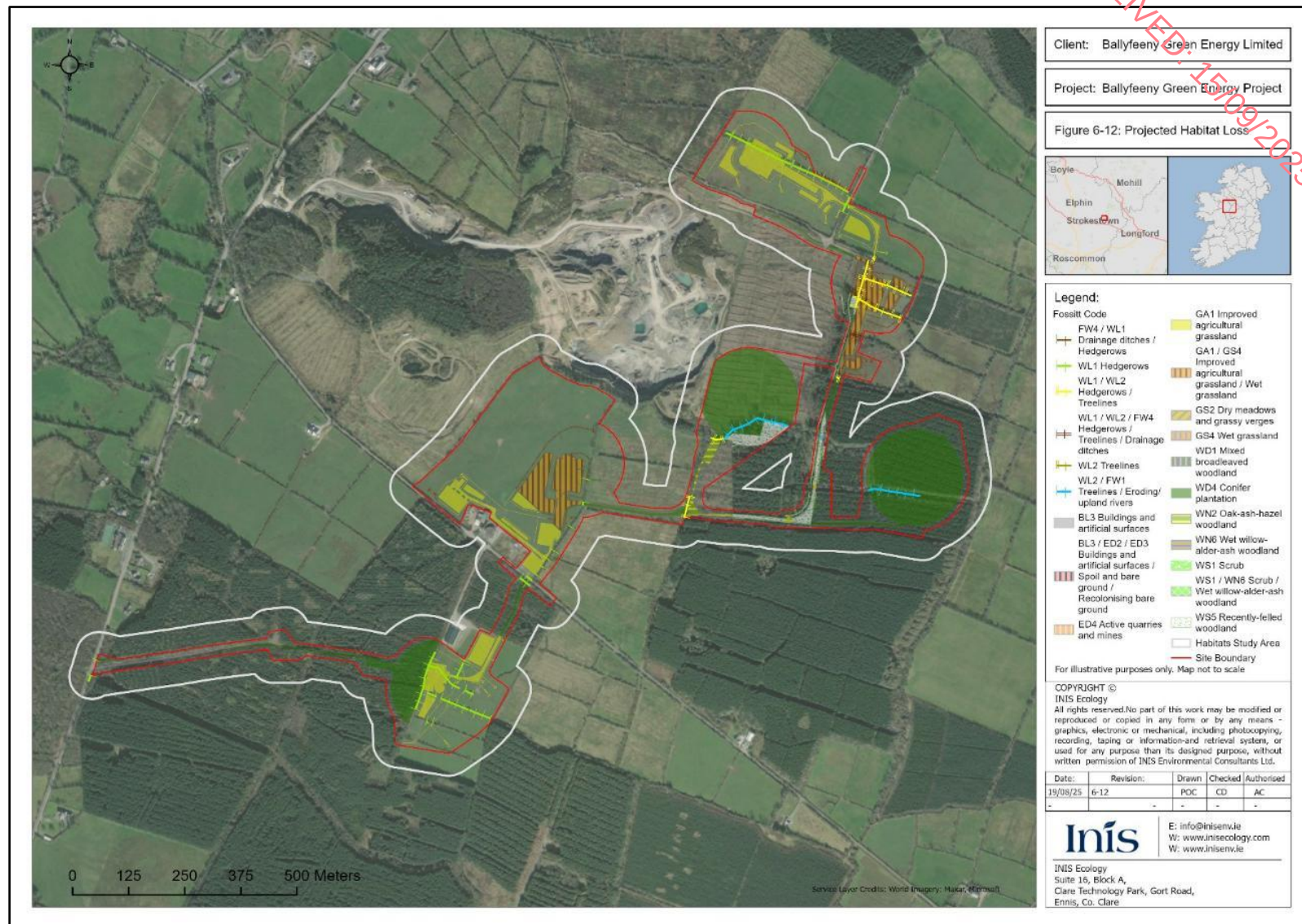


Figure 6-12: Projected Habitat Loss for Project Options 1, 2, 3 (Ref: EIAR Figure 6-12 (Volume 4))

The following habitats were brought forward for assessment as KERs for the Project.

Wet Grassland (GS4)

Wet Grassland covers 15.09ha of the proposed the Redline Boundary, of which less than 0.01ha is to be lost as a result of construction for any of the three Technology Options. Wet Grassland has a **Low** sensitivity and, with the level of loss is at a **Negligible** magnitude, the impact significance rating of **Very Low**.

The effect arising from the Project on Wet Grassland relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. In the absence of mitigation, due to the very small extent of habitat area involved, this represents a potential **Neutral, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Recently-felled Woodland (WS5)

Recently-felled Woodland covers 4.63ha of the proposed the Red Line Boundary, of which 0.89ha (19.22% of the area of this habitat within Redline Boundary area) is to be lost as a result of construction of either Technology Options 1 or 2, and 0.93ha (20.09%) for Technology Option 3. Recently-felled Woodland has a **Low** sensitivity rating. For Technology Options 1 & 2, the magnitude of loss is considered to be **Medium** (5-20% of the habitat area) and the magnitude of loss for Technology option 3 is **High** (20-80% of the habitat area). Therefore, the impact significance rating of this effect for Technology Options 1 or 2 is **Very Low / not significant**, with the impact significance for Technology Option 3 is **Low / slight effect**. It is worth noting that due to storm damage and wind blow from some major storms earlier this year.

The effect arising from the Project on Recently-felled Woodland relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. In the absence of mitigation, due to the extent of woodland habitats within the wider area around the Project which will give rise to this temporary habitat, coupled with the relatively small area of this habitat area involved compared to the extent in the wider landscape, overall this would be considered to be

an **Adverse, Long-term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Scrub (WS1)

Scrub covers 3.70ha of the proposed the Redline Boundary, of which 0.01ha is to be lost as a result of construction for any of the three Technology Options. Scrub has a **Low** sensitivity and, with the magnitude of loss is considered to be **Negligible**, with the impact significance rating of **Very Low**.

The effect arising from the Project on Scrub relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. In the absence of mitigation, due to the very small extent of this habitat area involved this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Mixed broadleaved Woodland (WD1)

Mixed broadleaf woodland covers 2.46ha of the proposed the Redline Boundary, of which there is no direct loss as a result of construction for any of the three Technology Options. Mixed broadleaf woodland has a **Low** sensitivity and, with a **Negligible** magnitude, the impact significance rating of **Very Low**.

The effect arising from the Project on Mixed broadleaf woodland relates to the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. In the absence of mitigation, due to the very small extent of this habitat area involved, this represents a potential **Adverse, Long-term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Oak-ash-hazel woodland (WN2)

Oak-ash-hazel woodland covers 1.48ha of the proposed the Redline Boundary, of which 0.39ha (equates to 26.35% of this habitat within the Redline Boundary) is to be lost as a result of construction for any of the three Technology Options. Oak-ash-hazel woodland has a **Low** sensitivity and, with the level of loss is at a **High** magnitude, the impact significance rating is **Low**.

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The effect arising from the Project on Oak-ash-hazel relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the extent of woodland habitats within the wider area around the Project, coupled with the relatively small area of this habitat area involved compared to the extent in the wider landscape. In the absence of mitigation, this represents a potential **Adverse, Long-Term, moderate** effect. In EIA terms, this is considered to be **not significant**.

Wet willow-alder-ash woodland (WN6)

Wet willow-alder-ash woodland covers 0.19ha of the proposed the Redline Boundary, of which 0.01ha (equating to 5.26% of this habitat within the Red Line Boundary) is to be lost as a result of construction for any of the three Technology Options. Wet willow-alder-ash woodland has a **Low** sensitivity and, with the level of loss is at a **Medium** magnitude, the impact significance rating is **Very Low**.

The effect arising from the Project on Oak-ash-hazel relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction phase of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the extent of woodland habitats within the wider area around the Project, coupled with the very small area of this habitat area involved compared to the extent in the wider landscape, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **not significant**.

Scrub/Wet willow-alder-ash woodland mosaic (WS1/WN6)

Scrub/Wet willow-alder-ash woodland mosaic habitats cover 0.03ha of the proposed the Redline Boundary, of which there is no direct loss as a result of construction for any of the three Technology Options. Scrub has a **Low** sensitivity and, with a **Negligible** magnitude, the impact significance rating of **Very Low**.

The effect arising from the Project on this mosaic of habitats relates to the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and

cementitious material. Due to the very small extent of this habitat area involved, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Hedgerows (WL1)

Hedgerows extend to 11,459m within the proposed the Redline Boundary, of which 873m (7.62% of the extent of this habitat within the Redline Boundary area) is to be lost as a result of construction of Technology Options 1 or 2, and 876m (7.64%) for Technology Option 3. Hedgerows have a **Low** sensitivity rating. For Technology Options 1, 2 or 3, the magnitude of effect is considered to be **Medium** (5-20% of the habitat area). Therefore, the impact significance rating of this effect for Technology Options 1, 2 or 3 is **Very Low**.

The effect arising from the Project on Hedgerows relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the extent of hedgerow habitats within the wider area around the Project, coupled with the relatively small area of this habitat area involved compared to the extent in the wider landscape, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Hedgerow/Treeline mosaics (WL1/WL2)

Hedgerow/Treeline mosaics extend to 1,207m within the proposed the Redline Boundary, of which 23m (1.91% of the extent of this habitat within the Red Line Boundary area) is to be lost as a result of construction of Technology Options 1 or 2, and 24m (1.99%) for Technology Option 3. Hedgerows have a **Low** sensitivity rating. For Technology Options 1, 2 or 3, the magnitude of effect is considered to be **Low** (1-5% of the habitat area). Therefore, the impact significance rating of this effect for Technology Options 1, 2 or 3 is **Very Low**.

The effect arising from the Project on Hedgerow/Treeline mosaics relate to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the extent of Hedgerow/Treeline mosaic habitats within the wider area around the Project, coupled with the

relatively small area of this habitat area involved compared to the extent in the wider landscape, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Treelines (WL2)

Treelines extend to 736m within the proposed the Redline Boundary, of which 427m (7.62% of the extent of this habitat within the Redline Boundary area) is to be lost as a result of construction of Technology Options 1, 2 or 3. Treelines have a **Low** sensitivity rating, and the magnitude of effect is considered to be **High** (20-80% of the habitat area). Therefore, the impact significance rating of this effect for Technology Options 1, 2 or 3 is **Low**.

The effect arising from the Project on Hedgerows relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the extent of hedgerow habitats within the wider area around the Project, coupled with the relatively small area of this habitat area involved compared to the extent in the wider landscape, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Drainage ditches (FW4)

Drainage ditches extend to 507m within the proposed Redline Boundary, of which there is no direct loss arising from the Project for any of the three Technology Options. Drainage ditches have a **Low** sensitivity and, with a **Negligible** magnitude, an impact significance rating of **Very Low**.

The effect arising from the Project on Drainage ditches relates to the potential for pollutants arising from works associated with the construction phase of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the very small extent of this habitat area involved, in the absence of mitigation, this represents a potential **Adverse, Long-term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Treeline/Eroding/upland rivers mosaic (WL2/FW1)

Treeline/Eroding/upland rivers mosaics extend to 405m within the proposed the Redline Boundary, of which 279m (68.89m% of the extent of this habitat within the Redline Boundary area) is to be lost as a result of construction of Technology Options 1 or 2, and 289m (71.36%) for Technology Option 3. Treeline/Eroding/upland rivers mosaics have a **Low** sensitivity rating. For Technology Options 1, 2 or 3, the magnitude of effect is **High** (20-80% of the habitat area). Therefore, the impact significance rating of this effect for Technology Options 1, 2 or 3 is **Low**.

The effect arising from the Project on Treeline/Eroding/upland rivers mosaics relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the small area of this habitat area involved compared to the extent in the wider landscape, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Drainage ditch/Hedgerows mosaic (FW4/WL1)

Drainage ditch/Hedgerow mosaics extend to 374m within the proposed the Redline Boundary, of which 15m (4.01% of the extent of this habitat within the Red Line Boundary area) is to be lost as a result of construction of Technology Options 1, 2 or 3. Drainage ditch/Hedgerow mosaics have a **Low** sensitivity rating, and the magnitude of effect is considered to be **Low** (1-5% of the habitat area). Therefore, the impact significance rating of this effect for Technology Options 1, 2 or 3 is **Low**.

The effect arising from the Project on Drainage ditch/Hedgerow mosaics relates to direct habitat loss during the construction phase as well as the potential for pollutants arising from works associated with the construction, operation and decommissioning of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material. Due to the extent of Drainage ditch/Hedgerow mosaics within the wider area around the Project, coupled with the relatively small area of this habitat area involved, in the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Plant Species

No protected or notable plant species were recorded within or in close proximity to the Project during the field surveys. Low numbers of Short-leaved Water Starwort (*Callitriche truncata*) were recorded at Lough Ree (**Appendix 6.8 – Aquatic Ecology**).

No rare or protected macrophytes or aquatic bryophytes or Annex I aquatic vegetation habitats were recorded during the surveys in August 2023. Considering the ecological baseline regarding important flora, effects on rare and protected plant species during the construction of the Project are considered **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Invasive Plant Species

No third schedule invasive plant species were recorded within the Project. Therefore, the spread of invasive plant species is unlikely to occur. As such, standard invasive species and biosecurity protocols will be followed per standard practice to ensure no vehicle to introduce invasive plant species to the ecological baseline occurs during the life cycle of the proposed Project. As no such event is likely, effects as a result of invasive plant species during the construction of the Project are considered **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Ornithology

Peregrine

With one active nest recorded during the two years of surveys during the breeding seasons 2023 and 2024, located 686m west of T06, Peregrine is assessed as being of **High** Sensitivity. Additionally, regular foraging activity was also recorded within the Project during the breeding and winter seasons. In the absence of mitigation, the worst-case scenario for the impact magnitude would be **Very High**, resulting in a **Very High** impact significance.

Considering the extent and locations of construction works within the Project (with regard to baseline Peregrine activity; notably the locations of the active nest site), and the reduced extent of available nesting habitat into which disturbed Peregrines would be displaced, in the absence of mitigation the construction of the Project is considered to potentially result in disturbance and displacement, where the breeding pair could be killed or displaced resulting in the nest being abandoned. Although of a high magnitude, mortality is unlikely to occur as a result of the construction phase works. As such, this effect is not considered to pose a likely significant effect.

Assuming the worst-case scenario, disturbance and displacement represents a potential **Adverse, Long-Term, Significant** effect. In EIA terms, this is considered to be **Significant**.

Hen Harrier

As outlined in **Appendix 6.5 – Ornithology**, the desk study identified six observations of Hen Harrier within the 10km grid square (M97), within which the Project is located (NBDC, 2025).

Sightings during field surveys comprised:

- Winter season 2022/2023 VP surveys, a female Hen Harrier was observed once;
- Breeding season 2024 VP surveys, Hen Harrier was observed on two occasions;
- Two observations of Hen Harrier were recorded during the Hen Harrier roost surveys in October 2023 and February 2024; and
- No nesting activity was recorded within the Site boundary throughout the survey period.

Hen Harrier is assessed as being of **Medium** sensitivity Importance. Due to the five sightings during field surveys, the magnitude of any impact is assessed as **Medium**, resulting in an overall impact significance of **Low**.

Construction phase effects, including disturbance and habitat fragmentation represent a potential **adverse, Short-term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Kestrel

As discussed in **Appendix 6.5 – Ornithology**, Kestrels typically forage over farmland, wetlands, moorland and roadside verges, and nest in trees, buildings and in cliff faces. During winter they are largely resident within the breeding territory, although some move down to lowland areas. Kestrel is likely to be widespread in the surrounding area due to the extensive presence of suitable habitat. The desk study identified 23 observations of Kestrel within the M78 and M98 10km grid squares, within which the Project is located, most recently on 31/12/2011 (NBDC, 2024).

Sightings during field surveys comprised:

- Winter season 2022/2023 VP surveys, Kestrel was observed on 13 occasions;
- Winter season 2022/2023 VP surveys, Kestrel was observed on 20 occasions;

- Breeding season 2023 VP surveys, Kestrel was observed on 24 occasions;
- Breeding season 2024 VP surveys, Kestrel was observed on 13 occasions;
- One Kestrel was recorded during winter transect surveys in December 2023;
- During the breeding season 2023, one male Kestrel was recorded during breeding raptor surveys, hunting over suitable foraging habitat (but no nest found); and
- During the breeding season 2024 breeding raptor surveys, a Kestrel pair were recorded flying over the quarry in the direction of conifer plantation, 539.7m northwest of the wind farm Site boundary.

Kestrel is assessed as being of **Medium** sensitivity, with any construction phase effects likely to be of **Medium** magnitude, resulting in an overall impact significance of **Low**.

In the absence of mitigation, any construction phase effects, (including disturbance and habitat fragmentation, mortality or pollution/contamination incidents and due to the extent of alternative, suitable habitats for Kestrel) represent a potentially **Adverse, Long-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Buzzard

As outlined in **Appendix – 6.5 Ornithology**, the desk study identified 10 observations of Buzzard within the 10km grid squares within which the Project is located, most recently on 03/05/2023 (NBDC, 2024). Buzzard is likely to be widespread in the surrounding area due to the extensive presence of suitable habitat.

Sightings during field surveys comprised:

- Winter season 2022/2023 VP surveys, Buzzard was observed on 20 occasions;
- Winter season 2023/2024 VP surveys, Buzzard was observed on 34 occasions;
- Breeding season 2023 VP surveys, Buzzard was observed on 35 occasions; and
- Breeding season 2024 VP surveys, Buzzard was observed on 51 occasions.

As a common and widespread raptor in Ireland, Buzzard are assessed as being of **Low** sensitivity to the construction phase of the Project, with any construction phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

Construction phase impacts, including disturbance and habitat fragmentation, mortality or pollution/contamination incidents represent a potential **Adverse, Short-term, imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Barn Owl

As outlined in **Appendix 6.5 – Ornithology**, the desk study identified one record of Barn Owl within the relevant 10km grid square (M97), most recently on 04/09/2020 (NBDC, 2025). High suitability Barn Owl nesting sites were recorded in the form of ruins and traditional agricultural buildings; the closest site was located 1.7km northeast of the proposed Project.

Sightings during field surveys comprised:

During the breeding season 2024, a Barn Owl sighting was recorded 29.6m southeast of the proposed Onsite Substation, although no active nest was located.

With a record of Barn Owl roosting in close proximity to the proposed Onsite Substation, Barn Owl is assessed as being of **Medium** sensitivity, with any construction phase effects likely to be of **Medium** magnitude, resulting in an overall impact significance of **Low**.

In the absence of mitigation, construction phase impacts, including disturbance and habitat fragmentation, mortality or pollution/contamination incidents represent a potentially **Adverse, Short-term, Moderate** effect, due to the extent of alternative, suitable habitats for Barn Owl. In EIA terms, this is considered to be **Not Significant**.

Woodcock

As outlined in **Appendix 6.5 – Ornithology**, the desk study identified seven records of Woodcock within the 10km grid square (M97), most recently on 31/12/2011 (NBDC, 2024). Woodcock is likely to be widespread in the surrounding area due to the extensive presence of suitable habitat.

Sightings during field surveys comprised:

- Breeding season 2023 Woodcock surveys recorded a total of 18 Woodcock observations. Observations included a pair calling and flying together over conifer plantation habitat, a roding male over conifer plantation and an individual flying overhead;
- Breeding 2024 Woodcock surveys recorded a total of 12 Woodcock observations, with all sightings recorded within a single territory, a conifer plantation adjacent to the footprint of

the GCR, no breeding behavior was observed. Season 2024 VP surveys, Kestrel was observed on 13 occasions.

Woodcock are assessed as being of **Medium** sensitivity, with any construction phase effects likely to be of **Medium** magnitude, resulting in an overall impact significance of **Low**.

The Project will result in the loss of suitable nesting habitat (9.32ha of Conifer Plantation) during the construction phase. Although wider areas of suitable Woodcock habitat will be retained within and adjacent to the Project (including identified territories), direct habitat loss and fragmentation, as well as disturbance arising from construction activities, constitutes an impact of **Adverse, Short-Term, Moderate** effect to Woodcock. In EIA terms, this is considered to be **Not Significant**.

Wintering Waterbirds

Populations of wintering waterbirds are assessed as being of **Low** sensitivity to the construction phase of the Project, with any construction phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

No suitable habitats for these species within the wind farm Site boundary, and no records or flightlines were observed for these species during field survey. There is the potential for these species to be present in the surrounding area where the presence of suitable habitat occurs. Construction phase impacts, including disturbance and habitat fragmentation, pollution/contamination on wintering waterbirds, represent a potential **Adverse, Short-term, Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Considering the absence of waterbird flightline activity recorded within the of the Site boundary, and the proposed mitigation measures (**Section 6.8.1**), construction effects on waterbirds through direct mortality are considered **not significant**.

Summary of Assessment of Effects for Birds

A summary of the effects on KERs during construction are outlined in **Table 6-20**.

Table 6-20: Construction effect characterisation for bird KERs.

KER	Effect	Effect magnitude	Effect significance
Peregrine	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Very High	Long-term Significant adverse effect
	Pollution	Negligible	No significant effect
	Direct mortality	Very High	Unlikely to occur. No significant effect
Hen Harrier	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Low	Imperceptible effect
	Pollution	Negligible	No significant effect
	Direct mortality	Negligible	No significant effect
Kestrel	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Low	Slight effect
	Pollution	Negligible	No significant effect
	Direct mortality	Low	Imperceptible effect
Buzzard	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Negligible	Imperceptible effect
	Pollution	Negligible	No significant effect

	Direct mortality	Negligible	No significant effect
Woodcock	Direct habitat loss and fragmentation	Low	Moderate effect
	Disturbance and displacement	Low	Moderate effect
	Pollution	Negligible	No significant effect
	Direct mortality	Low	Imperceptible effect
Barn Owl	Direct habitat loss and fragmentation	Low	Imperceptible effect
	Disturbance and displacement	Low	Moderate effect
	Pollution	Negligible	No significant effect
	Direct mortality	Low	Imperceptible effect
Passerines	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Negligible	No significant effect
	Pollution	Negligible	No significant effect
	Direct mortality	Negligible	No significant effect
Waterbirds	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Very Low	Imperceptible effect
	Pollution	Very Low	Imperceptible effect
	Direct mortality	Negligible	No significant effect

Bats

Common Pipistrelle and Soprano Pipistrelle were the most common species recorded within the Site boundary, with Common Pipistrelle recording high levels of activity at T01. Leisler's Bat was recorded at lower levels. *Myotis sp.*, Nathusius' pipistrelle and Brown Long-eared bat are brought forward for assessment but were only recorded at low levels of activity. The PRAs identified two structures to be surveyed for bat roosting, namely 'BL2' and 'BL3' (see **Appendix 6.6 – Bats, Figure 6.1**). No roosts were identified.

Bats are assessed as being of **Low** sensitivity to the construction phase of the Project, with any construction phase effects likely to be of **Low** magnitude, therefore resulting in an overall impact significance of **Very Low**.

In the absence of mitigation, the construction of the proposed Project will cause a decrease in the availability and connectivity of suitable bat foraging and commuting habitat, including loss of between 1,645m (for Technology Options 1 or 2) and 1,659m (for Technology option 3) of hedgerow/treeline habitats, and other edge habitats for woodland that will be removed. The felling of hedgerow/treeline habitats is required to facilitate the construction of the wind farm Site and is also required to achieve the required buffer distance for the protection of bats from collision discussed further in **Section 6.6.3**. In the absence of mitigation, this habitat loss represents a potential **Adverse, Long-term, Moderate** effect. In EIA terms, this is considered to be **Not Significant**.

Construction works associated with the project may also disturb or displace bats occurring within or in the proximity of the Project as a result of habitat loss reducing suitability for commuting and foraging activity. In the absence of mitigation, this disturbance or displacement represents a potential **Adverse, Long-term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Mammals and Other Receptors

Otter

As discussed in **Appendix 6.7 – Mammals & Other Receptors** and **Appendix 6.8 – Aquatic Ecology**, evidence of Otter activity (prints) was recorded 1.4km south of the GCR works on the R371 on an unnamed stream (Bellmount/Curraghroe Stream tributary) (26_1714) which has no downstream connectivity to Wind farm site and the GCR. A regular Otter spraint site was also

recorded 3.7km upstream on the Curraghroe Stream at sample site C6 (**Appendix 6.8 – Aquatic Ecology, Figure 1.1**), which is located 3.7km south of the GCR crossing on the R371. There is no downstream hydrological connectivity between the Project and the spraint site. No breeding sites (holts, couches) were recorded downstream of the proposed wind farm Site. Watercourses downstream of the proposed Project were assessed as being potentially suitable for commuting and foraging Otter. The distance between the proposed Project and the Lough Ree SAC is 11.8km, therefore any Otter populations which may be found downstream of the proposed Project could be associated with the aforementioned SAC. Due to the potential of Otter occurring within the Project to be linked to the Lough Ree SAC population, Otter has been assessed as being of **Very High** sensitivity to the construction phase of the Project, with any construction phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Medium**.

As described in **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** and discussed further below, the proposed wind farm Site and its associated infrastructure (turbines, Site Access Tracks, Onsite Substation, temporary compound) does not cross any EPA mapped watercourse i.e., there are no mapped watercourses onsite.

As described in **Chapter 2 – Project Description, Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** and within the **Appendix 2.1 – Construction and Environmental Management Plan (CEMP)**, no instream works will be required for the proposed GCR.

The proposed crossing of the Bellmount Stream (also known as Cloggernagh Stream) is outlined in **Chapter 2 – Project Description, Section 2.5.8**. The proposed method will be cable trenching within the existing carriageway of the R371.

Potential effects on Otter have been reviewed in conjunction with the Threat Response Plan (TRP) for Otter (NPWS, 2009f). This document outlines the major and specific threats facing Otter in 29 European countries including Ireland. Habitat destruction, water pollution, mortalities and disturbances / recreation being the four most cited threats.

There is potential for the construction works within the proposed wind farm Site to result in the runoff of silt, nutrients and other pollutants such as hydrocarbons into land drains which have hydrological connectivity with the Culliagh Stream due east of the proposed Site boundary and the Ballymartin Stream located on the western boundary of the proposed Site boundary.

The local hydrology includes the Culliagh Stream (as noted) which runs adjacent to the proposed Site's eastern boundary and approximately 70m from the closest infrastructure (Turbine Hardstand) adjacent to turbine T03. The Culliagh Stream flows south and turns east to join the Feorish River (Tarmonbarry)_020. The latter then joins the River Shannon (upper), approximately downstream of the proposed wind farm Site, which from that point flows to Lough Ree SAC, approximately 22.1km downstream of the wind farm Site.

The Ballymartin Stream (first order stream) is also located approximately 51m from closest infrastructure related to the proposed Onsite Substation and Communications Relay Tower. The Ballymartin Stream flows west before turning north to flow into Kilglass Lough approximately 1.8km downstream of the proposed Project.

Additionally, there is potential for the proposed works along the GCR to result in the run-off of silt and other pollutants into the receiving Bellmount (or Cloggernagh) Stream. Machinery operating adjacent to Bellmount Stream may knock exposed sediment directly into the water channel or move material to a position where, should it rain, the sediment would be more vulnerable to mobilisation by surface water runoff (either as sheet flow or slumping of sediment piles into the channel)

The GCR runs west of the Gortlustia Stream, which flows into the Scramoge River. The Scramoge River then continues into the Mountain West River and ultimately reaches Kilglass Lough.

Given the nearest location of Otter was recorded 1.4km south of the proposed construction activity from both the proposed wind farm site and GCR crossing (territory for otter can exceed 10km Reid et al, 2013), any potential for disturbance will be a potential **Adverse, Short-term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

In the absence of mitigation, the indirect effect of water pollution on Otter resulting in mortality of the animal and habitat fragmentation during construction phase will be a potential **Adverse, Short-term, Moderate** effect. Given that no Otter were recorded within the wind farm Site boundary and no construction works are taking place within suitable habitat for Otter, mortality during the construction phase is considered to be an **Adverse, Short-term, Not Significant** effect. In EIA terms, this is considered to be **Not Significant**.

Pine Marten

As discussed in **Appendix 6.7 – Mammals and Other Receptors**, Pine Marten was recorded 13 times within the M97 and M98 grid squares (NBDC, 2024), the most recent records were on 29/06/2021. A single Pine Marten was observed on camera trap 19067 on the 30/11/2023 (six images). Another single Pine Marten was observed on camera trap 19065 on the 06/02/2024 (three images). Secondary evidence of Pine Marten in the form of scat was recorded three times during field surveys undertaken within the proposed wind farm Site. The nearest sign (scat) to the proposed Project was recorded 135.7m southeast of the proposed wind farm Site.

Pine Marten is assessed as being of **Low** sensitivity to the construction phase of the Project, with any construction phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

The Project will result in the loss of suitable Pine Marten habitat (9.32ha of Conifer Plantation) during the construction phase. Although wider areas of suitable Pine Marten habitat will be retained within and adjacent to the Project, direct habitat loss and fragmentation, as well as disturbance arising from construction activities, represent a potentially **Adverse, Short-term, Slight** effect. In EIA terms, this is considered to be **not significant**.

Direct mortality during construction phase is possible, as is the potential for pollution or contamination; however, in a worse-case scenario this is of low likelihood and would be considered to be, **Adverse, Short-Term, Not Significant** effect. In EIA terms, this is considered to be **Not Significant**.

Smooth Newt

As discussed in **Appendix 6.7 – Mammals and Other Receptors** and **Appendix 6.8 – Aquatic Ecology**, Smooth Newt was recorded in moderate abundances at pond site 217.46m west of the wind farm Site boundary. Multiple records of Smooth Newt were identified during the desk study. Smooth Newt within the proposed Project and adjacent lands have therefore been identified as being of **Low** sensitivity to the construction phase of the Project, with any construction phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

Potential construction effects on Smooth Newt through habitat loss and fragmentation, pollution, disturbance and direct mortality are considered to represent a potential **Adverse, Short-term, Not Significant** effect. In EIA terms, this is considered to be **Not Significant**.

Aquatic Ecology

The local hydrology includes the Culliagh Stream (as noted) which runs adjacent to the proposed Site's eastern boundary and approximately 70m from the closest infrastructure (Turbine Hardstand) adjacent to turbine T03. The Culliagh Stream flows south and turns east to join the Feorish River (Tarmonbarry)_020. The latter then joins the River Shannon (upper), approximately downstream of the proposed wind farm Site, which from that point flows to Lough Ree SAC approximately 22.1km downstream of the wind farm Site.

The Ballymartin Stream (first order stream) is also located approximately 51m from closest infrastructure related to the proposed Onsite Substation and Communications Relay Tower. The Ballymartin Stream flows west before turning north to flow into Kilglass Lough approximately 1.8km downstream of the proposed Project.

As discussed in **Appendix 6.8 – Aquatic Ecology**, aquatic species recorded during surveys included lamprey. Lamprey ammocoetes were recorded from only two sites on the Culliagh Stream (A3) (present in high densities) and Curraghroe Stream (C6) (low densities) and suitability for the species was typically poor or absent in the survey area. Due to the low numbers of lamprey recorded during aquatic surveys, and sub-optimal habitat quality Lamprey is considered to be of **Low** sensitivity. Construction phase effects to lamprey likely to be of **Low** magnitude, therefore resulting in an overall impact significance of **Very Low**.

Invasive Aquatic Species including, Asian Clam and Quagga Mussel were detected at the mouth of the Lough Ree within the River Shannon. Should water quality degradation upstream occurs as a result of agricultural and other anthropogenic sources, these species distribution may increase and continue to spread. The proposed Project will have no interaction with the waterbody within which these species were recorded, therefore no likely spread of these species will occur as a direct result of the Project.

As described in **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** and discussed further below, the proposed wind farm Site and its associated infrastructure (turbines, Site Access Tracks, Substation, temporary compound) does not cross any EPA mapped watercourse i.e., there is complete avoidance of any EPA mapped watercourses within the Site boundary.

As described in **Chapter 2 – Project Description, Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology**, and within **Appendix 2.1 – CEMP**, no instream works will be

required for the proposed GCR on the Bellmount Stream (also known as Cloggernagh Stream). The proposed method will be cable trenching on the existing carriageway of the R371 (see **Chapter 2 – Project Description**). As no instream works are proposed, there will be no direct effects on aquatic habitats or associated aquatic species.

There is potential for the construction phase to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons into downstream watercourses. This represents a potential indirect effect on the identified aquatic receptors and water quality in the form of habitat degradation through water pollution. These potential effects on water quality are fully described and assessed in **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** of this EIAR.

In the absence of mitigation, the indirect effect of water pollution on surface water quality, and therefore aquatic ecology species such as Lamprey, represents a potential **Adverse, Short-term, Moderate** effect. In EIA terms, this is considered to be **Not Significant**.

Summary of Assessment of Effects for Non-avian Receptors

A summary of the effects on KERs during construction are outlined in **Table 6-21** (excluding birds).

Table 6-21: Construction effect characterisation for KERs.

KER	Effect	Effect magnitude	Effect significance
Habitats	Habitat loss and fragmentation	High Oak-ash-hazel woodland (WN2); Treeline/ Eroding/upland rivers (WI2/FW1).	Long-term Moderate adverse effect
		High Treelines (WL2).	Long-Term Slight adverse effect

KER	Effect	Effect magnitude	Effect significance
		High Recently-felled Woodland (WS5)	No significant effect
		Medium Wet willow-alder-ash woodland (WN6); Hedgerows (WL1).	No significant effect
		Low Hedgerows/Treelines	Long-term slight adverse effect
		Negligible/Very Low Wet Grassland (GS4); Scrub (WS1); Mixed broadleaved Woodland (WD1); Scrub/Wet willow-alder-ash woodland mosaic (WS1/WN6); Drainage ditches (FW4)	No significant effect

KER	Effect	Effect magnitude	Effect significance
	Disturbance, displacement and pollution	Negligible	No significant effect
Invasive non-native plant species	Spread of invasive non-native species	Negligible	No significant effect (Unlikely)
Otter	Habitat loss and fragmentation	Moderate	Short-term, slight negative adverse, impact.
	Disturbance, displacement	Low	Short-term, slight negative adverse effect
	Pollution	Moderate	Short-term, slight negative adverse, effect
	Direct mortality	Negligible	No significant effect
Pine Marten	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant
Bats	Habitat loss and fragmentation	Low	Long-term slight adverse effect
	Disturbance, displacement, pollution	Low	No significant effect
	Direct mortality	Negligible	No significant effect
Amphibian and Reptiles	Habitat loss and fragmentation	Negligible	No significant effect

KER	Effect	Effect magnitude	Effect significance
	Disturbance, displacement, pollution	Negligible	No significant effect
	Direct mortality	Negligible	No significant effect
Aquatic species	Habitat loss and fragmentation	Negligible	No significant effect
	Disturbance, displacement, pollution	Low	Short-term Slight effect
	Direct mortality	Negligible	No significant effect
Water quality	Pollution	Moderate	Short-term and moderate effect

6.6.3 Operational Phase

The three Technology Options considered in the EIAR present no variation to the scale or magnitude of predicted impacts as a result of the Operational Phase. As such impacts on KERs described below assign the same magnitude, character and likelihood for significant effect across the three Technology Options.

Statutory Sites

The proposed Project is not located within the boundaries of any European or Nationally designated statutory site. There will be no direct effects on any designated site as a result of the construction of the proposed Project.

European Sites

Three European sites were screened in for further assessment (refer to **Section 6.4.1, Table 6-12**) as being within the Zone of likely impact on ecological features:

- Lough Ree SAC [000440];
- Ballykenny-Fisherstown Bog SPA [004101]; and

- Lough Ree SPA [004064].

Lough Ree SAC (000440)

This site is 11.7km from the proposed wind farm Site and 8.5km from the GCR. The only QI for this SAC that has been brought forward for assessment is Otter, as a physical pathway exists between the Project and Lough Ree SAC for Otter to occur within the defined ZOI of the Project. Otters associated with the SAC have a **Very High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Low** resulting in an impact significance rating of **Low**.

The effect arising from the Project on Otter relates to the potential for fine sediment pollution and accidental spills and leaks, such as fuel leakage from vehicles used to maintain the proposed wind farm. Additionally, the increased Turbine Hardstanding areas including the Turbine Foundations will have the potential to contribute to an increase in surface water runoff into adjacent watercourses where Otter may be foraging. In the absence of mitigation, this represents a potential **Adverse, Long-Term, Moderate** effect. In EIA terms, this is considered to be **Not Significant**.

Ballykenny-Fisherstown Bog SPA (004101)

Ballykenny-Fishertown Bog SPA is located 7.4km from the proposed wind farm Site, therefore disturbance occurring during operation may affect the core foraging range of Greenland White-fronted Goose, which is a SCI of this SPA, as such this would be rated as having a **Very High** sensitivity. However, the intervening distance, which is at the extreme range of Greenland White-fronted Goose for assessing connectivity (of 5-8km; NatureScot, 2016), coupled with the absence of any records of Greenland White-fronted Goose in this area for many years, means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

The operation phase could give rise to a potential **Adverse** (via disturbance and / or displacement, if the SCI were present), **Short-Term, Not Significant** effect. In EIA terms, this is considered to be **Not Significant**.

Lough Ree SPA (004064)

Lough Ree SPA is located 11.8km from the wind farm Site and 8.5km from the GCR.

A total of 11 bird SCIs (for Lough Ree SPA) were recorded during I-WeBS searches: Common Tern, Coot, Goldeneye, Lapwing, Little Grebe, Mallard, Shoveler, Teal, Tufted Duck, Whooper Swan, Wigeon, Mallard, Shoveler and Golden Plover. Full details of bird survey efforts and results are presented in **Appendix 6.5 – Ornithology**.

Two species that are SCIs of Lough Ree SPA (Mallard and Golden Plover) had flightlines recorded during VP surveys and were therefore included for consideration in the CRM (see **Appendix 6.5 – Ornithology** and **Appendix 6.9 – Collision Risk Model**). However, due to the separation distance between the SPA and the Project (11.8km), it is not considered likely that the flightline records of these two species are from the SPA population. The records of Golden Plover recorded during the survey period 2022 – 2024 are from the breeding migration period only and were only recorded once in April 2024. This suggests those observed during field studies are not the wintering population associated with Lough Ree SPA (and listed as SCIs) but rather potentially the population associated with somewhere closer such as Kilglass Lough. The Lough Ree SPA is therefore scoped out from collision mortality effects to any SCIs.

As such, no likely significant disturbance/displacement or collision effects, are anticipated on the SCI species for Lough Ree SPA. This is considered to be **Not Significant** in EIA terms.

A number of SCI species of the Lough Ree SPA may be present in downstream aquatic habitats due to the occurrence of suitable foraging habitats. The effect arising from the Project on these SCI species for Lough Ree SPA relates to the potential for fine sediment pollution and accidental spills and leaks, such as fuel leakage from vehicles used to maintain the proposed wind farm. Additionally, the increased Turbine Hardstanding areas including the Turbine Foundations will have the potential to contribute to an increase in surface water runoff, release of sediments, hydrocarbons and pollutants into adjacent watercourses into wetland habitats (including wet grassland) where these bird species may be foraging.

The SCI species for Lough Ree SPA have a **Very High** sensitivity. However, the intervening distance to suitable foraging habitats means that the magnitude of any effects will be **Negligible**. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

National Sites

Six Nationally Designated sites (see **Table 6-13, Section 6.5.2**) were identified as being within the Zone of likely impact on ecological features:

- Kilglass and Grange Loughs pNHA;
- Lough Boderg and Lough Bofin pNHA;
- Ardakillin Lough pNHA;
- Corbally Turlough pNH;
- Lough Ree pNHA; and
- Shad Lough pNHA.

Kilglass And Grange Loughs pNHA (000608)

Kilglass and Grange Loughs pNHA is located directly 1km north of the wind farm Site boundary and approximately 1.8km downstream of the wind farm Site boundary via the Ballymartin Stream. The site is noted for wetland habitats, invertebrates and wintering birds, and has been brought forward for assessment as both a hydrological and a physical pathway exist between the Project and pNHA. The species and habitats associated with the pNHA have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Low**, resulting in an impact significance rating of **Low**.

The effect arising from the Project on the wetland habitats, invertebrates and birds relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons into those wetland habitats downstream of the Project.

In addition, disturbance occurring within the proposed Project during operation may affect foraging ranges of the wintering bird species associated with this pNHA. Although this represents a potential **Adverse** effect, the separation distance between the Kilglass and Grange Loughs pNHA is greater than the disturbance distances (Livesey *et al.*, 2016) associated with the bird species listed for this site (which includes Greenland White-fronted Goose, although these have not been recorded at the site for many years). This, coupled with the **Short-Term** nature of the effect, means that the overall evaluation of this effect is a **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Lough Boderg And Lough Bofin pNHA [001642]

Lough Boderg and Lough Bofin pNHA is located 6.2km northeast of the Site boundary and is hydrologically connected by a short channel to Kilglass and Grange Lough pNHA approximately 10.1km downstream of the proposed Project via the Ballymartin Stream. The site is noted for woodland and wetland habitats and the occurrence of Greenland White-fronted Goose and has been brought forward for assessment as both hydrological and a physical pathway exist between the Project and pNHA. The species and habitats associated with the SAC have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Low**, resulting in an impact significance rating of **Low**.

The effect arising from the Project on the wetland habitats and birds relates to the potential for pollutants arising from works associated with the operation of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons into those wetland habitats downstream of the Project.

In addition, disturbance occurring within the proposed Project during construction may affect foraging ranges of the Greenland White-fronted Goose associated with this pNHA. However, the intervening distance, which is at the extreme range of Greenland White-fronted Goose for assessing connectivity (of 5-8km; NatureScot, 2016), coupled with the absence of any records of Greenland White-fronted Goose in this area for many years, means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

Although a potential **Adverse** effect exists, the lack of Greenland White-fronted Goose records, coupled with the **Short-Term** nature of the effect, means that the overall evaluation of this disturbance effect is **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Ardakillin Lough pNHA (001617)

Ardakillin Lough pNHA is located 7.9km west of the closet Project element. The site is noted for wetland habitats and wintering birds and has been brought forward for assessment as a physical pathway exists between the Project and pNHA. The species and habitats associated with the pNHA have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Low**.

The effect arising from the Project relates to disturbance occurring during operation, which may affect foraging ranges of the wintering bird species associated with this pNHA. Although this represents a potential **Adverse** effect, the separation distance between Ardakillin Lough pNHA is

greater than the disturbance distances associated with the bird species listed for this site. This, coupled with the **Short-Term** nature of the effect, means that the overall evaluation of this effect is **Not Significant**. In EIA terms, this is considered to be **Not Significant**.

Lough Ree pNHA [000440]

Lough Ree pNHA is located 8.5km South of the GCR and 11.8km South of the wind farm Site (straight-line distance). This site is connected hydrologically downstream (18.7km). The QIs and SCIs of this pNHA correspond to its SAC and SPA equivalents (NPWS, 2016; NPWS, 2022). Despite the sensitivity of the species and habitats within the pNHA considered to be **High**, the magnitude of any effects is considered to be **Negligible (due to distance well outside of the disturbance distance for the species listed as QIs and SCIs)**, this results in an impact significance rating of **Very Low**.

As with the SAC and SPA, the effect arising from the Project on habitats and species associated with Lough Ree pNHA relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into watercourses. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Shad Lough pNHA (001648)

Shad Lough pNHA is located 13.3km southwest of the Project. The QIs for this pNHA that has been brought forward for assessment are Wigeon and Otter. For Wigeon, populations of wintering waterbirds are assessed as being of Low sensitivity to the operation phase of the Project, with any operational phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**. In EIA terms, this is considered to be **Not Significant**.

For Otter although physical pathway exists between the Project and Shad Lough pNHA for Otter to occur within the defined ZoI of the Project. Otters associated with the pNHA have a **High** sensitivity. However, the intervening distance means that the magnitude of any effects will be **Negligible**, resulting in an impact significance rating of **Very Low**.

The effect arising from the Project on Otter relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other

pollutants such as hydrocarbons and cementitious material into watercourses where Otter may be foraging. In the absence of mitigation, this represents a potential **Adverse, Short-Term, Slight** effect.

Potential impacts on the pNHA are considered to be **Not Significant**.

Habitats

The proposed Project has an anticipated lifespan of 35 years. Potential effects identified during the operational phase are as follows:

- **Pollution of habitats:** through operational activities such as the use, assembly and storage of machines and materials (risk of chemical and fuel spills); particularly regarding aquatic habitats.

There will be no removal of habitats during the operational phase of the proposed Project. As a result, there is no potential for direct adverse effects to habitats arising from the operational phase of the proposed Project.

In the worst-case scenario, where habitats (including aquatic habitats) are subject to a potential pollution or contamination effect during the operational phase of the proposed Project, this would be rated as having a **Low** sensitivity and, considering the likely extent of any habitat alteration will be minimal, the magnitude will be **Negligible**, resulting in an impact significance rating of **Very Low**.

In the absence of mitigation, this represents a potential **Adverse, Long-Term, Imperceptible** effect.

No specially protected or notable plant species were recorded within or in close proximity to the Project during the field surveys undertaken in 2023 and 2024. Low records number of Short-leaved water starwort, a rare and protected macrophyte (Flora Protection Order, 2022) were available for Lough Ree (NPWS data; not shown). Embedded mitigation during the operation of the proposed Project including measures to minimise pollution and disturbance effects on watercourses (e.g., habitats potentially supporting Short-leaved water starwort) and avoid harm to any other important flora which could potentially be present.

No third schedule invasive species have been identified within the Project. Therefore, the spread of invasive species during the operation of the Project is considered **Not Significant**.

In summary, considering the embedded mitigation measures (see **Section 6.5**), potential effects on habitats (notably aquatic) during the operation phase of the proposed Project are considered **Imperceptible** to **Neutral** at most. In EIA terms, this is considered to be **Not Significant**.

Ornithology

The assessment of effects on bird species during the operation of the Project is described below. Predicted effects identified during the operational phase are as follows:

- **Disturbance and displacement:** disturbance of nesting, flying, sheltering and foraging birds (e.g., from additional noise, light, vibration, visual disturbance and human activity) potentially resulting in displacement of birds; and
- **Direct mortality:** bird collisions with turbines whilst flying within the proposed Project area, resulting in fatalities and injuries.

The species selected for the Collision Risk Model outlined in **Appendix 6.9 – Collision Risk Model, Table 1.2** (breeding season) and **Table 1.3** (wintering season). Whilst some birds can occur at a site all year round, there tends to be differing activity levels between breeding and non-breeding seasons. This can be seen by the differences in activity between where, for example, raptors (e.g., Buzzard, Hen Harrier and Kestrel) are more regularly observed in summer months compared to winter. Conversely, wintering waders (including Golden Plover and Snipe *Gallinago gallinago*) are only observed in winter months. To accurately reflect the changing avifauna between seasons, separate CRMs are presented for wintering and breeding seasons.

Target species for the proposed Project are based upon likely collision risk as well as their status as BoCCI Red or Amber Lists (Gilbert et al., 2021). Full data on target species are contained with **Appendix 6.5 – Ornithology**. Target species were:

- All species of waterfowl;
- All species of raptor;
- All species of owl;
- All species of grouse;
- All species of wader; and
- All species of gull.

From this target species list, 12 species were recorded during VP Watches (see **Appendix 6.9 – Collision Risk Management, Table 1.2** and **Table 1.3**). From these species, Raven was not included in the CRM as it was not identified as a target species. Of the remaining species, only

those with sufficient flight activity (defined here as a minimum total of five flights or minimum of ten individuals of each target species recorded during each season of analysis; numbers below these thresholds are likely to exhibit negligible collision risk). This resulted in six species being assessed for collision risk during the breeding season (Buzzard, Cormorant, Golden Plover, Kestrel, Lesser Black-backed Gull and Peregrine, and two species being assessed during the wintering season (Buzzard and Kestrel).

Collision Risk Modelling adopts a mathematical approach to determining the likelihood of a bird species colliding with wind turbine rotors at a pre-defined site and is fully described by Band *et al.* (2007) and Scottish Natural Heritage (SNH, 2000), with supporting information provided by Scottish Natural Heritage (SNH, 2019). This determination is based upon field data collected at the proposed wind farm site. The output from the model indicates the number of birds likely to collide with rotors of all turbines within the wind farm per year of operation of the wind farm as a whole. The inverse of this (i.e., the number of years over which a single fatality would be likely) is also often indicated.

Data on the site (such as the number, size, dimensions and likely functioning of the turbines proposed for the Site) forms part of the model, along with biometric data on the bird species themselves. These are reconciled against standardised field data collected using systematic and prescribed Best Practice methods on birds flying through the proposed site (SNH, 2017). Collectively, these data are then used to determine the number of bird flights through the rotors of all turbines within the area on an annual basis (CRM Stage 1) as well as the probability that a bird flying through the turbine will collide with the rotors (CRM Stage 2). The product of the numerical output from these two stages of assessment indicates the number of birds likely to collide with the rotors if no avoiding action is being taken by the bird species in question. This value is then corrected using published avoidance rates (CRM Stage 3), to give a final indication of collision risk (number of birds colliding with the rotors per annum).

Assessment of operational effects through turbine collisions for KERs is informed by species-specific collision risk modelling where appropriate. Collision risk modelling methods are presented in **Appendix 6.9 – Collision Risk Management**. The results of collision risk modelling for KERs are summarised in **Table 6-21** and referred to in the relevant sections.

Table 6-21: Collision risk modelling results for relevant KERs.

KER	Breeding season						Winter season					
	Estimated collision fatalities per year			Estimated operation duration for one collision fatality to occur (years)			Estimated collision fatalities per year			Estimated operation duration for one collision fatality to occur (years)		
Technology Option	1	2	3	1	2	3	1	2	3	1	2	3
Buzzard	0.16	0.12	0.13	6.22	8.05	7.98	0.08	0.06	0.06	13.21	17.09	16.93
Cormorant	0.06	0.04	0.04	17.77	22.56	22.37	-	-	-	-	-	-
Golden Plover	0.03	0.03	0.03	32.24	40.11	39.78	-	-	-	-	-	-
Kestrel	0.08	0.06	0.06	13.08	17.04	16.87	0.07	0.05	0.05	14.45	18.82	18.63
Lesser Black-backed gull	0.03	0.02	0.02	31.91	41.03	40.65	-	-	-	-	-	-
Peregrine	0.02	0.02	0.02	41.80	53.78	53.28	-	-	-	-	-	-

Peregrine

The population of Peregrine recorded is assessed as being of National Importance. One active nest was recorded during the two years of detailed surveys, located 686m west of T06. This nest was in an active quarry. Regular foraging activity was also recorded within the Project during the breeding and winter seasons, Peregrine is assessed as being of **High** Sensitivity. In the absence of mitigation, the worst-case scenario for the impact magnitude would be **Very High**, resulting in a **Very High** impact significance.

No suitable nesting habitat is available within the wind farm Site boundary therefore, whilst vegetation removal to facilitate operational maintenance of the Project could cause a reduction in the availability and connectivity of habitats used by breeding Peregrine, any vegetation removal will be small in scale; particularly in the context of retained suitable habitat outside the collision risk zone and adjacent to the proposed Project. In the absence of mitigation, effects on breeding Peregrine due to vegetation removal at the turbine base during the operational phase of the

proposed Project represents a potential **Adverse, Long-term, Slight** effect. In EIA terms, this is considered to be **Not Significant**.

Peregrine is not considered a likely risk for direct mortality based on the low level of activity of this species within wind farm Site area and that suitable foraging habitat being present west of the known nest site. A collision is estimated every 41.8 - 53.78 years depending on the Technology Option (**Appendix 6.8 – Aquatic Ecology**), which extends beyond the life cycle of the Project. Albeit unlikely, a single fatality to the male or female of the breeding pair present within the ecological baseline would constitute a **Significant** effect as it would impact the nest success and could result in long-term abandonment of the nest.

Kestrel

Kestrel is assessed as being of **Medium** Sensitivity. With regular foraging activity recorded within the wind farm Site during the breeding and winter seasons, in the absence of mitigation, the worst-case scenario the impact magnitude would be **Moderate**, resulting in a **Low** impact significance.

As per habitat fragmentation outlined in **Section 6.6.2** Construction phase effects, no additional impacts are predicted as a result of operational phase works.

Kestrel is a species at risk from mortality related effects. The Worst-case scenario fatality is one collision every 13.08 to 17.04 years for breeding season and every 14.45 to 18.82 years for winter season, depending upon the Technology Option. As this species is a red-list bird species, of County Importance with a breeding pair within the ecological baseline, the collision mortality impact represents a potential **Adverse, Long-term, Slight** effect. The predicted collision risk overall is low therefore no significant effects of collision risk are anticipated at the County scale. In EIA terms, this is considered to be **Not Significant**.

Buzzard

Buzzard are assessed as being of **Low** sensitivity with any operation phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

Assuming no additional significant habitat loss as a result of operational vegetation management, a worst-case scenario effects on Buzzard due to habitat loss and fragmentation during the operational phase of the Project represents a potential **Adverse, Long-term, Imperceptible** effect.

Buzzard is a species at risk from mortality related effects, with the Worst-case scenario for fatalities equating to one collision every 6.22 to 8.05 years for breeding season and every 13.21 to 17.09 years for winter season, depending upon the Technology Option. This collision mortality impact represents a potential **Adverse, Long-term, Slight** effect.

In EIA terms, the effect on Buzzard during the operational phase, is considered to be **Not Significant**.

Barn Owl

The population of Barn Owl is assessed as being of **Medium** sensitivity, with evidence of roosting activity recorded within agricultural buildings in close proximity to the proposed Onsite Substation during the breeding season 2024, the worst-case scenario for the operational impact magnitude would be **Moderate**, resulting in a **Low** impact significance.

Whilst vegetation removal to facilitate operational maintenance of the Project could cause a reduction in the availability and connectivity of habitats used by breeding and wintering Barn Owl, any vegetation removal will be small in scale; particularly in the context of retained suitable habitat within and adjacent to the Project.

Effects on breeding and wintering Barn Owl due to habitat loss and fragmentation during the operational phase are considered to be of **Adverse, Long-Term, Not Significant** effect.

Effects on breeding and wintering Barn Owl due to disturbance and displacement during the operational phase may occur, therefore this impact represents a potential **Adverse, Long-Term, Slight** effect.

No Barn Owl activity was recorded over proposed turbine locations to justify detailed collision risk modelling and Barn Owl are not subject to collision mortality with wind turbines as a result of their flight characteristics. Collision impacts on Barn Owl during the operational phase are therefore considered a potential **Adverse, Long-Term, Not Significant** effect. However, mitigation measures related to carcass searches will include monitoring for this species under a precautionary principle (see **Section 6.7**)

In EIA terms, the effect on Barn Owl during the operational phase, is considered to be **Not Significant**.

Woodcock

Woodcock is assessed as being of **Medium** Sensitivity. With evidence of breeding activity recorded in close proximity to the Project during the breeding season 2023 and in the breeding season 2024, the worst-case scenario for the impact magnitude would be **Moderate**, resulting in a **Low** impact significance.

Whilst vegetation management to facilitate operational maintenance of the Project could cause a reduction in the availability and connectivity of habitats used by breeding and wintering Woodcock, any vegetation removal will be small in scale; particularly in the context of retained suitable habitat within and adjacent to the Project. Effects on breeding and wintering Woodcock due to habitat loss and fragmentation during the operational phase are considered a potential **Adverse, Long-term, Not Significant** effect.

Considering the limited scale of operational disturbance, effects on breeding and wintering Woodcock due to disturbance and displacement during the operational phase are considered a potential **Adverse** effect, that will occur over a **Long-Term, Imperceptible** effect.

Whilst displaying Woodcock may fly at heights which would potentially bring them into contact with turbine blades, Woodcock are rarely recorded colliding with turbines. Collision mortality on Woodcock during the operational phase are therefore considered as a potential **Adverse, Long-term, Not Significant** effect.

In EIA terms, the effect on Woodcock during the operational phase, is considered to be **Not Significant**.

Wintering Waterbirds

Populations of wintering waterbirds including Whooper Swan, Greenland White-fronted Goose, ducks and waders are assessed as being of **Low** sensitivity to the operation phase of the Project, with any operational phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

The Project does not contain suitable habitat for wintering waterbirds, hence the absence of records within the wind farm Site boundary. Habitat loss and fragmentation during the operational phase are considered to have a potential **Adverse, Long-Term, Imperceptible** effect.

Operational turbines have been shown to contribute to disturbance pathways to bird receptors. Of the species identified, Greenland White-fronted Goose has the largest minimum buffer zone of 1km. The remaining waterbird species were recorded within the Kilglass Lough and have

disturbance distances of less than 500m. Due to the distance between the proposed wind farm Site and suitable habitats the effects of operational phase disturbance to wintering waterbirds are considered a potential **Adverse, Long-Term, Not Significant** effect.

Collision with operating turbines is considered a possible result at any active wind farm development. Only four waterbirds were recorded during VPs (Cormorant, Lesser Black-backed Gull, Mallard and Golden Plover). However, of these species were recorded, only one Mallard flightline was recorded within the wind farm Site boundary. Golden Plover was assessed for collision risk, with an estimated collision once every 32.24 - 40.11 years (depending upon the Technology Option). Cormorant was assessed for collision risk, with an estimated collision once every 17.77 - 22.37 years (depending upon the Technology Option). Lesser Black-backed Gull was assessed for collision risk, with an estimated collision once every 31.91 - 40.65 years (depending upon the Technology Option). Mallard was too scarce to warrant inclusion within the CRM as the number of flightlines would not give rise to any significant effect (see **Appendix 6.9 – Collision Risk Modelling**).

Given this rate of collision and the risk for it to occur is limited to the migratory periods in April and September in a worst-case scenario for Golden Plover, and the impact risk for the other three species is limited to approximately one fatality in the 35 year lifespan of the Project, any impact as a result of mortality predicted effects are considered a potential **Adverse, Long-Term, Not Significant** effect.

In EIA terms, the effect on wintering waterbird populations is considered to be **Not Significant**.

Passerines

Populations of breeding and wintering passerines (specifically Redwing, Starling and Willow Warbler) are assessed as being of Low sensitivity, with any operational phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

Therefore, whilst vegetation removal to facilitate operational maintenance of the Project could cause a reduction in the availability and connectivity of habitats used by breeding and wintering passerines, any vegetation removal will be small in scale; particularly in the context of retained habitat within and adjacent to the Project. Effects on breeding and wintering passerines due to habitat loss and fragmentation during the operational phase are considered a potential **Adverse, Long-term, Imperceptible** effect.

Operational phase disturbance due to additional noise, vibration, light, and human activity, relevant passerine species are considered to be relatively tolerant to such disturbance and are likely to quickly habituate to new levels of 'background' disturbance during the operation of the Project. Considering the limited scale of operational disturbance, the low sensitivity of relevant passerine species and the embedded mitigation described in **Section 6.5**, effects on breeding and wintering passerines due to disturbance and displacement during the operational phase are considered a potential **Adverse, Long-term, Imperceptible** effect.

Due to their size and typical flight patterns, passerine species such as those relevant to the Project are not considered to be susceptible to significant impacts from collisions with wind turbines. Collision impacts on breeding and wintering passerines during the operational phase are considered a potential **adverse** effect, which will occur over a **Long-term** resulting in an **Imperceptible** effect. In EIA terms, this is considered to be **Not Significant**.

Summary of Assessment of Effects for Birds

A summary of the effects on KERs during operation are outlined in **Table 6-22**.

Table 6- 22: Operational effect characterisation for KERs.

KER	Effect	Effect magnitude	Effect significance
Peregrine	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Very High	Significant
	Direct mortality (Turbine collisions)	Very High	Significant
Kestrel	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Low/moderate	Slight Effect

KER	Effect	Effect magnitude	Effect significance
	Direct mortality (Turbine collisions)	Low	Slight Effect
Other raptors	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Negligible	No significant effect
	Direct mortality (Turbine collisions)	Low	Imperceptible Effect
Woodcock	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Negligible	No significant effect
	Turbine collisions	Negligible	No significant effect
Barn Owl	Direct habitat loss and fragmentation	Low	Slight Effect
	Disturbance and displacement	Low	Slight Effect
	Turbine collisions	Negligible	No significant effect
Passerines	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Negligible	No significant effect
	Turbine collisions	Negligible	No significant effect
Waterbirds and waders	Direct habitat loss and fragmentation	Negligible	No significant effect
	Disturbance and displacement	Low	No significant effect
	Direct mortality (Turbine collisions)	Negligible	No significant Effect

Bats

The Site and adjacent lands have been identified as being used by foraging and commuting bats; notably Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Nathusius' Pipistrelle, Brown Long-eared Bat and *Myotis spp.* Common Pipistrelle and Soprano Pipistrelle were the most common species recorded within the wind farm Site boundary, both recording high levels of activity at T01. Leisler's Bat was recorded at lower levels. The bat survey results provided in **Appendix 6.6 – Bats** found that the proposed Project is utilised by a regularly occurring bat population of Local Importance (**Table 6.26, Appendix 6.6 – Bats**).

Four bat species identified within the Site are of high collision risk (Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle and Leisler's Bat). It should be noted that Leisler's Bat, whilst fairly rare in Great Britain and Europe, is one of the most common bat species in Ireland, with an estimated population of 112,800-202,300 (2018-2023) that is considered of importance within an European context due to the rarity of Leisler's Bat outside of Ireland (Roche and Langston, 2024).

Both direct collision with turbine blades and barotrauma resulting from close contact with blades have been reported as an issue for bats at operational wind farms (Cryan & Barclay, 2009). The susceptibility of different bat species to such impacts depends on multiple factors; notably their tendency to fly at rotor blade height.

In order to assess the overall potential risk to bats utilising the proposed Project site, the Risk assessment process has been applied as per NatureScot 2021.

The Site and surrounding areas are considered, on a precautionary basis, as being of **Moderate** value for bats (*buildings/trees with moderate/high value as roosts sites on/near site, habitat could be used extensively by bats, site connected to wider landscape by linear features as per NatureScot, 2021*).

The Project size is considered **Medium** based on the **size of turbines** (>100m in height) being proposed despite the small number of turbines (No. 6). Medium defined as turbines 50 -100m in height between 10 - 40 turbines.

The Site risk assessment is therefore **Moderate** site risk (as per criteria in Table 6-7, **Section 6.3.6**).

Table 6- 22: Overall Assessment for bat risk during operational phase

Survey Period	Species	Site Risk Level	Activity Category	Overall Assessment
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Spring 2023	Brown Long-eared Bat	Moderate (3)	Negligible (2)	Medium
	Common Pipistrelle		High (5)	High
	Leisler's Bat		Low (3)	Medium
	Myotis spp.		Low (3)	Medium
	Nathusius' Pipistrelle		Negligible (2)	Medium
	Soprano Pipistrelle		Low (3)	Medium
Summer 2023	Brown Long-eared Bat		Negligible (2)	Medium
	Common Pipistrelle		Low (3)	Medium
	Leisler's Bat		Negligible (2)	Medium
	Myotis spp.		Negligible (2)	Medium
	Nathusius' Pipistrelle		Negligible (2)	Medium
	Soprano Pipistrelle		Moderate (4)	Medium
Autumn 2023	Brown Long-eared Bat		Negligible (2)	Medium
	Common Pipistrelle		High (5)	High
	Leisler's Bat		Negligible (2)	Medium
	Myotis spp.		Negligible (2)	Medium
	Nathusius' Pipistrelle		Negligible (2)	Medium
	Soprano Pipistrelle		High (5)	High

The overall risk assessment for Common Pipistrelle and Soprano Pipistrelle (considered to be present at high levels of activity) in the absence of mitigation is **High (Table 6-22)**.

Leisler's Bat is assessed as **Medium** despite the lower activity, due to its flight behaviour making them particularly vulnerable to collision with turbines (**Table 6-6, Table 6-8**). In EIA terms, the effect on Leisler's Bat during the operational phase, is considered to be **Not Significant**. As per NatureScot guidance there is no requirement to complete an Overall Risk Assessment for low-risk species i.e., Myotis sp, and Brown long-eared bat. Overall activity levels for the latter species was low. Therefore, no significant collision related effects are anticipated.

In the absence of mitigation, mortality of bats as a result of the operation of the proposed Project is considered to have a potential **Adverse, Long-Term, Significant** effect. In EIA terms, this is considered to be **Significant**.

Mammals and Other Receptors

Otter

Otter has been assessed as being of **Very High** sensitivity to the construction phase of the Project, with any operational phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Medium**.

No sightings or secondary evidence of Otter was recorded within the wind farm Site boundary. There is potential for Otter presence within watercourses downstream of the wind farm Site; notably an unnamed Curraghroe River tributary and the Curraghroe River which was previously known to support Otter and the Feorish River.

Otter is a mobile QI species downstream of the proposed Project. Otter is considered for ex-situ effects during the operational phase via potential pollution disturbance to the downstream reaches of the Feorish River and Curraghroe River, in a worst-case scenario.

Impacts on the water quality during the operational phase refer to both the static ongoing operation of the proposed wind farm and to any specified maintenance requirements. There are no anticipated likely impacts to the water environments as a result of the GCR or TDR during the operational phase.

As discussed in **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology**, potential impacts of these activities on water quality, include fine sediment pollution and accidental spills and leaks, such as fuel leakage from vehicles used to maintain the proposed wind farm. Additionally, the increased Turbine Hardstanding areas including the Turbine Foundations will have the potential to contribute to an increase in surface water runoff, release of sediments, hydrocarbons and pollutants into adjacent watercourses.

Therefore, in the absence of mitigation, the operation of the Project is considered to have the potential to be an **Adverse, Long-Term, Moderate** effect.

Mortality arising from operational phase effects is an unlikely event for Otter but is considered forward to identify the extent of the significance in a worst-case scenario. Although unlikely, there is potential for Otter to cross the Site Access Tracks and public roads in use by machinery and project vehicles during maintenance works. Otter is considered for maintenance works mortality related effects during the operational phase of the Project. Therefore, in the absence of mitigation, the operation of the Project is considered to have the potential to be an **Adverse, Long-Term Imperceptible** effect.

In EIA terms, the effects on Otter during the operational phase is considered to be **Not Significant**.

Pine Marten

Pine Marten is assessed as being of **Low** sensitivity to the operational phase of the Project, with any operational phase effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

Any operational phase impacts, including mortality or pollution/contamination incidents represent a potentially **Adverse, Short-Term, Not Significant** effect.

In EIA terms, the effects on Pine Marten during the operational phase is considered to be **Not Significant**.

Smooth Newt

Although no evidence of presence was recorded within the wind farm Site, Smooth Newt, was recorded in moderate abundances at pond site 217.46m north of the Site boundary and there are multiple records of Smooth Newt identified during the desk study. Smooth Newt within the proposed Project and adjacent lands have therefore been identified as being of **Low** sensitivity to the operational phase of the Project, with any effects likely to be of **Low** magnitude, resulting in an overall impact significance of **Very Low**.

Considering the lack of amphibian and reptile presence recorded within the ecological baseline of the proposed Project, the presence of suitable habitat for Smooth Newt in the wider area, operational phase effects on Smooth Newt through habitat loss and fragmentation, pollution, disturbance and direct mortality are considered to represent a potential **Adverse, Long-Term, Not Significant** effect.

In EIA terms, the effects on Smooth Newt, during the operational phase is considered to be **Not Significant**.

Aquatic Ecology

Aquatic species recorded during surveys included lamprey, considered to be of **Low** sensitivity (Kilglass Lough pNHA and Otter are assessed separately above).

All of the infrastructural components of the proposed wind farm are located significantly away from the delineated 50m watercourse buffer zone with the proposed siting of permanent infrastructure being 60m and in some cases 70m from the nearest EPA mapped watercourse.

This represents a potential indirect effect on the identified aquatic receptors and water quality in the form of habitat degradation through water pollution. These potential effects on water quality are fully described and assessed in **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology, Section 8.8.3** of this EIAR. Potential impacts during the operational phase on water quality, include fine sediment pollution and accidental spills and leaks, such as fuel leakage from vehicles used to maintain the proposed wind farm. Additionally, the increased Turbine Hardstanding areas including the Turbine Foundations will have the potential to contribute to an increase in surface water runoff, release of sediments, hydrocarbons and pollutants into adjacent watercourses

Species that were recorded during aquatic surveys, including lamprey, are considered to be of **Low** sensitivity. Operational phase effects to lamprey (and other freshwater aquatic species) are likely to be of **Low** magnitude, therefore resulting in an overall impact significance of **Very Low**.

In the absence of mitigation, the indirect effect of water pollution on surface water quality, and therefore aquatic ecology, represents a potential **Adverse, Long-Term, Slight** effect.

Evidence of invasive non-native species (INNS) was recorded during aquatic surveys. These species are negative indicators for the identified KERs. Where the Project interacts or reduces water quality, this may contribute to the spread of these INNS's given they typically are more tolerant of such changes to aquatic conditions. In the absence of mitigation, the indirect effect of water pollution on surface water quality, and therefore aquatic ecology regarding spread of INNS, represents a potential **Adverse, Long-Term** effect. This effect is not considered likely given the nearest records of the invasive species are significantly downstream and the impact on water quality is projected to be of slight effect.

In EIA terms, the effects on Aquatic Ecology during the operational phase is considered to be **Not Significant**.

Summary of effects on all non-avian KERs during operation

A summary of effects on all non-avian KERs during operation are outlined in **Table 6-24**.

Table 6- 24: Operational effect characterisation for KERs.

KERs	Effect	Effect magnitude	Effect significance
Habitats	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
Plant species	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant
Invasive non-native plant species	Spread of invasive non-native species	Negligible	Not significant
Invertebrates	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant
Amphibians and reptiles	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant
Otter	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Low	Moderate effect
	Direct mortality	Low	Not significant
Pine Marten	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant

KERs	Effect	Effect magnitude	Effect significance
Bats	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Low	Slight Effect
	Direct mortality (including turbine collisions)	Moderate	Adverse, Long-term, Significant Effect
Aquatic species	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant
	Spread of Invasive Species	High	Not likely to Occur. Not significant

6.6.4 Decommissioning Phase

The three Technology Options considered in the EIAR present no variation to the scale or magnitude of predicted impacts as a result of the Decommissioning Phase. As such impacts on KERs described below assign the same magnitude, character and likelihood for significant effect across the three Technologies.

Following the end of the operational phase the Applicant may wish to replace the turbines with a new set of turbines, subject to fulfilling the planning requirements at the time or the proposed Project may be decommissioned fully. The Onsite Substation and GCR will remain in place as it will be in the ownership of ESB Networks and will form part of the National Grid. The Relay Tower will remain in place as it will form part of the telecommunication network in the area. Other activities will include:

- Removal of turbines nacelles and towers. These works will operate essentially in the reverse of construction and remove the wind farm structure to ground level;
- Removal of the above ground section of the Turbine Foundation called the 'plinth' and restoration of the areas to agricultural land or suitable for forestry replanting as preferred by the landowner;
- Removal of onsite cabling but leaving the buried ducting in place to prevent the need for excessive groundworks;
- Removal and reduction of Turbine Hardstands and Access Tracks by excavation and reinstatement. Areas of access track deemed of use to the landowner for ongoing farm management will be retained with their agreement; and
- Restoration of hedgerows and field boundaries where tracks have been removed and return of topsoil to hardstand areas, as determined by the landowner based on agricultural practices at the time.

The Site Access Tracks and associated drainage will serve the ongoing forestry and farming practices in the area. All other hard surfaced areas such as the Turbine Hardstands will be covered by earth and reseeded/replanted as agreed at the time with the landowners and the Local Authority. It is intended that the electrical and fibre optic cabling between the turbines and the Onsite Substation will be removed from the cable ducting during decommissioning. The cabling will be pulled from the cable duct using a mechanical winch which will extract the cable and re-roll it on to a cable drum and recycled.

The lands will be left in a prepared state for the landowner to return land to predevelopment usage or to seed, plant forestry or undertake alternate activities, as they will determine. The lands will be left in a prepared state for the landowner to seed, plant forestry or undertake alternate activities. The reuse for forestry or agriculture will accelerate the resumption of the natural drainage management that will have existed prior to any construction.

A full description of the decommissioning works is outlined in **Chapter 2 – Project Description**.

Potential impacts associated with the decommissioning phase are anticipated to be similar to those outlined above for the construction and operational phases. Turbine design enables decommissioning to be a relatively straightforward process, during which cranes will disassemble each turbine, and turbine sections will then be removed. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations and hardstanding areas covered over with topsoil and left to regenerate naturally. Underground cables will be cut back at the turbine termination, and either be recycled or left buried in-situ. Site materials will be disposed of in accordance with current waste legislation.

Habitat removal and alteration during decommissioning will be limited to small-scale temporary removal. Any temporarily removed habitat will be allowed to reinstate naturally once decommissioning has been completed. Considering the extent of habitat removal and alteration, effects from habitat loss and fragmentation during decommissioning are considered a potential **Adverse, Short-Term, Imperceptible** effect, with regard to the habitats themselves and the flora and fauna they support.

The same potential effects on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase, these represent a potential **Adverse, Short-Term, Imperceptible** effect.

In EIA terms, the effects on habitats and species during the decommissioning phase are considered to be **Not Significant**.

Ornithology

Effects on birds during the decommissioning phase of the Project is predicted to be similar to those effects during the construction phase. Decommissioning works would likely result in short-term disturbance as a result of increased noise and human presence. However, such effects would be experienced on a temporary basis only and would not be expected to affect the

conservation status of any KER within the wind farm Site boundary and Study Areas. Effects during decommissioning would be less extensive and of a shorter duration than those experienced during construction and disturbance during decommissioning is unlikely to significantly disturb KER's, especially given the short-term temporary nature of the proposed works and extensive areas of suitable habitat that will exist and remain on site and in the wider area during the decommissioning phase of the Project.

Considering the extent and locations of construction works within the Project (with regard to baseline Peregrine activity; notably the locations of the active nest site), and the reduced extent of available nesting habitat into which disturbed Peregrines would be displaced, in the absence of mitigation the decommissioning phase of the Project is considered to potentially result in disturbance and displacement, where the breeding pair could be killed or displaced resulting in the nest being abandoned. Assuming this worst-case scenario, this represents a potential **Adverse, Long-Term, Significant** effect. In EIA terms, this is considered to be **Significant**.

In EIA terms, the effects on ornithology during the decommissioning phase is considered to be **Significant**.

Table 6-25: Decommissioning effect characterisation for KERs.

KER	Effect	Effect magnitude	Effect significance
Habitats	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
Plant species	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution	Negligible	Not significant
Invasive non-native	Spread of invasive non-native species	Negligible	Not significant

KER	Effect	Effect magnitude	Effect significance
plant species			
Invertebrates	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution, direct mortality	Negligible	Not significant
Amphibians and reptiles	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution, direct mortality	Negligible	Not significant
Terrestrial mammals	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution, direct mortality	Negligible	Not significant
Bats	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution, direct mortality	Negligible	Not significant
Aquatic species	Habitat loss and fragmentation	Negligible	Not significant
	Disturbance, displacement, pollution, direct mortality	Negligible	Not significant
Bird Species	Direct habitat loss and fragmentation	Negligible	Not significant
	Disturbance and displacement	Very High	Long-Term, Adverse Significant effects

KER	Effect	Effect magnitude	Effect significance
	Pollution	Negligible	Not significant
	Direct mortality	Negligible	Not significant

6.7 Mitigation Measures

In the impact assessment discussed above, a range of potential effects on ecological receptors were identified. Mitigation measures in the construction, operational and decommissioning phases of the proposed Project will be implemented to reduce any likely significant adverse effects on biodiversity.

Measures are required during the construction and decommissioning phases, will pose the greatest level of disturbance due to construction activity onsite and during the operational phase, when there may be mortality impacts associated with the turbines themselves.

In the sections below the mitigation measures for the 'Do Nothing' scenario, construction phase, operation phase and decommissioning phase are discussed.

6.7.1 'Do Nothing' Scenario

In the 'Do Nothing' scenario, no mitigation measures are proposed as no development will take place.

6.7.2 Construction Phase

Best practice construction measures will be adopted to avoid likely adverse significant effects during construction and decommissioning on KERs. These are detailed within the **CEMP (Appendix 2.1 – Construction Environmental Management Plan)** and include measures to minimise working areas to avoid unnecessary habitat removal/alteration and disturbance, and measures to avoid/minimise the generation of additional noise, dust, light spill and vibration. Pre-Construction surveys will be undertaken in accordance with the **Appendix 6.10 – SHMP** and mitigation measures set out in this section.

Timing of Works

These measures are employed to avoid damage, destruction and disturbance to sensitive species and their (nesting) habitats. These measures are achieved through timing of construction works throughout the nesting period; such timing of works is outlined as follows:

- To minimise the potential for impacts on nesting birds, removal or alteration of suitable nesting habitat (e.g., dense vegetation, trees, rough grassland), wherever possible, be undertaken outside of the peak breeding season (i.e., outside of the period mid-February to early September inclusive). Similarly, works with the potential to cause significant disturbance of sensitive breeding birds (e.g., through the generation of noise, dust, vibration and/or light spill, or through increased human activity) will also be undertaken outside of the peak breeding season where possible. It should be recognised that whilst undertaking works in late September to early February inclusive minimises the likelihood of effects on breeding birds, certain species may still nest during this period;
- Restricting activities in sensitive areas as far as practicable in the early part of the breeding season until the location and breeding status of nesting birds has been established; and clearance of uncultivated vegetation, i.e. trees and hedgerows, will be undertaken outside the main breeding bird season, from March to August inclusive. If other site clearance and construction activities are required to take place during the main breeding bird season, works to the habitat will be preceded by a nesting bird check, during which a suitably experienced ornithologist would check the affected habitat for any active nests. This check will be undertaken within 48 hours prior to the commencement of the works. If an active nest is encountered, an exclusion zone will be established within which works would be suspended until the nest is no longer active (to be confirmed by a suitably experienced ornithologist through ongoing monitoring of the nest). The size of the exclusion zone would be dependent on the species affected, the likely level of disturbance caused by the works relative to baseline disturbance levels on site, and the extent to which the nest site is screened from disturbance (e.g., by adjacent dense vegetation). Exclusion zones may range from 5m (e.g., for breeding passerines) to several hundred metres (e.g., for breeding raptors) in accordance with accepted disturbance distance sensitivities guidance provided by NatureScot (Goodship and Furness, 2022).
- For Peregrine, pre-construction surveys will determine if the nest site is active in the year of construction and mitigation measures will be applied if the nest is determined to be

active, with a buffer of 750m from any identified nest to the nearest construction works during the Peregrine nesting season. These pre-construction surveys will also check for breeding Kestrel and Barn Owl. If any Kestrel or Barn Owl nesting site is located, a 250m buffer will be applied to any active Kestrel nest and 150m–175m for Barn Owl for construction works during the nesting season.

Other sensitive receptors

To minimise the potential for impacts on sensitive species, works with the potential for harm and/or disturbance of such species will be undertaken at the appropriate time of year to avoid/minimise effects (in accordance with relevant best practice guidance). Where this is not possible, works will be preceded and/or accompanied by appropriate ecological monitoring and/or supervision.

Roles and Responsibilities

Ecological Clerk of Works

A suitably qualified Ecological Clerk of Works (EcoCoW) will be appointed by the Employer and will have overall responsibility for overseeing Environmental compliance on the Project and will report to the Construction Manager (CM) and liaise with the Environmental Clerk of Works (ECOW).

The EcoCoW will monitor the site works and ensure that ecological methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment. The EcoCoW is responsible to ensure that all mitigation as identified in the NIS is implemented onsite.

The duties and responsibilities of the ECoW will include:

- Monitor the implementation of the CEMP, carry out site inspections and audits to ensure the works are carried out in compliance with the CEMP;
- Keep site records to demonstrate compliance with the CEMP, the Planning Permission and other statutory requirements;
- Attend design team meetings, site meetings and other stakeholder meetings as required to ensure environmental compliance;
- Advise site management and contractors on items such as:
 - Prevention of environmental pollution;

- Implementation of planning conditions linked to environmental and ecological sensitivities and implementation of statutory requirements linked to environmental controls;
 - Suitability and use of plant, equipment and materials to prevent pollution; and
 - Environmentally sound methods and systems of working to prevent environmental hazards.
- Ensure agreed mitigation measures are initiated, implemented and maintained throughout the construction phase and where required during the operational phase;
 - Liaise with EcoCoW / Project Ecologist, Project Archaeologist, Hydrologist and Geotechnical Engineer and ensure their regular site visits and audits / inspections are completed;
 - Ensure adequate emergency response procedures are put in place for potential environmental hazards;
 - Ensure that details of environmental incidents are communicated in a timely manner to the relevant regulatory authorities;
 - Investigate incidents of significance and ensure corrective actions are carried out;
 - Identify environmental training requirements and arrange relevant training for all levels of site-based personnel.; and
 - Put communication protocols in place to ensure that all personnel on site are made aware that they are responsible for ensuring good construction and environmental practice and that they are encouraged to provide feedback and suggestions for improvements.

The duties and responsibilities of the EcoCoW will include:

- Monitor the implementation of the mitigation and controls as identified in the NIS, carry out site inspections and audits to ensure the works are carried out in compliance with the NIS and Planning Conditions;
- Keep site records to demonstrate compliance with the NIS, the Planning Permission and other statutory requirements;
- Attend design team meetings, site meetings and other stakeholder meetings as required to ensure environmental compliance;
- Ensure agreed mitigation measures are initiated, implemented and maintained throughout the construction phase and where required during the operational phase;

- Investigate incidents of significance related to ecology and ensure corrective actions are carried out;
- Identify ecological training requirements and arrange relevant training for all levels of site-based personnel.
- Ensure the Ecological Chance Finds protocol is implemented onsite; and
- Ensure the Species and Habitats Management Plan is implemented onsite.

Project Ecologist

The Project Ecologist will report to the EcoCoW and is responsible for the protection of sensitive habitats and species encountered during the construction phase of the development. The Project Ecologist will carry out periodic site inspections during construction.

The responsibilities and duties of the Project Ecologist will include the following:

- Review and input into any revisions of the CEMP, NIS and Planning Permission in respect of ecological matters;
- Carry out site visits to carry out environmental audits and reviews and report any issues noted;
- In liaison with EcoCoW, oversee and provide advice on all relevant ecology mitigation measures set out in the EIAR and NIS and as may be required for compliance with the planning conditions; and
- Carry out pre-construction surveys, ecological monitoring and survey work as may be required during the construction phase and any survey work as may be required for compliance with the planning conditions from the Local Authority.

Statutory Sites

Although no likely significant adverse effects are anticipated on Statutory Sites from the proposed Project, best practice construction methods outlined in **Chapter 7 – Land, Soils & Geology Section 7.5.2** and **Chapter 8 – Water, Hydrology (Flood Risk Assessment) & Hydrogeology, Section 8.9.2**, have been prepared to mitigate impacts on the Land, Soils Geology, water, hydrology & hydrogeology environments.

These include for Land, Soils and Geology environment, soil compaction and sealing, subsoil and bedrock removal, storage and stockpile management measures. For hydrology & hydrogeology environment, surface water management, fine sediment pollution, hydromorphology, accidental,

spills and leaks and groundwater mitigation measures. These mitigation measures have been developed with the source-pathway-receptor links outlined in **Section 6.6.2** in mind and are designed to break this link either by removing the source or disrupting the downstream pathway for pollution to the Statutory Sites.

Otter is predominantly crepuscular in nature and construction activity will mostly be confined to daytime hours, thus minimising potential disturbance related impacts to the species (Reid *et al.*, 2013).

Habitats

The total maximum proposed habitat loss within the wind farm Site boundary, including GCR and TDR' during construction is 19.13ha and 1,659m of linear habitat. Measures that will be implemented during the construction, operation and decommissioning phases of the Project described within the CEMP include:

- No removal of habitats or movement of construction machinery will occur outside of the development works areas during the construction phase, clearly marking out the works footprint for site staff;
- Measures to protect retained trees and hedgerows that will be implemented in full include the installation of tree protection barriers around the root protection zones of retained trees and hedgerows. Where essential works are required within root protection zones, ground protection (such as cellweb membrane) will be installed, following consultation with a qualified arboriculturist, to minimise risks of damage to roots;
- Existing hedgerows and trees being retained within and in the vicinity of the wind farm Site will be protected in line with current guidance and on the advice of an appointed arboriculturist (NRA, 2006);
- All edible and putrescible waste will be stored and disposed of at licensed waste facilities;
- Construction materials will be stored and stockpiled according to strategies set out within **Chapter 7 – Land, Soils & Geology** and the **CEMP**;
- A **SHMP** has been prepared for the proposed Project (**Appendix 6.9 – SHMP**). The **SHMP** details that 3km of hedgerow/treeline will be planted and 381m of existing hedgerow and treeline will be enhanced which will offset and provide net gain for biodiversity from any loss from the construction works and provide native tree and hedgerow to be utilised by fauna within the wind farm Site boundary. This will provide mitigation for the loss of 1,659m

of linear habitat as a result of the proposed wind farm construction (and associated bat buffers) (**Figure 6-13**).

- The loss of oak-ash-hazel woodland (0.39ha)— and other woodland habitats totals 10.22ha to 10.66ha depending on the technology option. 9.32ha – 9.72ha of this, accounts for conifer plantation woodland lost. Newly planted broadleaf trees will be planted totalling 3km as part of compensation and shelter belts along site boundaries. This will provide mitigation for the loss of high value woodland habitats as a result of the proposed wind farm construction (and associated bat buffers) (**Figure 6-13**).
- Further mitigation is provided within the SHMP which has been prepared to incorporate the above mitigation and will be followed during the construction and operation phases (**Appendix 6.10 – SHMP**).

Birds

Habitat Loss and Fragmentation

The habitats within the wind farm Site are not suitable for nesting Peregrine, which mostly nest on cliffs and crags. The Site, however, may form part of the foraging range for the identified nesting Peregrine located adjacent to the wind farm Site boundary. Whilst Peregrine may suffer some loss of available habitat for foraging, as outlined in **Section 6.6.2** and **6.6.3**, effects are not likely to be significant given the species' foraging range (2-18km, SNH, 2016), its infrequent use of the site (based on activity survey data obtained to date) and the wide availability of alternative foraging habitat within the surrounding area.

Kestrel was not recorded breeding or nesting within the Project; however, significant levels of foraging activity were recorded within the wind farm Site boundary, particularly over the footprints of T03, T04 and T05. There is suitable foraging habitat within the Site boundary for Kestrel, so no significant effects are likely for breeding Kestrel in respect of habitat loss. Mitigation to limit Kestrel foraging activity around turbines will be implemented. This will include the following measures to reduce prey availability within the hardstand areas associated with each turbine:

- Removal of timber/brush from felling and chipping of tree stumps to ground level;
- Piping/filling over of open field/forestry drains;

- Spread and compaction of chipped wood and spoil to create a flat surface to prevent rapid colonisation of new vegetation; and
- Ryegrass planting and the creation of uniformly short vegetation heights via infrequent mowing or trimming of vegetation around areas not proposed for other measures (e.g., replanting, enhancement).

Habitat loss for Hen Harrier, other raptors and passerines are not considered significant, due to the extent of suitable alternative foraging habitat within the surrounding hinterland. Nevertheless, due to a record of a Barn Owl in the vicinity of the proposed project, a Barn Owl nesting box will be erected in an appropriate location, as directed by a suitably experienced ornithologist during the pre-construction phase of the proposed Project.

Disturbance and Displacement

Potential effects are likely to be greatest during the breeding season (March and August inclusive), depending on the species under consideration, in this context, only Peregrine, Woodcock and Barn Owl are considered for disturbance/displacement effects.

- As outlined in **Chapter 10 – Noise & Vibration**, best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working for the duration of the contract;
- 750m construction phase disturbance buffer for nesting Peregrine will be adhered to where required (Ruddock & Whitfield, 2007). The nest site is located 686m west of T06. Survey data indicated that this nest site was used for two consecutive breeding seasons (2023 and 2024). There is no other suitable nesting habitat for Peregrine within closer proximity to the Project. The implementation of good practice measures would serve to minimize the risk of short-term disturbance, by avoiding construction activity around the active nest sites (by up to 750m depending on topography, which is considered the worst-case scenario) (**Figure 6-14**);
- 100-200m construction phase disturbance buffer for breeding Woodcock;
- 150-175m construction phase disturbance buffer for Barn Owl (Shawyer, 2011); and

- If an active nest is encountered, a disturbance buffer exclusion zone, in accordance with best practice guidelines, will be established within which works would be suspended until the nest is no longer active (to be confirmed by a suitably experienced ornithologist through ongoing monitoring of the nest).

The size of the exclusion zone would be dependent on the species affected, the likely level of disturbance caused by the works relative to baseline disturbance levels on site, and the extent to which the nest site is screened from disturbance (e.g., by adjacent dense vegetation). Exclusion zones may range from 5m (e.g., for breeding passerines) to several hundred meters (e.g., for breeding raptors).

If the 750m disturbance buffer for nesting Peregrine cannot be achieved, the presence of a permanent EcoCoW (experienced Project Ecologist with Stop Works Authority) is required to confirm:

- If nest site is occupied during the breeding season overlapping with construction period via continuous monitoring;
- If nest is occupied watching brief to be put in place to confirm successful breeding attempt; and
- Watching brief to continue until chick(s) have fledged.

Bats

To comply with best practice guidance (SNH, 2021), a total of 1.011km/1.006km of hedgerow and treeline habitat will be lost as a result of the recommended buffers applied for bats at T01, T03 and T04, T06 (see **Appendix 6.10 – SHMP** for further details). There are an extensive network of linear landscape habitat features in the wider area that will be fully retained. In order to offset the loss of linear habitat during construction of the proposed Project and to provide additional new opportunities for commuting and foraging bats, it is proposed to;

- Plant ~3km of new hedgerow and treeline habitat as discussed in **Appendix 6.10 – SHMP**.
- The locations in which the proposed planting will take place has been identified in agreement with the involved Landowners in the Project. Areas for planting are shown in **Appendix 6.10 – SHMP, Annex A** of the **SHMP**.
- Planting will be of species indigenous to the local area. As a result of the proposed replanting, there will be no likely significant effects with regard to loss of commuting and foraging habitat.

- Overall, the proposed replanting will result in a net gain of approximately 1.807km in linear landscape features within the site from the existing baseline predicted to be lost as a result of the construction works.

The following best practice and site-specific mitigation measures will be employed to avoid and reduce the potential for significant displacement/ disturbance effects on local Bat populations:

- As outlined in **Chapter 10 – Noise & Vibration**, best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working for the duration of the contract;

Mammals and other receptors

The proposed Project has the potential to result in habitat loss, fragmentation and disturbance impacts on faunal species that were recorded on the site but were not included as KERs. Given the extensive area of suitable habitat that will remain undisturbed within the Project and the avoidance of the most significant areas of faunal habitat notably mixed broadleaved woodland, scrub/ wet willow-alder-ash woodland, dry meadows and grassy verges and wet grassland (<0.01), no likely significant effects on KER and non-KER faunal biodiversity are anticipated as a result of the proposed Project.

However, in accordance with best practice methodologies, a pre-construction mammal survey will be carried out immediately before the commencement of vegetation clearance to ensure that there is no evidence of resting/breeding sites of protected mammal species in or directly adjacent to the construction corridor despite the baseline pre-construction surveys confirming there are no known mammal resting or breeding sites which will be directly impacted by the proposed Project. This it to ensure no establishment of resting/breeding sites in the interim period.

In the event that resting places of any protected mammal species become established in the interim period the EcoCoW (or the Project Ecologist) will advise on the appropriate course of action. The Project Ecologist will have 'Stop Work' authority and works will only proceed in the vicinity of the identified constraint in accordance with the advice of the ecologist and the relevant environmental legislation.

Vehicle speeds onsite and within 150m of watercourse crossings will be limited to 25km/hr. Any incident of roadkill will be reported to the EcoCoW / Project Ecologist onsite and additional measures will be introduced where necessary.

Where possible, excavations will be covered at night to prevent mammals getting trapped. If this is not possible, a method of egress will be provided to allow mammals to escape.

The effect arising from the Project on Otter relates to the potential for pollutants arising from works associated with the construction of the Project to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into watercourses where Otter may be foraging. Best practice mitigation measures outlined in **Chapter 7 – Land, Soils & Geology Section 7.5.2** and **Chapter 8 – Water, Hydrology (Flood Risk Assessment) & Hydrogeology, Section 8.9.2**, will be implemented to avoid the potential from pollutants arising from works associated with the Project.

Otters are predominantly crepuscular in nature and construction operations shall generally be restricted to between 07:00hrs and 19:00hrs on weekdays and between 07:00hrs and 14:00hrs on Saturdays, thus minimising potential disturbance related impacts to the species (Reid *et al.*, 2013).

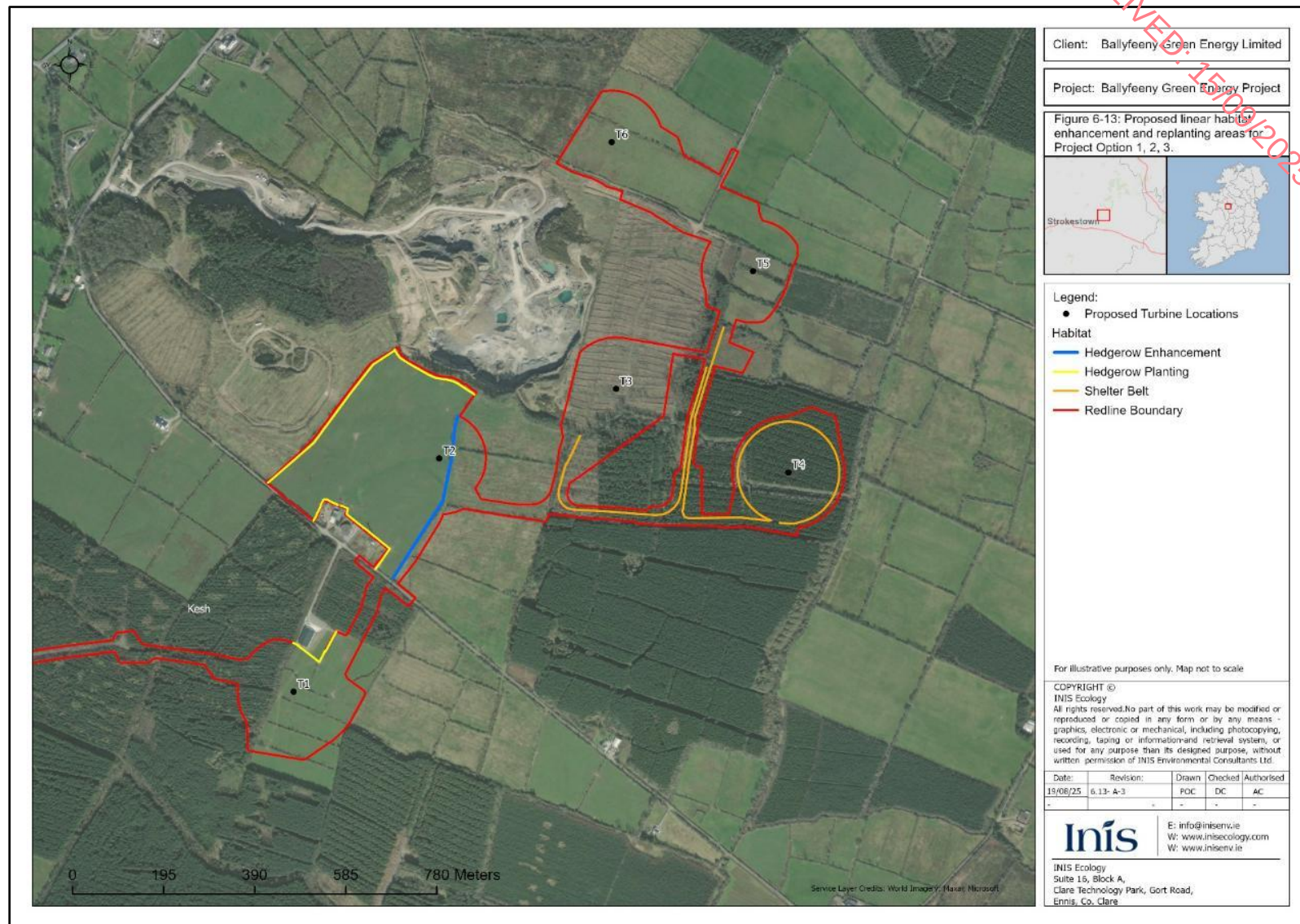


Figure 6-13 Proposed linear habitat enhancement and replanting areas for Project Option 1, 2, 3. (Ref: EIAR Figure 6-13 (Volume 4))

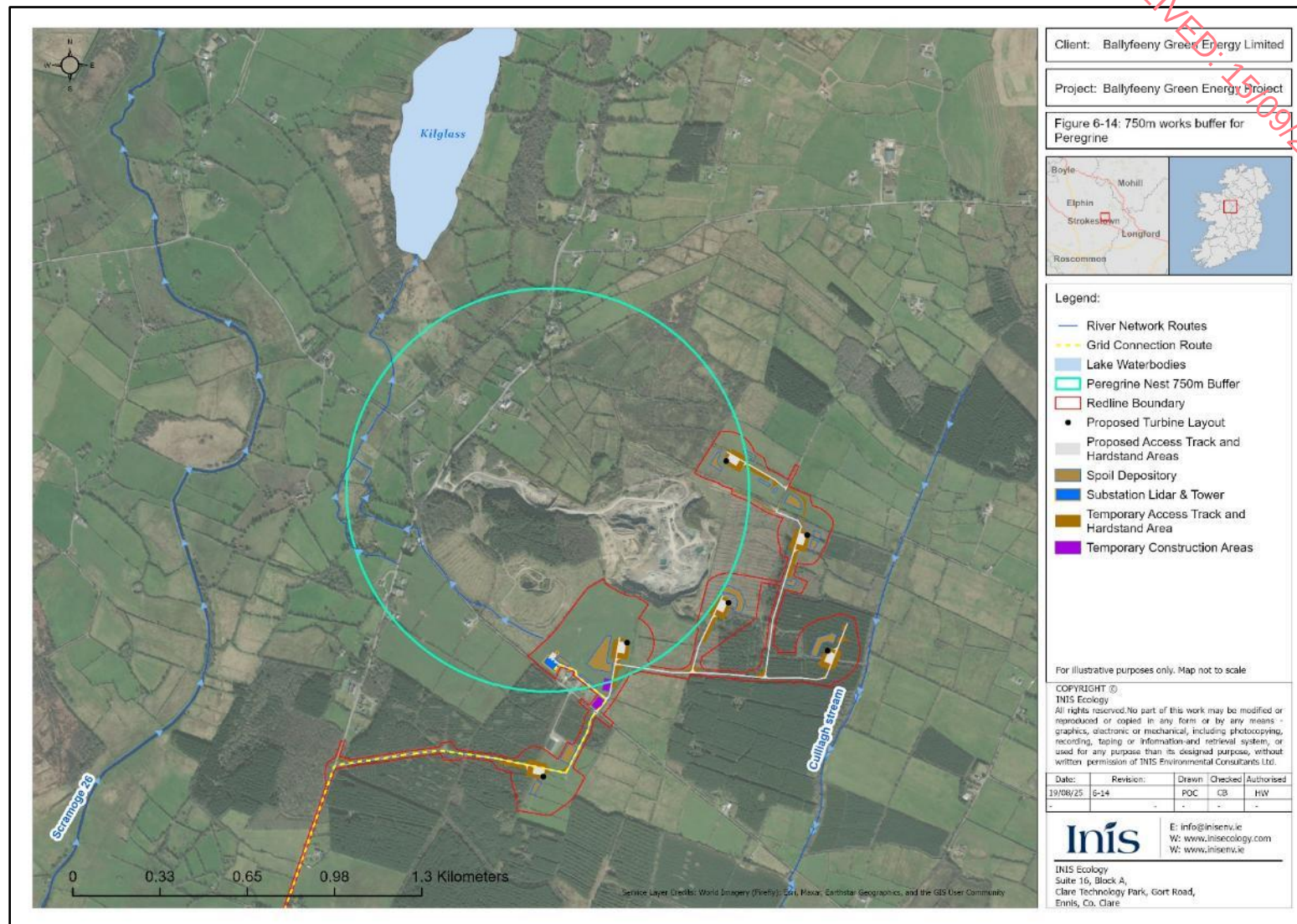


Figure 6-14: Peregrine buffer zone for works during construction phase between Mid-February to Late-September (Ref: EIAR Figure 6-14 (Volume 4))

6.7.3 Operational Methods

Statutory Sites

During the operational phase, the operator of the wind farm will put the mitigation measures outlined in **Chapter 8 – Water, Hydrology (Flood Risk Assessment) & Hydrogeology, Section 6.7.2 – Accidental Spills and Leaks** in place during maintenance works.

The revegetation of drainage works and other exposed surfaces, combined with the non-intrusive nature of operations, minimises the risk of sediment release into watercourses during the operational phase. To ensure controlled, inspected, and managed drainage discharges throughout the operational phase, attenuation/settlement ponds will be installed at discharge points.

As per **Appendix 2.1.1 – SWMP**, following construction, the amount of on-site traffic will be negligible and there will be no particular risk of sediment runoff. Runoff from Site Access Tracks, Turbine Hardstands, and other works areas will continue to be directed to settlement ponds, which will be left in place. Check dams within the drainage channels will remain in place. The retention of this part of the drainage infrastructure will ensure that runoff continues to be attenuated and dispersed across existing vegetation before discharge into the ground. Details of settlement ponds and check dams are contained in **Planning Drawings 23604-400** and **23604-401**, respectively. In the operational phase of the wind farm, the reliance on the drainage system will be reduced as areas naturally revegetate. Once areas revegetate, this will result in a resumption of the natural drainage management that will have existed prior to any construction.

Site Audits will be completed by the wind farm operator to ensure control measures set out during the construction phase will be followed through the operation phase. These audits will include;

- Confirmation that fuels are stored appropriately;
- The **Appendix 2.1.2 – Waste Management Plan** is adhered to; and
- Surface Water and run off control measures are in-place and functioning.

All environmental records, including completed audits, will be retained in the project folder.

Habitats

The best practice measures described in **Section Error! Reference source not found.2** in relation to construction methods will also be adopted during operational maintenance, as described within **Appendix 2.1 – CEMP**. Specifically, operational maintenance will minimize the level of removal of suitable habitat (e.g., grassland, hedgerows, scrub).

Newly created or enhanced, habitats will be subject to condition assessment by an appropriately qualified ecologist as outlined in **Appendix 6.10 – SHMP** and **Section 6.12** of this Chapter. The assessment will follow, the Hedgerow Appraisal System (Foulkes et al., 2013) each year after planting for the first five years (the establishment phase), and then every five years until (and including) year 20 (the operations phase).

This will help identify ongoing management actions, such as weed control, gapping up and where fence maintenance is required.

- By Year 5 after planting, hedgerows should meet the criteria for 'Favourable' under the Hedgerow Appraisal System (which will be adapted for non-hedgerow "woody" habitats for woodland planting); and
- In addition to the condition assessment, the diversity of the tree/shrub/climber component (otherwise described in the Hedgerow Appraisal System as 'canopy' forming species) should be the same, or greater than, that at planting (e.g. >10 native species per 30m length).

Ornithology

Habitat Loss and Fragmentation

As mentioned above, habitat loss effects are not anticipated during the operational phase, therefore no bird receptors will be impacted by habitat loss or fragmentation during the operational phase of the Project.

Disturbance and Displacement

As outlined in **Section 6.6.3**, disturbance and displacement effects are not considered to be significant during the operational phase, therefore it is not anticipated that bird receptors will be impacted by disturbance and displacement during the operational phase of the Project.

Collision Risk Mitigation

Collision risk with turbines is highest (albeit **Not Significant**) for buzzard, kestrel, based on Collision Risk Modelling taking into account the respective conservation status of each species. For kestrel and buzzard, mitigation to limit foraging activity (outlined in **Section 7.7.2**) around turbines will be implemented. This will include measures to reduce prey availability within the hardstand areas associated with each turbine.

For Peregrine, the risk of collision is more likely associated with birds flying through the site when leaving or arriving at the breeding location rather than birds hunting around the turbines. As adult peregrines would normally be highly effective in avoiding man-made structures such as antennae, masts and turbines, the risk of collision is likely to be highest when inexperienced young birds are initially fledged and engaging in flight practice. As the young birds will often follow the adults in their initial practice flights, the turbines which pose the highest risk would be determined by the route used most regularly by the adults when exiting the breeding location.

Mitigation to minimise risk of collision will be by real time monitoring of the breeding location through the breeding season or for as long as the breeding attempt is in progress. It is noted that in some years the breeding site may not be occupied, or breeding may be abandoned at any stage for various reasons, which is often inclement weather.

In the early stage of the breeding cycle, focus will be on determining the routes taken by the adults when leaving the site (or arriving back at same). This may indicate the turbines which pose the highest potential risk of collision. Through June, emphasis will be on assessing the progress of the young and when the birds are fledged (the average date of fledging in Britain/Ireland is 20th June). At this stage the birds are highly vocal and easily detected by an observer. From thence on, focus will be on the behaviour and movements of the young birds. For several weeks, the young will be fed by the parents whilst they practice hunting themselves. If there are two or more young, they will also engage in social activities and play 'hunting games' in the air. As the young grow stronger, they and the parents move increasingly further from the home cliff during the day, but the family may return there at night to roost. With time, the young will gain full independence and will roost away from the natal site (see **Appendix 6.7 – Mammals and Other Receptors**)

From the above, it is considered that there is at least a **4-week period** when the young birds are at the highest risk of collision with the turbines. In this period, it is proposed to curtail during daylight hours the turbine or turbines which are likely (based on earlier observations) to pose a

likely significant risk to fledgling collision. Alternatively, the approach might be to turn off the required turbines immediately when the young birds are becoming active in the morning (which will vary between days based on weather) and leave them off until they settle down later in the day (which could be for several hours). This will require daily on-site monitoring for the duration of the nesting season.

As noted, the above mitigation would only be required in the years when the breeding territory is occupied and when young birds are reared successfully.

Monitoring

As described in **Appendix 6.10 – SHMP** and **Section 6.12** of this Chapter, detailed monitoring (including collision fatality monitoring outlined above) will be undertaken to ensure the mitigation and enhancement measures specified in this Chapter are satisfying their aims and inform any additional management measures and/or changes in management practices. In particular, monitoring will focus on the success of bird populations within and adjacent to the Project (notably in any identified mitigation and enhancement areas), and on monitoring turbine collisions through frequent carcass searches using, where available, trained detection dogs following SNH (2021) best practice guidance. Carcass monitoring will be conducted in concert with efficiency trials and carcass removal trials to inform the percentage of carcasses found to numbers likely missed due to scavenger activity and searcher efficiency.

If monitoring identifies the requirement for any additional scope for mitigation and/or enhancements during operational period, these will be implemented into an updated SHMP in consultation with the Roscommon County Council. The SHMP will remain a live document and will be updated to incorporate any conditions of planning and/or recommendations from the EcoCoW for additional mitigation or enhancements. Full details of monitoring in relation to KERs are provided in the SHMP (**Appendix 6.10 – SHMP**).

Bats

As outlined above, newly created or enhanced, habitats will be subject to condition assessment by an appropriately qualified ecologist as outlined in **Appendix 6.10 – SHMP** and **Section 6.12** of this Chapter. The assessment will follow the Hedgerow Appraisal System (Foulkes et al., 2013) each year after planting for the first five years (the establishment phase), and then every five years until (and including) year 20 (the operations phase). This will ensure the new created linear

habitats such as hedgerow and treelines will serve as commuting corridors for bats (and other wildlife). The planting aims to provide substantially improved bat foraging and commuting habitats through the wind farm Site, influencing bats to utilise these areas rather than fly towards the turbines.

During the operational phase of the Project, ongoing monitoring of bat activity will be undertaken for the Project as per best practice guidance (SNH, 2021) (**Section 6.12.3** and **Appendix 6.10 – SHMP**).

Mitigation measures implemented during the construction phase to minimise the risk of collisions and barotrauma will be put in place, notably by clearing linear Hedgerow/Treeline features and forestry features within 76.32 - 108.12m of turbine blade tips to make this area unfavourable for bats and thus discourage them from flying through/near turbines, will be maintained during the operational phase. The current recommended guidance (SNH, 2021) for this mitigation is dependent upon the turbine size and for the sake of this assessment, under a worst-case scenario using the turbine requiring the largest area cleared for bat buffers (Technology Option 1).

Monitoring will provide data and information on the actual recorded impact of the wind turbines on the local bat populations. Full details of the proposed monitoring programme are provided in **Section 6.12**.

The following best practice and site-specific mitigation measures will also be employed to avoid and reduce the potential for significant displacement/ disturbance effects on local Bat populations during the operational phase:

- Directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction (and post construction), shall be designed to minimize light spillage, reducing the effect on areas outside the Project. Lighting will be directed away from mature trees/treelines around the periphery of the Site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands;

- Lights are to be used with the following guidance from Dark Sky Ireland¹ during the construction and operation phases of the Project; every light needs to be justifiable, limit the use of light to when it is needed, direct the light to where it is needed, reduce the light intensity to the minimum needed, use light spectra adapted to the environment, when using white light, use sources with a “warm” colour temperature (less than 3000K); and
- With regard to the potential for lighting to increase collision risk, it is noted that there will be some illumination of the turbines in the form of aviation lighting. Barriers to ensure the lights are only visible from above, not from ground level, will offset the likelihood for lighting to increase collision risk (**Chapter 14 – Material Assets**). Whilst this lighting is unlikely to result in any significant increase in collision risk, a comprehensive and site-specific mitigation and monitoring programme, described in **Section 6.12**, is proposed for in line with NatureScot guidance on bat mitigation and post-construction monitoring.

The results of post construction monitoring shall be utilised to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy.

Mammals and Other Receptors

As outlined in **Section 6.6.3**, it is not anticipated that the operation of the Project will have any effect on Otter or Pine Marten or their supporting habitat during the operation phase. There will be no requirements for in stream works or significant tree felling, thus no loss of riverine habitat or foraging habitat during operational of the Project is anticipated. No maintenance works associated with the operation of the Project are proposed in close proximity to watercourses.

Standard vehicle speed restrictions of 25km/h will be in place for any maintenance works required for the operational phase. As such, following these mitigation measures stated.

¹ [Dark Sky Ireland - Promoting & Preserving Ireland's Dark Skies](#)

Aquatic Species

Mitigation measures for aquatic habitats and species during the operational phase will follow the proposed mitigation measures outlined for Statutory Sites above. No further mitigation measures are identified for Aquatic Species during the operational phase.

6.7.4 Decommissioning Phase

All embedded mitigation measures and all supporting mitigation measures provided for the construction phase will be implemented as relevant for the decommissioning works (**Section 6.7.2**). In accordance with the Scottish National Heritage Decommissioning and Restoration Plan for wind farms (SNH, 2016), all pre-commencement surveys will be conducted to appropriately identify any additional measures required based on any changes in the future ecological baseline. The **DMP (Appendix 2.1.4 – Decommissioning Management Plan)** will be updated 3 – 5 years prior to the commencement of decommissioning and shall incorporate findings from the habitat and species monitoring requirements outlined in **Section 6.12**.

Birds

The operational monitoring surveys as prescribed in **Section 6.7.3** and **Section 6.12** will be used to inform any amendments to assessment of magnitude or significance for any KERs that may differ from the existing ecological baseline pre-construction. Good practice mitigation measures outlined for the construction phase (**Section Error! Reference source not found.7.2**) would be implemented during the decommissioning phase. These measures would include pre-commencement surveys to provide an updated assessment of potential breeding birds.

6.8 Residual Effects

Following the implementation of the recommended mitigation measures and the final design and layout of the proposed Project, the likely significance of residual effects is discussed in the following sections.

6.8.1 Construction Phase

The three Technology Options considered in the EIAR present no variation to the scale or magnitude of predicted impacts as a result of the Operational Phase. As such impacts on KERs

described below assign the same magnitude, character and likelihood for significant effect across the three Technologies.

Statutory Sites

Although significant effects are not anticipated on Statutory Sites that have been identified as KER's for the proposed Project, through the implementation of best practice mitigation measures as described in **Section 6.7.2** and **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology**, to maintain water quality in local drains and watercourses during the construction phase. These mitigation measures have been developed with the source-pathway-receptor links in mind and are designed to break this link either by removing the source or disrupting the downstream pathway for pollution to the Statutory Sites. As a result, there will be **No Significant residual effects** on the QI, the SCI or the conservation objectives of the Statutory Sites during the construction phase of the proposed Project.

Habitats

Through the strict implementation of mitigation measures outlined in **Appendix 6.10 – SHMP** and **Section 6.7.2**, a total of 3km of linear habitats (hedgerows and treelines) will be planted, to offset the loss of bat commuting and foraging habitat, and the provision of an extra 0.39ha of oak-ash-hazel woodland as enhanced habitats for the lifetime of the proposed Project.

The management prescriptions applied will benefit general wildlife in both the short term and long term and will ensure the supply of a substantial area of suitable foraging habitat, over and above that lost as a result of the proposed Project. The overall aim of the management plan is for a net gain of foraging habitat following the construction of the proposed Project. The management prescriptions we propose will enhance the existing biodiversity of the areas for prey items and wildlife in general, which is an extremely important component of successful SHMP application.

The habitat management measures, notably for linear features including hedgerows and treelines, will not only sufficiently offset habitats that will be removed as part of the proposed Project, but will also provide a long-term biodiversity net-gain within the local area.

The Applicant will be solely responsible for implementation of all aspects of the SHMP and will ensure that the relevant stakeholders are regularly briefed on the progress of the plan in relation to achieving its objectives (including any proposed deviation from the provisions of the Plan which may be required for any reason).

Following the implementation of the mitigation measures as described above, there will be a long term **Significant Positive residual effect** on habitats as a result of the Project.

Ornithology

As described in **Section 6.7.2** and **Appendix 6.10 – SHMP** the Project design includes mitigation to minimise disturbance during construction; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration. In addition, **Section 6.7.2** includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Peregrine (or other raptor) nests is avoided, these measures include exclusion zones (e.g., as detailed by Goodship & Furness (2022)). Additional measures are also proposed for Barn Owl (nest box provision) and the timing works outside the most sensitive periods, and the implementation of ecological supervision where required.

For all bird species identified as KER's, following the implementation of the mitigation measures as described in **Section 6.7.2** and **Appendix 6.10 – SHMP**, there will be **No Significant residual effect** on breeding or wintering birds during the construction phase of the proposed Project.

Bats

Following the implementation of the mitigation measures as described in **Section 6.7.2** and **Appendix 6.10 – SHMP**, including the implementation bat buffers around turbines and the creation of 3km of linear habitats (hedgerows and treelines) to offset the loss and enhance, commuting and foraging habitat for bats. There will be **No Significant adverse residual effect** on bats as a result of the Project.

Mammals and Other Receptors

As described in **Section 6.7.2** and **Appendix 6.10 – SHMP**, the Project includes mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, (e.g., of aquatic habitat for foraging and commuting), as well as measures to avoid pollution or contamination of freshwater aquatic habitats. Following the implementation of the mitigation measures as described in **Section 6.7.2** and **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology**, there will be **No Significant residual effect** on Otters, general mammals or other receptors as a result of the Project.

Aquatic Ecology

Following the implementation of the mitigation measures as described in **Section 6.7.2, Appendix 6.10 – SHMP and Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** there will be **No Significant residual effect** on freshwater sites, aquatic habitats or species as a result of the Project.

6.8.2 Operational Phase

Statutory Sites

Although significant effects are not anticipated on Statutory Sites that have been identified as KER's for the proposed Project, through the implementation of best practice mitigation measures as described in **Section 6.7.3 and Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology**, to maintain water quality in local drains and watercourses during the operation phase.

In the operational phase of the wind farm, the reliance on the drainage system will be reduced as areas naturally revegetate. Once areas revegetate, this will result in a resumption of the natural drainage management that will have existed prior to any construction.

Site Audits will be completed by the wind farm operator to ensure control measures set out in **Appendix 2.1.1 – SWMP**, during the construction phase will be followed through the operation phase.

Two species that are SCIs of Lough Ree SPA (Mallard and Golden Plover) had flightlines recorded during ornithological fieldwork and were therefore included for consideration in the CRM (see **Appendix 6.5 – Ornithology** and **Appendix 6.9 – Collision Risk Model**). However, due to the separation distance between the SPA and the Project (11.8km), it is not considered likely that the flightline records of these two species are from the SPA population. The records of Golden Plover recorded during the survey period 2022 – 2024 are from the breeding migration period only and were only recorded once in April 2024. This suggests those observed during field studies are not the wintering population associated with Lough Ree SPA (and listed as SCIs) but rather potentially the population associated with somewhere closer such as Kilglass Lough. The Lough Ree SPA is therefore scoped out from collision mortality effects to any SCIs. It is therefore concluded that there will be no significant adverse effect on the conservation objectives for Golden Plover, or any other SCIs/QIs for Statutory Sites during the operational phase.

Following the implementation of the mitigation measures as described, it is considered there will be **No Significant residual effect** on Statutory Sites as a result of the Project.

Habitats

Through the strict implementation of mitigation measures outlined in **Appendix 6.10 – SHMP** and **Section 6.7.3**, a total of 3km of linear habitats (hedgerows and treelines) will be planted, to offset the loss of these features and 0.39ha of oak-ash-hazel woodland as compensatory habitats management for the lifetime of the proposed Project.

Newly created or enhanced, habitats will be subject to condition assessment by an appropriately qualified ecologist as outlined in **Appendix 6.10 – SHMP** and **Section 6.12** of this Chapter.

Following the implementation of the mitigation measures as described above, there will be a long term **Significant Positive residual effect** on habitats as a result of the Project.

Ornithology

Following the implementation of the mitigation measures as described in **Section 6.7.2** and **Appendix 6.10 – SHMP**, coupled with the monitoring requirements outlined in **Section 6.12**, specifically to reduce the likelihood of raptors foraging within the turbine swept area by ensuring that no reinstatement works of suitable foraging habitat for Peregrine, Kestrel and passerine species are permitted within the footprints of the turbine bases, will avoid collision risk. With substantial, alternative foraging habitats in the surrounding landscape, this reduction in foraging habitats will **not** result in any **Significant residual effect** on Peregrine or Kestrel.

For Peregrine, the highest risk during the period is around fledging time, this risk will be reduced through mitigation involving curtailment of turbines posing highest risk during the period around fledging – this programme will be supported by real-time monitoring post-construction surveys as outlined in **Section 6.12**. With mitigation measures implemented, it is considered there will be **No Significant residual effect** on Peregrine.

Following the implementation of the mitigation measures as described in **Section 6.7.2**, there will be **No Significant residual effect** on any ornithology receptors as a result of the Project.

Bats

Through the strict implementation of mitigation measures outlined in **Appendix 6.10 – SHMP** and **Section 6.7.3**, a total of 3km of linear habitats (hedgerows and treelines) will be planted, to offset the loss of bat commuting and foraging habitat and 0.39ha of oak-ash-hazel woodland as compensatory habitats management for the lifetime of the proposed Project.

Newly created or enhanced, habitats will be subject to condition assessment by an appropriately qualified ecologist as outlined in **Appendix 6.10 – SHMP** and **Section 6.12** of this Chapter.

Following the implementation of the mitigation measures as described above, there will be a long term **Significant Positive residual effect** on bats as a result of the Project.

Mammals and Other Receptors

As discussed in **Section 6.7.3** No maintenance works associated with the operation of the Project are proposed in close proximity to watercourses. Mitigation measures including, standard vehicle speed restrictions of 25km/h will be in place for any maintenance works required for the operational phase. Following the implementation of the mitigation measures as described in **Section 6.7.3**, there will be **No Significant residual effect** on any mammal (including otter and pine marten) and other receptors as a result of the Project.

Aquatic Ecology

Mitigation measures for aquatic habitats and species during the operational phase will follow the proposed mitigation measures outlined for Statutory Sites in **Section 6.7.3**. No further mitigation measures are identified for Aquatic Species during the operational phase. It is considered, there will be **No Significant residual effect** on any aquatic ecology receptors as a result of the Project.

6.8.3 Decommissioning Phase

As outlined in **Section 6.7.4** a **DMP (Appendix 2.1.4)** has been prepared for the proposed Project, in accordance with the Scottish National Heritage Decommissioning and Restoration Plan for wind farms (SNH, 2016), all pre-commencement surveys will be conducted to appropriately identify any additional measures required based on any changes in the future ecological baseline. The **DMP** will be updated 3 – 5 years prior to the commencement of decommissioning and shall incorporate findings from the habitat and species monitoring requirements outlined in **Section 6.12**.

Mitigation measures proposed for the construction phase, coupled with measures to include pre-commencement surveys to provide an updated assessment of potential breeding. Any additional measures required based on any changes to the future ecological baseline will be implemented during the decommissioning phase of the proposed Project.

It is considered, there will be **No Significant residual effect** on the local biodiversity during the decommissioning phase of the proposed Project.

6.9 Risk of Major Accidents and/or Disasters

This section considers the vulnerability of the proposed Project to major accidents and/or disasters, the risk of those major accidents and/or disasters occurring and the potential for any significant adverse effects on biodiversity.

According to EPA Guidelines, these unplanned events can include '*spill from traffic accidents, floods or landslides affecting the site, fire, collapse or equipment failure on site*'. Additionally, the EIA Directive requires "*major accidents, and/or natural disasters (such as flooding, sea level rise or earthquakes)*" be addressed.

The *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017) requires the consideration of major hazards in the context of the SEVESO III Directive. It is noted that the proposed Project will not come under the Control of Major Accident Hazards (COMAH) Regulations and the closest COMAH establishment is c. 37km west of the development

During the construction and decommissioning phases, there is a risk of contamination being mobilised into ground or surface waters during a heavy rainfall event and which could impact on biodiversity receptors. However, a **CEMP (Appendix 2-1)** and **SWMP (Appendix 2.1.1)** have been prepared for the proposed Project and will be implemented by the Appointed Contractor for the construction phase. These documents set out a framework to ensure that appropriate controls will be implemented on site, including the implementation of an ERP. With this mitigation in place, it is considered that the risk associated with heavy rainfall events is low and there are no associated significant adverse effects on biodiversity. This is considered **Not Significant** in EIA terms.

6.10 Cumulative Effects Assessment

The three Technology Options considered in the EIAR present no variation to the scale or magnitude of predicted impacts as a result of the Operational Phase. As such impacts on KERs described below assign the same magnitude, character and likelihood for significant effect across the three Technologies.

Chapter 16 - Cumulative Effects Assessment details the approach to the assessment of cumulative effects. **Appendix 16.1 – Long List of other Projects for Cumulative Effects Assessment** presents the list of other projects that have the potential to cause cumulative effects together with the proposed Project.

In brief, the list of other projects was established from a desk study of relevant data sources completed in mid-May 2025 for any new and relevant sites. Planning applications older than 10 years were excluded from the list. These are likely to have already been built or no longer being progressed. The list includes other wind farm and relevant projects within a 20km radius of the proposed wind farm Site, incorporating the GCR; and relevant projects within a 50m buffer either side of the proposed TDR.

This list was further refined based on likely significant cumulative effects arising to biodiversity. Scoped-in projects included all wind farms within 20km of the Project, other projects within 2km of the Redline Boundary or 50m of relevant nodes on the TDR. A summary of these scoped-in project is shown in **Table 6-26**.

Three wind farm sites were identified (Sliabh Bawn Wind Farm, Derryadd Wind Farm and Derrane Wind Farm). Other Scoped-in project included Ballyfeeney Rock Quarry, Lanesboro – Sliabh Bawn 100kV overhead line and the N5 Ballaghaderreen to Scramoge Realignment Scheme.

6.10.1 Sliabh Bawn Wind Farm

Sliabh Bawn Wind Farm is located approx. 3km south of the wind farm Site, with the GCR extending to connect to the Sliabh Bawn 110kV Substation. With the exception of birds, the separation distance (c.3km) is too great for most mobile species (mammals, bats, etc.) to traverse and any likely cumulative effect to arise. However, for birds species, the proximity and similar nature of these projects means that there is potential for adverse cumulative impacts if no mitigation measures are implemented.

Mortality / collision risk for bird species as a result of in-combination effects is possible due to the increased number of operational turbines. Also, this in-combination effect has the potential to disturb bird species using the wider landscape.

Sliabh Bawn Wind Farm is operational since 2017. The EIS and planning compliance documents for this project state the following:

“Wintering Birds: No specific monitoring proposal required. There was no predicted impact on wintering birds and the habitats present on the Site are not likely to support species such as Whooper Swan, Golden Plover, Lapwing and geese. Breeding Birds: No significant residual impacts and effects are anticipated and therefore no specific monitoring is proposed”.

Given the negligible level magnitude of the collision rate on species arising from the Collision Risk Model (see **Appendix 6.9 – Collision Risk Model**) no cumulative adverse effect on any species is considered likely. The findings from the residual impacts on the Sliabh Bawn Project concluded for wintering birds, there was no predicted impact, and the habitats present on the site are not likely to support species such as Whooper Swan, Golden Plover, Lapwing and geese, therefore, no mitigation is required. For breeding birds, the residual impacts due to a loss of habitat was deemed not significant. As such, it is considered that there will be a **Slight, Short-Term, Adverse** cumulative effect, during the construction, operation and decommissioning phases of the proposed Project. In EIA terms, the cumulative effect with the operational Sliabh Bawn wind farm and the proposed Project is considered to be **Not Significant**.

6.10.2 Derryadd Wind Farm

Derryadd Wind Farm (ACP Ref: PA322485), a proposed 22 turbine wind farm was submitted to An Coimisiún Pleanála in July 2025. Derryadd Wind Farm is located downstream of the proposed Project. However, it is located within a separate river sub-basin to the proposed Project and therefore no hydrological connection exists.

The distance between the proposed Derryadd Wind Farm and that of the proposed Project (c. 13km) is considered sufficient to prevent any disturbance / displacement and collision related cumulative effects on bird species as the separation distance is greater than typical foraging or ranging extents (Goodship & Furness, 2022). As such, it is considered that there will be a **Negligible, Short-Term, Adverse** cumulative effect, during the construction, operation and decommissioning phases of the proposed Project. In EIA terms, the cumulative effect in

combination with the proposed Derryadd Wind Farm and the proposed Project is considered to be **Not Significant**.

6.10.3 Derrane Wind Farm

Derrane Wind Farm is located downstream of the proposed Project. The distance between the consented Derrane wind farm and the proposed Project (16km) is considered sufficient to prevent any cumulative effects on the receiving environment through hydrological and ecological pathways. The separation distance (c.16km) is likely to result, if built, in negligible impacts to mobile ecological receptors (such as birds) associated with the Project. As such, it is considered that there will be a **Negligible, Short-Term, Adverse** cumulative effect, during the construction, operation and decommissioning phases of the proposed Project. In EIA terms, the cumulative effect in combination with the proposed Derrane Wind Farm and the proposed Project is considered to be **not significant**.

6.10.4 Ballyfeeney Rock Quarry

The closest active sand and gravel quarrying operation to the Project, is Ballyfeeney Rock Quarry. The nearest receiving surface water body to both the Project and the Ballyfeeney Rock Quarry is the Ballymartin Stream (EPA Code 26B82). The Ballymartin Stream is a first order stream which rises directly adjacent to the western boundary of the wind farm Site, approximately 60m from the proposed Onsite Substation and Communications Relay Tower.

The EIS for the Ballyfeeney Rock Quarry reported no significant adverse residual effects and noted that the quarry operates under planning conditions that include environmental management controls. This combined with the retained WFD status of “Good” over successive River Basin Management Plan cycles demonstrates continued compliance with discharge limits to the receiving Ballymartin stream.

While both projects individually conclude no likely significant effects (see **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology Section 8.12**), the combination of multiple no likely significant effects has the potential to result in significant cumulative impacts. Taking into account the environmental controls in place at the quarry, any cumulative effects are expected to be limited in scale and duration and are not anticipated to result in significant adverse impacts on the receiving surface water quality as demonstrated by the continued “Good” water quality status.

With the implementation of the mitigation measures outlined in this Chapter, along with the conclusions of the EIS for the Ballyfeeny Rock Quarry and its continued compliance with discharge limits, it is considered that there will be a **Negligible, Short-Term, Adverse** cumulative effect, during the construction, operation and decommissioning phases of the proposed Project. In EIA terms, the cumulative effect in combination with the active Ballyfeeny Rock Quarry and the proposed Project is considered to be **Not Significant**.

6.10.5 The Lanesboro – Sliabh Bawn 100kV

The Lanesboro – Sliabh Bawn 100kV overhead line is located approx. c. 4.23km south of the wind farm Site, with the GCR extending to connect to the Sliabh Bawn Substation. Given the proximity and similar nature of these projects, there is potential for cumulative hydrological impacts to the receiving watercourse downstream in the absence of mitigation measures.

The Planning and Environmental Considerations Report for the Lanesboro – Sliabh Bawn 100kV overhead line states within Section 9 – Water (table 9-2) that “*works are proposed within 50m of surface waters on the unnamed tributary of the Bellmount Stream (IE_SH_26FO30400)*”.

The Planning and Environmental Considerations Report for the Lanesboro – Sliabh Bawn 100kV overhead line concludes as follows:

“Taking account of the proposed mitigation measures outlined in Section 9.4 and detailed within the supporting CEMP (Atkins, 2023) the proposed development will not have a significant adverse effect on hydrology or hydrogeology or human health within the receiving environment. The proposed development will not cause a deterioration of the status of any surface or groundwater under the WFD and will not undermine the attainment by any such body of good status”

Therefore any likely impacts to water quality in the receiving Bellmount (or Cloggernagh) Stream as a result of the 110kV overhead line have been appropriately mitigated.

The GCR for the Project also crosses the Bellmount (or Cloggernagh) Stream.

Both developments have undergone full environmental assessment in the form of an EIAR. Any potential impacts on aquatic ecology receptors as a result of the overhead line will as outlined, have appropriate mitigation measures in place, as does the proposed Project. Furthermore, there is no spatial overlap between the two projects therefore no opportunity for disturbance related in-combination effect arises. As such, it is considered that there will be a **Negligible, Short-Term,**

Adverse cumulative effect, during the construction, phase of the proposed Project. In EIA terms, the cumulative effect in combination with the proposed Lanesboro – Sliabh Bawn 100kV overhead line works and the proposed Project is considered to be **not significant**.

6.10.6 N5 Ballaghaderreen to Scramoge Realignment Scheme

The proposed N5 Ballaghaderreen to Scramoge Realignment Scheme, due for completion by late 2027, transects the GCR and shares hydrological links with the proposed Project. Given the scale and nature of this development and the proposed Project, there is potential for cumulative impacts on biodiversity through hydrological pathways, particularly the Gortlustia Stream and Scramoge River, in the absence of mitigation. However, the N5 Scheme which is likely to be completed in advance of the construction phase of the proposed Project, has been subject to comprehensive environmental assessment through a full EIAR. Mitigation measures have been incorporated into the design and construction phase of the Scheme to address potential hydrological impacts, and with the implementation of the mitigation measures of the proposed Project, **no likely significant cumulative effects** are anticipated and is considered to be **Not Significant** in EIA terms.

Other projects outlined in **Chapter 16 - Cumulative Effects Assessment** are not expected to have a significant cumulative effect with the proposed Project. This is due to their small size and the absence of complex likely effects. This includes projects situated along the TDR, where the localised and temporary nature of the work at the proposed accommodating works indicates that no likely significant cumulative effects are anticipated. None of the wind farms identified show TDR or haul routes that have the risk of overlapping or shared junction works.

As such, it is considered that there will be a **Slight, Short-Term, Adverse** cumulative effect, during the construction and decommissioning phases of the proposed Project, and a **Slight, Long-Term, Adverse** cumulative effect during the operational phase. In EIA terms, the cumulative effect in combination with the proposed proposed N5 Ballaghaderreen to Scramoge Realignment Scheme and the proposed Project is considered to be **Not Significant**.

Table 6-26: Cumulative Project list for assessment of cumulative effects on biodiversity.

Project	Planning / Project Ref.	Nearest Distance to the Proposed wind farm Site	Description / Status	Scoped in / out for cumulative assessment
Ballyfeeney Rock Quarry	7272	Shared boundary	Active quarry and ancillary processes (blasting, crushing, screening).	Yes
Sliabh Bawn Wind Farm	10507	3km	Operational 20-turbine wind farm.	Yes
Lanesboro- Sliabh Bawn, 100kV overhead line upgrade	23342	3km	Uprate the existing Lanesboro - Sliabh Bawn 100kV overhead line.	Yes
Derryadd Wind Farm	322485	16km	Construction of a wind farm comprising 22 no. wind turbines, 1 no. 110kV substation and all related works.	Yes
Ion Renewables BESS	22223	9km	Construction of a stationary battery energy storage facility which includes forty 20ft containers and eight medium voltage transformers and (ii) all associated site and development works	No
Ballykenny Solar Farm	305969/19222	12km	Construction of a 9MW solar farm with associated infrastructure, landscaping and cable route	No

Project	Planning / Project Ref.	Nearest Distance to the Proposed wind farm Site	Description / Status	Scoped in / out for cumulative assessment
Cloon to Lanesborough 110kV Overhead line	302597/18/320	12.5km	Refurbish the existing single circuit 110kV overhead electricity line.	No
Cleggill Solar Farm	248470/1747	13km	Construction of a solar farm comprising of photovoltaic panels on ground mounted frames, together with associated infrastructure	No
Lough Ree Power Station (BESS & Sync Con)	2275/315485	13km	Development at the 'Lough Ree Power (LRP) Station', consisting of the demolition of the existing LRP station and the development and operation of electricity grid services - namely a battery energy storage system (BESS) and a Synchronous Condenser (Sync Con).	No
Kinbrace Battery Energy Storage System (BESS)	301965/PD18/7	14km	Battery energy storage facility which will comprise of rechargeable battery units contained within up to 31 No. 40 foot containers on site and associated development of unit substations.	No

Project	Planning / Project Ref.	Nearest Distance to the Proposed wind farm Site	Description / Status	Scoped in / out for cumulative assessment
Derrane Wind Farm	303677	16km	Construction of a wind farm comprising 2 no. wind turbines, and all related works.	Yes
N5 Ballaghaderreen to Scramoge Realignment Scheme	300493	3km from Wind Farm; crosses the GCR.	N5 Ballaghaderreen to Scramoge Road Development and associated CPO. The proposed road has been designed as a Type 1 Single Carriageway Cross section with two 3.65m lanes and associated hard shoulders, road verges and drainage ditches.	Yes

6.11 Inter-related Effects

The topics addressed in this EIAR do not exist separately from one another, and therefore, any effect on a specific element of the environment has the potential to impact another. The interactions between effects on various factors identified throughout the EIAR are addressed within **Chapter 17 – Interrelated Effects**. Interactions between biodiversity and other aspects are described as follows:

Chapter 7 – Land, Soils and Geology: Hydrogeology is linked with surface water networks. surface water run-off can directly affect soil quality and condition through deposition or withdrawal of chemicals, suspended solids, and nutrients. During construction eroded material can enter surface water causing an influx of sediments. This has the potential to increase suspended sediments. Through implementation of mitigation measures outlined in the **Chapter 7 – Land, Soils and Geology, Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** and this Chapter, the effect through interaction is reduced to **Short-Term, Slight, Adverse**. In EIA terms, this is **Not Significant**.

Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology: Watercourses serve as valuable ecological corridors, providing habitats for a number of significant and protected species. Impacts on waterbodies within such networks can affect aquatic habitats and the species they support. Key potential impacts during the construction and decommissioning phases include accidental sediment release, pollution from spills or leaks, and disruption to habitats caused by instream or bank-side activities. Similar impacts are associated with the operational phase where is potential for accidental spills or leaks during maintenance works and uncontrolled run-off from hardstanding areas. Through implementation of mitigation measures outlined in the **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology** and this Chapter, the potential effect through interaction is reduced to **imperceptible, Short-Term, Adverse**. In EIA terms, this is **Not Significant**.

Chapter 10 – Noise and Vibration: Works during the construction and decommissioning phases have the potential to cause disturbance to sensitive breeding birds and bats through the generation of noise from plant, vehicles and equipment. With the implementation of mitigation measures in this Chapter and **Chapter 10 – Noise & Vibration**, the potential residual effects through interaction were determined to be **Short-Term, Adverse** and ranging from **Moderate to Slight** (depending on the species). In EIA terms, this is **Not Significant**.

6.12 Monitoring Requirements

As specified in the Error! Reference source not found. **6.7.3 Appendix 6.10 – SHMP** for the Project, a post-construction monitoring schedule has been devised for Biodiversity. This will ensure the mitigation and enhancement measures specified in this Chapter are satisfying their aims and inform any additional management measures and/or changes in management practices.

Specific monitoring to be undertaken during the operation of the Project regarding ecological features will be as follows.

6.12.1 Habitat Monitoring

Habitats within and adjacent to the Project will be periodically monitored to ensure that they are delivering the maximum benefit to biodiversity.

Frequency of surveys per the **Appendix 6.10 – Species and Habitat Management Plan** post-construction monitoring schedule:

- By Year 5 after planting, woodlands should meet the criteria for 'Favourable' under the Hedgerow Appraisal System (which will be adapted for non-hedgerow "woody" habitats).
- In addition to the condition assessment, the diversity of the tree/shrub/climber component (otherwise described in the Hedgerow Appraisal System as 'canopy' forming species) should be the same, or greater than, than at planting.

These condition assessments will form part of an audit report and feedback on all woodlands will be provided to landowners under their management agreements. It will be a condition of these landowner agreements to address any issue in relation to identified management actions.

6.12.2 Bird Population Monitoring

Frequent bird population monitoring will take place throughout the construction and operation of the Project. Frequency of surveys per the **Appendix 6.10 – Species and Habitat Management Plan** monitoring schedule. This monitoring should be undertaken in accordance with best practice survey methods (Gilbert *et al.*, 1998; Hardey *et al.*, 2013; Drewitt and Langston, 2006).

Flight Activity Survey (Vantage Point Surveys) - to be conducted during **construction and years 1, 2, 3, 5, 10 and 15 post-construction** (requirement for years 5, 10 and 15 subject to consultation with NPWS). A flight activity survey is to be undertaken during the summer and winter

months to include Vantage Point surveys following Best Practice Guidance (NatureScot, 2017). This will include recording any barrier effects i.e. the degree of avoidance exhibited by species approaching or within the wind farm (Drewitt and Langston, 2006) by recording changes in flight heights of key receptors post construction.

Target species to be all raptors, all wild goose and duck species, all swan species, and all wader species.

Breeding raptor survey to be conducted during the April to June prior to **construction and years 1, 2, 3, 5, 10 and 15 post-construction** (requirement for years 5, 10 and 15 subject to consultation with NPWS). The breeding raptor survey will cover Peregrine, Kestrel and Barn Owl following Best Practice Guidance (NatureScot, 2017; Hardey *et al.*, 2013).

Avian Mortality Monitoring to be conducted during **years 1, 2, 3, 5, 10 and 15 post construction** (with the requirement for years 5, 10 and 15 subject to consultation with NPWS). A comprehensive fatality monitoring programme is to be undertaken following published best practice to confirm the accuracy of the collision risk modelling predictions and to guide any additional mitigation requirements. Carcasses of birds will be searched for using human observers with or without specially trained cadaver dogs.

The primary components are as follows:

Turbine searches for fatalities are to be undertaken following best practice (SNH, 2021) in terms of search area (minimum radius hub height) and at intervals selected to effectively sample fatality rates based on carcass removal rates (e.g. 1 per month). To be conducted **during years 1, 2, 3, 5, 10 and 15 post construction** (requirement for years 5, 10 and 15 subject to consultation with NPWS) to allow for annual variation and cumulative effects. Radial visual search around each turbine for birds using human observers with or without specially trained cadaver dogs.

A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality impact (if any). Recorded fatalities to be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

During carcass searches any carcasses will be photographed and logged in an annual fatality search report.

Initial carcass removal trials to establish levels of predator removal of possible fatalities. This is to be done following best recommended practice and with due cognisance to published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results.

No turbines which are used for carcass removal trials are to be used for subsequent fatality monitoring. Carcass removal trials shall be continued for the duration of fatality searches.

A Planning compliance report presenting full year results will be completed and submitted to NPWS and the Local Authority in the relevant monitoring years.

Consultation with NPWS. At Year 3 seek consultation with NPWS on next 3 years surveys based on the results of the 3 years of completed surveys. (i.e. requirement for years 5, 10 and 15 subject to consultation with NPWS).

Specific monitoring measures are proposed with regards to Peregrine, when the risk of collision is likely to be highest when inexperienced young birds are initially fledged and engaging in flight practice. Monitoring proposals set out in **Section 6.7.3** will be implemented, in the years when the breeding territory is occupied and when young birds are reared successfully. If during the operational phase the nest site is considered to be abandoned. The monitoring and curtailment measures outlined would no longer be required.

6.12.3 Bat Population Monitoring

In reference to the predicted effects on bats identified in this Chapter (notably the potential collision and baro pressure mortality effects identified in **Section 6.7.2.4**), detailed monitoring will be undertaken to detect any significant changes in bat activity relative to pre-construction surveys. This will aim to assess changes in bat activity patterns.

Bat activity using static detectors will be measured within monitoring years between April and October at each turbine location, in combination with carcass searches during **years 1, 2, 3, 5, 10 and 15 post construction** (requirement for years 5, 10 and 15 subject to consultation with NPWS) to allow for annual variation and cumulative effects.

Bat buffers are designed to create ecologically unsuitable and generally featureless habitat around turbines and to deter foraging bats, as well as potential prey items for foraging raptor species. Monitoring of bat buffers by an appropriately qualified ecologist will be required during **years 1, 2, 3, 5, 10 and 15 post construction** (requirement for years 5, 10 and 15 subject to consultation with NPWS) to ensure vegetation clearance measures and ongoing management in the desired habitat conditions (T01 & T06).

Turbine searches for fatalities of bats are to be undertaken at the same frequency as bird fatality monitoring and using the same methodology.

Initial carcass removal trials of bats are to be undertaken at the same frequency as bird fatality monitoring and using the same methodology.

Annual Planning compliance report presenting full year results will be completed and submitted to NPWS and the Planning Authority.

Consultation with NPWS. At Year 3 seek consultation with NPWS on next 3 years surveys based on the results of the 3 years of completed surveys. (i.e. requirement for years 5, 10 and 15 subject to consultation with NPWS).

6.13 Summary of Effects

This Chapter has assessed the potential effects on biodiversity during the construction, operation and decommissioning phases of the proposed Project. **Table 6-26** displays the impact assessment for all phases of the Project and confirms the residual effects following the application of mitigation measures. The assessment has identified that the proposed Project exhibits low risk to Biodiversity and that there will be **No Significant** effects on Biodiversity because of the proposed Project. Due to the prevention and mitigation measures to be taken, it is not likely that there will be significant effects on biodiversity and the environment

Table 6-26: Summary of effects

Potential Impact	Receptor	Significance of effect	Additional Mitigation	Residual significance of effect
Construction Phase				
Habitat loss and fragmentation	Habitats	Moderate, Long-Term Moderate adverse effects to Imperceptible (Not Significant in EIA Terms)	- Loss of habitats will be minimised with clearly marked footprint for works (see Section 6.7.2); - Habitats of Local Importance (Higher Value) including hedgerows, treelines and woodland will be replaced (see Appendix 6.10 – Species and Habitat Management Plan)	Imperceptible (Not Significant in EIA Terms)
	Woodcock	Moderate (Not Significant in EIA Terms)		Imperceptible (Not Significant in EIA Terms)
	Pine Marten	Imperceptible (Not Significant in EIA Terms)		Imperceptible (Not Significant in EIA Terms)
Disturbance and Displacement	Peregrine	Significant	Timing of construction works will be outside of the Disturbance distance during the breeding season; ongoing monitoring; possible shutting down turbines?? (see Section 6.7.2);	Moderate (Not Significant in EIA Terms)

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Potential Impact	Receptor	Significance of effect	Additional Mitigation	Residual significance of effect
	Kestrel	Slight (Not Significant in EIA Terms)	- Pre-construction surveys will ensure no breeding sites within defined disturbance distance (see Section 6.7.2); - All appropriate best practice construction measures will be applied should a nest be recorded within this disturbance distance	Slight (Not Significant in EIA Terms)
	Barn Owl	Moderate (Not Significant in EIA Terms)		Slight (Not Significant in EIA Terms)
	Woodcock	Moderate (Not Significant in EIA Terms)	Preconstruction surveys will ensure no breeding sites within defined disturbance distance (see Section 6.7.2);	Slight (Not Significant in EIA Terms)
	Bats	Slight (Not Significant in EIA Terms)	Best Practice construction measures will be applied to minimise disturbance to bats, including pre-construction roost survey (see Section 6.7.2);	Slight (Not Significant in EIA Terms)
	Otter	Slight (Not Significant in EIA Terms)	Preconstruction surveys will ensure no breeding sites within defined disturbance distance (see Section 6.7.2);	Slight (Not Significant in EIA Terms)
Pollution	Otter	Slight (Not Significant in EIA Terms)	Best Practice construction measures will be applied to minimise pollution or contamination risk (see Section 6.7.2);	Imperceptible (Not Significant in EIA Terms)
Operational Phase				

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Potential Impact	Receptor	Significance of effect	Additional Mitigation	Residual significance of effect
Habitat loss and fragmentation	Peregrine	Slight (Not Significant in EIA Terms)	Best Practice construction measures will be applied to minimise pollution or contamination risk (see Section 6.7.2	Imperceptible (Not Significant in EIA Terms)
	Barn Owl	Slight (Not Significant in EIA Terms)	Tree planting and hedgerow enhancement will facilitate more suitable foraging habitat outside of the turbine zones.	Imperceptible (Not Significant in EIA Terms)
Disturbance and Displacement	Barn Owl	Slight (Not Significant in EIA Terms)	Tree planting and hedgerow enhancement will facilitate more suitable foraging habitat outside of the turbine zones	Imperceptible (Not Significant in EIA Terms)
	Kestrel	Slight (Not Significant in EIA Terms)	Tree planting and hedgerow enhancement will facilitate more suitable foraging habitat outside of the turbine zones	Imperceptible (Not Significant in EIA Terms)
	Otter	Slight (Not Significant in EIA Terms)	Measures in place to prevent pollution sources, no other sources for disturbance/displacement.	Imperceptible (Not Significant in EIA Terms)
Direct mortality	Peregrine	Significant	Full scale monitoring of Peregrine before and during the breeding season to identify breeding behaviour of Peregrine and implementation of	Slight (Not Significant in EIA Terms)

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Potential Impact	Receptor	Significance of effect	Additional Mitigation	Residual significance of effect
	Kestrel	Slight (Not Significant in EIA Terms)	curtailment where required should successful nesting attempts be confirmed. Restoration of habitats will not allow prey-rich foraging areas to develop (see Section 6.7.3);	Imperceptible (Not Significant in EIA Terms)
	Bats	Significant	Best Practice measures will be applied to minimise mortality to bats, including bat buffers around turbines (see Section 6.7.3); Post-construction monitoring will be undertaken to verify that the measures are delivering the desired avoidance of collision.	Slight (Not Significant in EIA Terms)
Pollution	Aquatic ecology	Moderate (Not Significant in EIA Terms)	Best Practice measures will remain in place to avoid in the unlikely event pollution or contamination risk (see Section 6.7.3);	Imperceptible (Not Significant in EIA Terms)
Decommissioning Phase				
Disturbance and displacement	Bird Species	Significant	Decommissioning commencement will be preceded by updated baseline bird surveys to identify any measures additionally required beyond what was prescribed for the construction phase of the Project.	Slight (Not Significant in EIA Terms)

6.14 References

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