Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Killoshulan Wind Farm, Co. Kilkenny

Chapter 6 - Biodiversity



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GLOSSARY OF TERMS

Terms	Definition
Biodiversity	The variety of living organisms, including diversity within species, between species and of ecosystems.
Ecological receptor	A habitat, species or ecological feature considered in the assessment of potential effects.
Key Ecological Receptor (KER)	An ecological feature of sufficient importance with a potential pathway for effects from the Proposed Project.
Zone of Influence (ZoI)	The area over which ecological features may be affected by changes arising from the Proposed Project; its extent varies by receptor and impact pathway.
Source–pathway–receptor	A framework for identifying whether an impact source can affect an ecological receptor through a plausible connection.
Qualifying Interest (QI)	A habitat or species for which a Special Area of Conservation is designated.
Special Conservation Interest (SCI)	A bird species or wetland interest for which a Special Protection Area is designated.
Special Area of Conservation (SAC)	A European site designated under the Habitats Directive for listed habitats and/or species.
Special Protection Area (SPA)	A European site classified under the Birds Directive for the conservation of wild birds.
Natural Heritage Area (NHA)	A nationally designated site protected under the Wildlife Acts.
Proposed Natural Heritage Area (pNHA)	A site identified for its natural heritage value but not formally designated as an NHA.
Baseline ecological environment	The ecological conditions used as the starting point for assessment of project effects.
Ecological impact assessment (EcIA)	The process of identifying, characterising and evaluating effects on ecological features.
Habitat fragmentation	The division or interruption of habitat areas or ecological connections.
Riparian habitat	Habitat associated with the banks or margins of a watercourse.
Relevé	A vegetation survey plot in which plant species and their cover are recorded.
Conservation status	The condition of a habitat or species in relation to its range, extent, population, structure or function.

GLOSSARY OF ACRONYMS

Acronyms	Definition
AA	Appropriate Assessment
AASR	Appropriate Assessment Screening Report
BCI	Bat Conservation Ireland
BEMP	Biodiversity Enhancement and Management Plan
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
DAU	Development Applications Unit
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
FPO	Flora (Protection) Order
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
IAS	Invasive Alien Species
IFI	Inland Fisheries Ireland
IVC	Irish Vegetation Classification
KER	Key Ecological Receptor
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
NT	Near Threatened
OPW	Office of Public Works
pNHA	proposed Natural Heritage Area

Acronyms	Definition
PRF	Potential Roost Feature
QI	Qualifying Interest
SAC	Special Area of Conservation
SCI	Special Conservation Interest
S.I.	Statutory Instrument
SPA	Special Protection Area
TII	Transport Infrastructure Ireland
WFD	Water Framework Directive
ZoI	Zone of Influence

6. BIODIVERSITY

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the likely significant effects (both alone and cumulatively with other projects) that the Proposed Project may have on Biodiversity. Mitigation by design was applied to the finalised Proposed Project layout wherever possible to avoid impacts on Biodiversity. This chapter sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. The residual impacts on biodiversity are then assessed. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976 (as amended) and/or EU Habitats Directive 92/43/EEC. Impacts on avian receptors are considered in Chapter 7 of this EIAR. The full description of the Proposed Project is provided in Chapter 4 of this EIAR.

The chapter is structured as follows:

- The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Valuation is then provided.
- This is followed by an Assessment of Effects which are described with regard to each phase of the Proposed Project: construction phase, operational phase and decommissioning phase. Potential Cumulative effects in combination with other projects are fully assessed.
- Proposed mitigation and best practice measures to avoid, reduce or offset the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on Biodiversity.

For the purposes of this EIAR:

- Where the 'Proposed Project' is referred to this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines (Proposed Turbines) and associated foundations and hardstanding areas, including entrances and access roads, underground cabling, permanent meteorological mast, temporary construction compounds, turbine delivery accommodation works, spoil management areas, borrow pit, tree felling, site drainage, operational stage signage, battery energy storage system (BESS), biodiversity enhancement areas and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Grid Connection' is referred to, this refers to the on-site 110kV Substation, all ancillary works and underground 110kV grid connection cabling connecting to the existing Ballyragget 110kV Substation, Co. Kilkenny, and all ancillary works and apparatus. The Proposed Grid Connection is described in detail in Chapter 4 of this EIAR.
- Where the 'Site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of the EIAR

and encompasses an area of approximately 796 hectares. Where the 'Proposed Wind Farm site' is referred to, this relates the EIAR Site Boundary without the corridor that encompasses the Proposed 110kV underground cabling route.

Both the EIAR and Natura Impact Statement (NIS) accompanying the planning application take into account the combined impacts of these individual elements of the Proposed Project.

For clarity in this EIAR, all elements of the Proposed Project will be assessed cumulatively with other projects to aid the competent authority in carrying out an EIA. The methodology for the identification of projects with the potential for cumulative effects is set out in detail in Chapter 2: Background to the Proposed Project of this EIAR.

In addition:

- For the purposes of this Biodiversity Chapter, 'Construction Phase' refers to site enabling works which include the construction of the site infrastructure. The 'Operational Phase' refers to the proposed operating wind farm post-construction.
- 'Key Ecological Receptor' (KER) is defined as a species or habitat occurring within the zone of influence of the Proposed Project upon which likely significant effects are anticipated.
- 'Zones of Influence' (ZoI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZoIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

6.1.1 Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, 1976 (as amended), is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild animals and flora. These species are therefore considered in this report as ecological receptors.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife (Amendment) Act 2017. NHAs are legally protected from damage from the date they are formally proposed for designation[1]. A list of pNHAs were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future and they are often afforded a degree of protection under policies and objectives contained within County Development Plans and/or County Biodiversity Action Plans.

The Flora (Protection) Order 2022 (S.I. No. 235) lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Acts. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. Under the Flora Protection Order it is illegal to cut, pick, collect, uproot or damage, injure or destroy species listed or their flowers, fruits, seeds or spores or wilfully damage, alter, destroy or interfere with their habitat (unless under licence).

[1] https://www.npws.ie/protected-sites/nha(accessed 24th September 2026).

National Policy

Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "**NBAP**"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives.

The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows:

- **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity.** Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan.
- **Objective 2: Meet Urgent Conservation and Restoration Needs.** Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government.
- **Objective 3: Secure Nature's Contribution to People.** Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy.
- **Objective 4: Enhance the Evidence Base for Action on Biodiversity.** This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.
- **Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives.** Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.

In addition, the National Biodiversity Data Centre published guidance on Pollinator-friendly management of Wind Farms[2]. This identifies an evidence-based action plan for wind farm operators that can help pollinators by employing changes to existing management strategies.

Such policies have informed the evaluation of ecological receptors recorded within the site and the ecological assessment process. Pollinator friendly measures have been incorporated into the Proposed Project and these are detailed within the Biodiversity Enhancement and Mitigation Plan (BEMP) (see **Appendix 6-4**).

[2] https://pollinators.ie/wp-content/uploads/2022/12/Wind-Farm-Pollinator-Guidelines-2022-WEB.pdf *(accessed 24th September 2026).*

European Legislation

Habitats and species of European importance are provided legal protection under the EU Habitats Directive 92/43/EEC (the Habitats Directive) and the EU Birds Directive 2009/147/EC (the Birds Directive) this legislation forms the cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites (hereafter referred to as European sites[3]) and the strict system of species protection. Both the Habitats and Bird Directives have been transposed into Irish law by Part XAB of the Planning and Development Acts 2000 (as amended) (from a land use planning perspective) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011).

Annex I of the Habitats Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. marsh fritillary, Atlantic salmon, and Killarney fern) whose conservation also requires the designation of SACs. Annex IV lists animal and plant species in need of strict protection such as lesser horseshoe bat and otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish hare, common frog and pine marten. Species can be listed in more than one Annex, as is the case with otter and lesser horseshoe bat which are listed on both Annex II and Annex IV. The disturbance of species under Article 12 of the Habitats Directive (and in particular avoidance of deliberate disturbance of Annex IV species, particularly during the period of breeding, rearing, hibernation and migration and avoidance of deterioration or destruction of breeding sites or resting places) has been specifically assessed in this EIAR.

The Birds Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

In summary, the species and habitats provided National and International protection under these legislative and policy documents have been considered in this chapter. A detailed assessment of the likelihood of the Proposed Project having either a significant effect or an adverse impact on any relevant European Sites (i.e. SACs, cSACs[4], SPAs or cSPAs) has been carried out in the Appropriate Assessment (AA) Screening Report and Natura Impact Statement. A separate assessment has not been carried out in this chapter, to avoid duplication of assessments. However, the relevant conclusions have been cross-referenced and incorporated.

In addition to the above, the following legislation applies with respect to habitats, fauna, invasive species and water quality in Ireland and has been considered in the preparation of this chapter:

[3] The term Natura 2000 network was replaced by 'European site' under the EU (Environmental Impact Assessment and Habitats) Regulations 2011 S.I. No. 473 of 2011.
[4] Candidate SAC (cSAC) are afforded the same protection as SACs. The process of making cSAC into SACs by means of Statutory instrument has begun and while the process if ongoing the term SAC will be used to conform with nomenclature used in the National Parks and Wildlife Services (NPWS) databased. The name applies to candidate SPAs.

- The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971)
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC).
- The following legislation applies with respect to non-native species - Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011) and the European Union (Invasive Alien Species) Regulations 2024.

6.1.2 Review of Relevant Guidance and Sources of Consultation

The assessment methodology is based primarily upon the Transport Infrastructure Ireland (TII) *'s Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2* (TII, 2009a) and the survey methodology is based on the TII Guidelines on *Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (TII, 2009b). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

While the overall assessment in this EIAR has been carried out in accordance with the EPA (2022) guidance: *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports,* as outlined in Chapter 1 of the EIAR, this Chapter has been prepared with a greater onus on the CIEEM (2018) guidelines: *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine,* as this guidance is more applicable to biodiversity.

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

- Kilkenny Biodiversity Action Plan 2025-2030
- Kilkenny City and County Development Plan 2021-2027
- Regional Spatial and Economic Strategy for the Southern Region.
- National Planning Framework. Ireland 2040 Our Plan.
- National Development Plan 2021-2030.

6.1.3 Statement of Authority

The baseline ecological surveys, including bat habitat assessment and activity surveys, were conducted by MKO ecologists; Pádraig Desmond (BSc), Deepali Mooloo (BSc, MSc) and Andrew McCarthy (BSc). All surveyors have relevant academic qualifications and are competent in undertaking habitat and ecological assessments. Bat survey scope development and project management was overseen by Aoife Joyce (BSc., MSc.). Bat surveys were undertaken by specialised MKO bat Ecologists, the details of whom are detailed in **Appendix 6-2**.

Aquatic surveys were undertaken by Triturus Environmental Ltd. ecologists Ross Macklin (BSc., HDip GIS, Dip IPM, MCIEEM, IFM) and Bill Brazier (BSc., MIFM).

All surveyors have relevant academic qualifications and experience in undertaking habitat and ecological assessments.

The EIAR Chapter has been prepared by Deepali Mooloo and Pádraig Desmond of MKO and reviewed by Caroline Kelly.

Pádraig Desmond

Pádraig is a Project Ecologist with MKO with six years post graduate ecological experience, five years of which have been in ecological consultancy. Pádraig holds a BSc (Hons) in Ecology and Environmental Biology from University College Cork. Pádraig took up his position with MKO in December 2021, prior to which he worked as a Junior Ecologist with Envirico. Through these consultancy roles Pádraig has gained excellent experience in producing ecological reports such as Natura Impact Statements, Ecological Impact Assessments, Biodiversity chapters, Invasive Species Management Plans, and Constraints Reports for a wide range of projects including small private developments to housing developments and renewable energy projects such as solar and wind farms. Prior to the above roles, Pádraig worked as a field ecologist for the Department of Conservation in New Zealand, where he developed a strong field-based skill set. Pádraig's key strengths and areas of expertise are in terrestrial ecology, including vegetation surveys, habitat identification, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. Pádraig is also skilled in GIS.

Deepali Mooloo

Deepali Mooloo is an Ecologist at MKO, having joined the company in September 2023. She holds an M.Sc. (Hons) in Applied Coastal and Marine Management from University College Cork, where she specialized in spatial ecology, field skills, and drone photogrammetry. Deepali's expertise lies in ecology and field surveys, with experience in a range of multidisciplinary assessments. Since joining MKO, she has conducted walkover surveys, marsh fritillary surveys, mammal surveys, winter bird surveys, and botanical surveys, including detailed relevés of plant species in both coastal and terrestrial habitats. She is also skilled in habitat assessments, utilizing Fossitt's Guide to Habitats in Ireland and the ERICA database. Her professional experience includes preparing Appropriate Assessment Screening Reports (AASR), Feasibility Studies, Ecological Impact Assessments (EcIA), and Natura Impact Statements (NIS). She is proficient in detailed habitat and ecological constraints mapping using QGIS and has expertise in cartography using both QGIS and ArcGIS. In 2024, Deepali successfully completed the Marine Mammal Observer Course with IDWG. She also has prior experience working in coastal and marine environments in Mauritius.

Ross Macklin

Ross Macklin BSc (Hons) Applied Ecology HDip GIS Dip IPM MCIEEM IFM is an environmental scientist specialising in freshwater and fisheries ecology. He studied a bachelor's degree in applied Ecology at UCC and later completed a higher diploma in Geographical Information Systems at UCC and a diploma in Integrated Pest Management at UCD. He is currently completing his PhD at UCC in fisheries ecology. Ross has an in-depth knowledge of all freshwater ecosystems and riparian corridors. He has undertaken river habitat, lake habitat, canal habitat and fisheries assessments in professional work for 20 years. His specialist freshwater experience lies in biological and physicochemical water quality analysis, fisheries ecology, riparian habitat assessments, habitat mapping, protected species, mammal surveys, geographical information systems, ecological design and invasive species. Ross has expert experience in identifying and assessing macrophyte plant, aquatic bryophytes, fish and macroinvertebrates from a variety of aquatic habitats. He routinely undertakes fisheries assessments, protected species surveys, invasive species surveys, river hydromorphology surveys, surface water management plans, CEMP, EcIA , EIAR and NIS reporting. He holds full national licences for freshwater pearl mussel (*Margaritifera margaritifera*), white-clawed crayfish (*Austropotamobius pallipes*) and amphibians inclusive of an open photography licence for numerous protected species. He has held over 300 section 14 licences for fisheries surveys spanning the breadth of Ireland.

Bill Brazier

Bill Brazier BSc (Hons)Applied Freshwater & Marine Biology, MIFM) is an aquatic, fisheries and mammalian ecologist with over 14 year's professional experience in Ireland. He is a senior ecologist at

Triturus Environmental Ltd. and is completing a PhD in fish genetics at UCC. He has extensive experience in a wide range of ecological and environmental projects including EIAR, EcIA and AA/NIS reporting, as well as the areas of renewable energy developments, flood relief schemes, road schemes, invasive species management blueways/greenways, biodiversity projects and non-volant mammal monitoring. He specialises in aquatic ecology and fisheries ecology, inclusive of fisheries assessments, macrophytes, water quality, otter, freshwater pearl mussel, white-clawed crayfish and amphibians, holding full national licences for all of these species. Bill is one of Ireland's most experienced fisheries scientists having held over 250 Section 14 authorisation licences for fisheries related work.

Aoife Joyce

Aoife Joyce is a Project Director (Ecology) with 6 years' professional experience in ecological assessments and has completed CIEEM and BCI courses in Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training, Bat ID, Trapping and Handling and Kaleidoscope Pro Analysis. She is a graduate of Environmental Science (Hons.) at University of Galway, complemented by a first-class honours MSc in Agribioscience. Prior to taking up her position with MKO in 2019, Aoife held previous posts with Inland Fisheries Ireland and Treemetrics Ltd. She has a wide range of experience from bat roost identification, acoustic sampling, sound analysis, electrofishing, mammal and habitat surveying to GIS, soil and water sampling, Waste Acceptability Criteria testing, Environmental Impact Assessments (EIAs) and mapping techniques. Since joining MKO, Aoife has been involved in managing bat survey requirements for a variety of renewables planning applications, as well as commercial, residential and infrastructure projects. This includes scope development, project coordination, roost assessments, remote bat detector deployment, dawn and dusk bat detection surveys, bat handling, sonogram analyses, mapping, impact assessment, mitigation design inputs and report writing. Within MKO, she oversees the bat team and works as part of a wider multidisciplinary team to help in the production of ecological reports and assessments. Aoife is a Full member of the Chartered Institute of Ecology and Environmental Management, a member of Bat Conservation Ireland and holds current Bat Roost Disturbance and bat photography licenses.

Caroline Kelly

Caroline is a Senior Ecologist with MKO with over ten years' experience in ecological consultancy and is a Full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Caroline holds a BSc in Environmental Biology from University College Dublin (UCD) and an MSc in Applied Ecological Assessment from University College Cork (UCC). In addition, Caroline has completed an Advanced Diploma in Planning and Environmental Law from Kings Inns Dublin. Prior to taking up her position with MKO in June 2025, Caroline worked as a Principal Ecologist with Scott Cawley Ltd. Caroline has strong generalist field ecology skills and has undertaken a range of ecological surveys including habitat, bird (both breeding and wintering), invasive species and protected fauna surveys. She has strong technical reporting skills and has extensive experience in a range of ecological assessments including Appropriate Assessment and Ecological Impact Assessment. She has undertaken ecological assessments and surveys on a variety of project types (e.g. linear infrastructure projects, industrial, commercial, residential, recreational, tourism and renewable energy developments).

6.2 Methodology

The following sections describe the methodologies followed to establish the baseline ecological condition of the site and surrounding area. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

6.2.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of NPWS Article 17 maps 2019, 2013 and 2007[5].
- Review of online web-mappers: National Parks and Wildlife Service (NPWS)[6], EPA maps[7], Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI)[8].
- Data on potential occurrence of rare plant and bryophytes – as per NPWS online map viewers; Flora Protection Order 2022 Map Viewer[9].
- Review of the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed Project is located.
- Potential for in-combination effects have been considered in Chapter 2 of this EIAR and Section 6.6 of this Chapter. This was informed by a review of the EIARs/NISs prepared for other plans and projects occurring in the wider area.

6.2.1.1 Designated Sites

6.2.1.1.1 *Identification of the Designated Sites within the Likely Zone of Influence (ZOI) of the Proposed Project*

The potential for the Proposed Project to impact on sites that are designated for nature conservation was considered in this chapter.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. 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"*. Section 6.5.5 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

Natural Heritage Areas (NHAs) are designated under Section 18 the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this chapter.

[5] [5] https://storymaps.arcgis.com/collections/1a721520030d404f899d658d5b6e159a?item=1 Accessed: 22/07/2026
[6] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba Accessed 22/07/2026
[7] https://gis.epa.ie/EPAMaps/ Accessed: 22/07/2026
[8] https://ifigis.maps.arcgis.com/apps/webappviewer/index.html?id=9a31fedb077c4fb29911184842b7ef025 Accessed 22/07/2026
[9] https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=a41ef4e10227499d8de17a8abe42bd1e Accessed: 22/07/2026

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this chapter.

The following methodology was used to establish which sites, that are designated for nature conservation, have the potential to be impacted by the Proposed Project:

- All designated sites within the vicinity of the EIAR Site Boundary were identified. In addition, the potential for connectivity with European or Nationally designated sites at greater distances from the Proposed Project was also considered in this initial assessment.
- The designation features of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Influence (ZoI) and further assessment is required.

6.2.1.2 NPWS habitats of conservation value data

A review of available NPWS datasets on habitats of conservation value was carried out as part of this assessment, which included the following:

- Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), including the Heath, Bogs and Mires;
- Irish Semi-Natural Grassland Survey datasets;
- National Survey of Native Woodlands and
- Ancient and Long-Established Woodland

6.2.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this EIAR, as described in Chapter 2, Section 2.6 of this EIAR.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-12 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment. Table 6-1 provides a list of the organisations consulted with regard to biodiversity during the scoping process, and notes where scoping responses were received.

In addition, MKO requested consultation with the National Parks and Wildlife Services (NPWS) to discuss the Proposed Project and to welcome any feedback they may have. This meeting was held online on the 9th of June 2026, where MKO presented an overview of the project to NPWS representatives, the surveys undertaken and the key findings, as well as European Site which are being considered in the accompanying Natura Impact Statement.

The key points of feedback relating this chapter are summarised below.

- **Concern:** NPWS highlighted the need for detailed botanical assessments within correct surveys season, and to classify habitats to IVC classifications to allows a more granular assessments. **Response:** Detailed relevés of habitats within the EIAR Site Boundary were undertaken and analysed using ERICA - Engine for Relevés to Irish Communities Assignment, which assigns vegetation data to communities defined by the Irish Vegetation Classification (IVC). Further detail in **Appendix 6-1**.

- **Concern:** NPWS noted that mitigations from Atkinson *et al.* (2024) should be included should freshwater pearl mussel be downstream of the Proposed Project.

Response: However, eDNA surveys showed no indication of downstream FWPM (see **Appendix 6-3**) and therefore, this added mitigation was not necessary to the assessment.

- **Concern:** NPWS highlighted the Loughans SAC which is a turlough southwest of the wind farm site. The NPWS said the Hydrology chapter alongside the NIS & chapter within the EIAR should show no significant impacts on the turlough or groundwater receptors.
  Response: Potential connectivity to this SAC was considered in Chapter 9: Hydrology & Hydrogeology of this EIAR. This chapter states that there is no surface water or groundwater connectivity to this SAC.

- **Concern:** The NPWS advised that a detailed hedgerow appraisal be carried out to identify ecological importance of each section. The purpose of this assessment is a more granular survey of the habitat by distinguishing higher importance sections (e.g., townland boundaries) with lower importance sections.
  Response: Detailed hedgerow appraisals were undertaken within the EIAR Site Boundary and are detailed in **Appendix 6-1.**

Table 6-1 Organisations consulted with regard to biodiversity.

Consultee	Scoping Response Date	Scoping Response	Addressed in
An Taisce	None received.	No response	N/A
Bat Conservation Ireland	None received	No response	N/A
BirdWatch Ireland	None received	No response	N/A
Department of Agriculture, Food and the Marine	27/09/2022 & 14/05/2026	Where felling of forestry is required, a felling licence will be required.	The tree felling activities required as part of the Proposed Project will be the subject of a Felling Licence application to the Forest Service, in accordance with the Forestry Act 2014, the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the wind farm be submitted with the felling licence applications; therefore, the felling licenses cannot be applied for until such time as planning permission is obtained for the Proposed Project.
Department of Communications, Climate Action and the Environment	07/11/2022 & 15/06/2026	Not applicable to Ecology	N/A
Department of Housing, Local Government and Heritage	23/09/2022 & 12/05/2026	Stated that the DAU represents the Department of Housing, Local Government and Heritage, coordinating responses/submission from National Parks and Wildlife Service, National Monuments Service, Underwater Archaeology Unit and Architectural Heritage. No further response.	NPWS also consulted, as discussed below

Consultee	Scoping Response Date	Scoping Response	Addressed in
National Parks and Wildlife Service	12/05/2026	States that the DAU has forwarded the information to NPWS to review. No further response.	N/A
Environmental Protection Agency	None received	No response	N/A
Inland Fisheries Ireland (SouthEast)	30/09/2022	Stated that the project is located in the Nore catchment, within the area of three surface water bodies; Gorteenahilla_010, Nuenna_010 and Nuenna_020, all within the Barrow-Nore SAC. States that all bodies are at risk and have Poor, and Moderate WFD Status respectively. There should be no deterioration to ecological status and all surface water bodies that are determined to be less than good must be restored to at least good status. Stated that a comprehensive aquatic habitat map should be created and assessed, especially considering the Atlantic salmon and lamprey species. Stated instream works must only occur between 1 July and 30 September. Request that new water crossings be minimised and altered crossings must be upgraded. Stated Sustainable Drainage Systems (SuDS) principles must be implemented. Recommends the inclusion of a CEMP, Emergency Response Plan (EMP) and a Surface Water Management Plan (SWMP).	Chapter 9: Hydrology & Section 6.5 of this Chapter
Irish Peatland Conservation Council	No response	No response	N/A
Irish Red Grouse Association - Conservation Trust	No response	No response	N/A
Irish Wildlife Trust	No response	No response	N/A
Kilkenny County Council	17/11/2022 & 07/07/2026	Includes a report that consists of responses from Transport Infrastructure Ireland, Irish Aviation Authority and Irish Water and the Kilkenny County Council Planning, Roads and Environment divisions.	N/A
The Heritage Council	No response	No response	N/A

6.2.3 Field Surveys

A comprehensive survey of the biodiversity within the EIAR Site Boundary was undertaken to inform this Biodiversity Chapter of the EIAR. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies and guidance followed. Surveys were carried out between January 2026 and August 2026 and are summarised in Table 6-2 below. An assessment of the Proposed 110kV Underground Cabling route was also undertaken on the 28th of May 2026. Surveys along the route comprised a multi-disciplinary walkover, otter surveys at watercourse crossings as well as an assessment of bat foraging, commuting and roosting habitat.

Table 6-2: Ecology Surveys Informing the EIAR

Survey Type	Dates	Appendix
Multi-disciplinary walkover (incl. habitats)	› 26th, 27th and 28th of May 2026 › 7th of August 2026	N/A
Detailed Botanical Surveys – Irish Vegetation Classification (IVC)	› 27th and 28th of May 2026 › 14th of July 2026 › 17th of July 2026	Botanical Report, **Appendix 6-1**
Hedgerow habitat appraisals	› 17th of July 2026	Botanical Report, **Appendix 6-1**
Badger/Mammal survey and camera trap set up	› 27th of May 2026 › 30th of July 2026	N/A
Bat Surveys	› 24th April 2025 › 13th May 2025 › 1st July 2025 › 14th July 2025 › 30th July 2025 › 26th August 2025 › 18th September 2025	Bat Report, **Appendix 6-2**
Aquatic surveys (including otter)	› January 2026	Aquatics Report, **Appendix 6-3**
Grid Connection and Turbine Delivery route	› 30th of July 2026 › 7th of August 2026	N/A

6.2.3.1 Multi-disciplinary Walkover Surveys (as per TII Guidelines, 2009)

Multi-disciplinary ecological walkover surveys were undertaken in May, June, and July 2026 in accordance with the TII Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (TII, 2008). These surveys provided baseline data on the ecology of the Site and assessed whether further, more detailed, habitat or species-specific ecological surveys were required. The multi-disciplinary ecological walkover survey comprehensively covered the entire Site.

Habitats were classified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). Habitat mapping was undertaken in compliance with guidance set out in 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011). Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2019).

The walkover surveys were designed to detect any protected habitats or species, including any suitable habitat for protected species, that may occur in the vicinity of the Site. Incidental sighting/ observations of birds and additional fauna were noted during the survey.

During each of the survey efforts listed in Table 6-2, consideration was given to protected flora, including those listed on the Flora Protection Order (2022).

During the multidisciplinary survey, a search for Invasive Alien Species (IAS), with a focus on those listed under the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. No 374 of 2024) and under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011) as amended, was also conducted.

6.2.3.2 Dedicated Habitat and Vegetation Composition Surveys

All habitats recorded on site and described in this Biodiversity chapter have been classified in accordance with Fossitt (2000). Full details of all the botanical surveys and results are provided in **Appendix 6-1** and an assessment of the potential for the site to support Annex I habitats is also provided in this Appendix.

Botanical surveys of the Site were undertaken in 2026. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the Proposed Project layout.

The habitat assessment surveys described in this report have been undertaken with reference to the following guidelines and interpretation documents:

- Commission of the European Communities (2013) *Interpretation Manual of European Union Habitats*. Eur 27. European Commission DG Environment.
- NPWS (2025). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Domhnall Finch, Aoife Delaney, Fionnuala O'Neill and Deirdre Lynn
- Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018), *The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats*. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013), *The Irish semi-natural grasslands survey 2007-2012*. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010), while mosses and liverworts nomenclature follows '*Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

6.2.3.2.1 *Vegetation composition assessment*

Detailed habitat classification and assessment was undertaken by MKO ecologists at targeted locations within the site, with relevés undertaken in representative habitats at each turbine base and associated Proposed Wind Farm infrastructure, see **Appendix 6-1** for all relevé data. The extent of each habitat on site was mapped using the ArcGIS Field Maps app. A representative photograph was also taken for each of the habitats recorded on site, including all relevés. The locations of all relevés are shown in **Appendix 6-1**.

The survey results were then analysed in accordance with the Irish Vegetation Classification (IVC) system. The IVC is a project with aims to classify, describe, and map in detail all aspects of natural and semi-natural vegetation in Ireland within a single, unified framework. The National Vegetation Database (NVD), upon which the IVC is based, holds data for over 30,000 relevés and is the core resource upon which the classification system is based.

A fundamental requirement of the IVC is to "aid in definition and identification of EU Habitat Directive (92/43/EEC) Annex I habitats" and to 'inform the planning process, for example through environmental impact assessments'.

The Engine for Relevés to Irish Communities Assignment (ERICA)[10] is a web application for assigning vegetation data to communities defined by the Irish Vegetation Classification (IVC). Data can be uploaded, checked for errors and analysed and the results can then be downloaded. ERICA works with both quantitative vegetation cover data (such as are recorded in relevés and other types of botanical recording plots) and presence/absence data, such as species lists. ERICA covers grasslands, woodland, duneland, heaths, bogs, fens, mires, freshwater, saline waters, rocky habitats, scrub, strandline, saltmarsh and weed communities (Perrin, 2018). The data collected from the botanical assessments was uploaded to ERICA, analysed and the results data downloaded.

The analysis procedure uses a clustering process to assign classification affinity to vegetation plots based on a degree of membership to each of the communities defined by the IVC. Table 6-3 details the categorizing types of plots utilising the clustering analysis. This categorizing procedure was utilised to determine if the grassland plots within the study area had any affinity to Annex I grassland and whether further assessment was required.

Table 6-3: Categorising types of plots using clustering analysis (after Wiser & de Cáceres, 2013).

Plot Type	Definition
Assigned	The plot has membership ≥ 0.5 for one of the vegetation communities and therefore relates to the core definition of that vegetation community.
Unassigned	The plot has membership ≥ 0.5 for the noise class and is poorly represented by the current classification scheme
Transitional	The plot has membership < 0.5 for all vegetation communities and for the noise class. It falls within the scope of the current classification scheme but does not relate to the core definition of any of the vegetation communities.

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive where present were identified and classified as KERs.

6.2.3.2.2 *Hedgerow appraisals*

Hedgerows within the Proposed Project Site were assessed using a method adapted from the Hedgerow Appraisal System (HAS) (Foulkes *et al.*, 2013). This methodology was used to record the extent (i.e. quantitative survey) floristic composition, context, physical structure, condition, and management of hedgerows (i.e. qualitative survey) on the site. This detailed survey methodology for hedgerows was applied to hedgerows within the footprint of the Proposed Project with potential to be impacted (i.e. those hedgerows that fall within the bat felling buffers around each of the turbines and other associated infrastructure (turbine hardstand, road infrastructure etc.). Prior to the initial ecological site visit, all hedgerows identified within the development footprint were mapped using landcover data from *Tailte Éireann's National Land Cover Map 2018 (Lydon and Smith, 2018)*. The hedgerows identified were also checked against the *1st Edition Ordnance Survey map (1841)* to identify whether they followed Townland Boundaries.

Full details of hedgerow appraisals are provided in **Appendix 6-1**.

[10] *Perrin, 2019, ERICA – Engine for Relevés to Irish Communities Assignment V5.0 User's Manual, Online, Available at: https://biodiversityireland.shinyapps.io/vegetation-classification/_w_9cd4889a/manual.pdf, [accessed 24th September 2026]*

6.2.3.3 Terrestrial Fauna Surveys

The results of the desk study and incidental records of protected species during ecological survey work and multidisciplinary walkover surveys were used to inform the scope of targeted ecological surveys required. Dedicated mammal surveys were undertaken on the dates set out in Section 6.2.3 above, with the methodologies followed also provided in the following sections. Dedicated surveys for bats were undertaken across the site and are detailed in the Bat Report in **Appendix 6-2**. Dedicated otter surveys within the EIAR Site Boundary were carried out by Triturus Environmental (see Section 2.8 of the Aquatic Baseline Report, **Appendix 6-3**) while surveys for otter along the Proposed 110kV Underground Cabling route were undertaken by MKO ecologists. During the multidisciplinary walkover surveys, where observed, incidental records of birds and invertebrates including butterflies, dragonflies, etc. were recorded.

6.2.3.3.1 *Badger Survey*

Forestry, open grassland and heath habitat, hedgerow, and earth banks within the Site provide potential suitable supporting habitat for badger. Therefore, a dedicated mammal survey was undertaken in May and July of 2026, to determine the presence or absence of badger signs within the Site. Surveys were conducted adhering to best practice guidance *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Roads Schemes* (TII, 2008) and *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes* (TII, 2005). Incidental records of badger signs were also considered during the multidisciplinary surveys.

The badger surveys were conducted in order to determine the presence or absence of badger signs within and adjacent to the Proposed Project. The Badger survey involved a search for all potential badger signs as per TII (2008) (latrines, badger paths and setts) and SNH (2003):

- Faeces: Badgers usually deposit faeces in characteristic excavated pits, concentrations of which (latrine sites) are typically found at home range boundaries.
- Setts, comprising either single isolated holes or a series of holes, likely to be interconnected underground.
- Paths between setts or leading to feeding areas.
- Scratching posts at the base of tree trunks.
- Snuffle holes (small scrapes where Badgers have searched for insects, earthworms, and plant tubers).
- Day nests (bundles of grass and other vegetation where Badgers may sleep above ground).
- Hair traces.
- Prints.

If/where encountered, setts are classified using the conventions set out in the Best Practice Badger Survey Guidance Note provided by SNH (2003), which are provided in Table 6-4 below.

Table 6-4 Classification of Badger Setts (Definition as per SNH 2003)

Sett Type	Description
Main	Several holes with large spoil heaps and obvious paths emanating from and between sett entrances.
Annexe	Normally less than 150m from main sett, comprising several holes. May not be in use all the time, even if main sett is very active.
Subsidiary	Usually at least 50m from main sett with no obvious paths connecting to other setts. May only be used intermittently.
Outlier	Little spoil outside holes. No obvious paths connecting to other setts and only used sporadically. May be used by Foxes and rabbits.

Main setts normally have a large number of entrances (both used and disused), with obvious heaps of spoil. These setts look well used, with obvious tracks between entrances. Annexe setts lie close to the

main sett, between 50 and 150m away, and are connected by tracks. They usually have several holes but may not be in use all the time. Subsidiary setts are not connected to another sett by obvious paths and are not continuously active. Outlier setts have usually just one or two holes, without obvious spoil heaps or paths. They are used by badgers sporadically and are often taken over by foxes and rabbits (Smal, 1995).

6.2.3.3.2 Otter Survey

Otter surveys were conducted adhering to best practice guidance (TII, 2009b), CIEEM best practice competencies for species surveys[11] and TII (2006) Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes[12]. Watercourses within the Site, and along the Proposed 110kV Underground Cabling route were identified as providing potential habitat for otter and were subject to targeted surveys for this species. This involved a search for all otter signs (e.g. spraints, scat, prints, slides, trails, couches and holts) within 150m of each survey site. Surveys were undertaken as part of the multi-disciplinary walkover surveys and the targeted aquatic surveys as detailed in the Aquatic Baseline Report in **Appendix 6-3**.

6.2.3.3.3 Red Squirrel and Pine Marten Surveys

As part of the dedicated mammal surveys, as well as the multidisciplinary surveys, red squirrel and pine marten surveys were undertaken within areas of suitable habitat (coniferous forestry plantation) occurring in close proximity to the Site. Areas of conifer plantation in particular, occurring within the Site, were searched for signs of activity for both species, including feeding remains/tables, scat, dreys and dreys.

6.2.3.3.4 Marsh Fritillary Habitat Suitability Surveys

As part of the multidisciplinary surveys, a search for potential suitable habitat for marsh fritillary butterfly was carried out as per TII (2008). This included a search for devil's- bit scabious (*Succisa pratensis*) which is the food plant for the larval stage of this species.

6.2.3.3.5 Bat Surveys

Detailed description of the survey methodologies undertaken in relation to bats is provided in the Bat Report included in **Appendix 6-2** of this EIAR, together with full details of the survey times and the surveyors who carried out the bat survey and assessment work.

Bat Habitat Suitability Appraisal

Bat walkover surveys were carried out throughout 2025. During these surveys, habitats within the Site were assessed for their suitability to support roosting, foraging, and commuting bats. Connectivity with the wider landscape was also considered. Suitability was assessed according to Collins (2023) which provides a grading protocol for roosting habitats and for commuting and foraging areas.

Roost surveys

In accordance with NatureScot (2021), targeted roost searches were undertaken within 200 m plus the rotor radius (81.5 m) of proposed turbine locations associated with the Proposed Project. In addition, buildings and structures present within the wider Site were identified and inspected for their potential to support roosting bats.

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[11] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey: Otter, Online, Available at: https://cieem.net/wp-content/uploads/2019/02/CSS-EURASIAN-OTTER-April-2013.pdf*

[12] *https://www.tii.ie/media/wsmlbxmv/guidelines-for-the-treatment-of-otters-prior-to-the-construction-of-national-road-schemes.pdf Accessed 24th September 2026*

Emergence surveys

Emergence surveys at dusk were carried out in 2025 which focused on the PRFs identified during the habitat appraisal. During these surveys, surveyors were equipped with Bat Logger M bat detectors (Elekon AG, Lucerne, Switzerland). The emergence surveys commenced approximately 15 minutes before sunset and concluded approximately 90 minutes after sunset. Where possible, species identification was made in the field and any other relevant information was also noted, e.g., numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications. The purpose was to identify any bat species, numbers, access points and roosting locations within the PRF structure. Surveys were carried out in favourable weather conditions. Structures assessed as having *Negligible* roosting potential were not subject to further survey (Collins, 2023).

Night-time bat walkover surveys

Night-time bat walkover (NBW) surveys undertaken after dusk. A series of representative transect routes were selected throughout the Site, with the aim to record species presence, relative abundance, behaviour (commuting and foraging), and to gather supplementary information on habitat features of importance to bats within the Site. NBW routes were designed with reference to the indicative turbine layout, findings from the desktop study and day-time walkover surveys and considering health and safety concerns and access constraints. As such, transects generally followed existing roads and tracks.

Ground-level Static Surveys

Where developments have less than 10 turbines, NatureScot (2021) requires one detector per turbine, while for larger developments the guide suggests an additional detector for every three turbines. Given that 11 no. turbines were proposed in 2025, 11 detectors were deployed to ensure compliance with NatureScot guidance. The turbine layout was later revised to a 10-turbine layout. Automated bat detectors were deployed for at least 10 nights in spring (April-May), 20 nights of summer (June-mid-August) and 10 nights of autumn (mid-August-October) (NatureScot, 2021/NIEA, 2021). Detector locations were based on indicative turbine locations.

6.2.3.4 Aquatic surveys

Dedicated aquatic baseline surveys were undertaken by Triturus Environmental. The baseline assessment focused on aquatic ecology including fisheries and biological water quality, as well as protected aquatic species and habitats in the vicinity of the Proposed Wind Farm. Undertaken on a catchment-wide scale, the baseline surveys focused on the detection of freshwater habitats and species of high conservation value. These included surveys for white-clawed crayfish (*Austropotamobius pallipes*), freshwater pearl mussel (*Margaritifera margaritifera*) (eDNA only), macro-invertebrates (biological water quality) and fish species, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities including Annex I habitat associations in the vicinity of the project. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Proposed Project and ensured that any habitats and species of high conservation value would be detected. Full details of the methodology followed for the aquatic surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, **Appendix 6-3**.

6.2.4 Methodology for Assessment of Impacts and Effects

6.2.4.1 Identification of Target Receptors and Key Ecological Receptors

The criteria used to assess the ecological value and significance of the study area for habitats and species present follows Guidelines for Assessment of Ecological Impacts of National Road Schemes (TII, 2009) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

6.2.4.2 Valuing Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the TII guidelines. These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

In accordance with these guidelines impact assessment is only undertaken of KERs. KERs are within the ZoI of the Proposed Project and are 'both of sufficient value to be material in decision making and likely to be affected significantly'. To qualify as KERs, features must be of Local Ecological Importance (Higher Value) or higher. Features valued at Local Ecological Importance (Lower Value) are not considered to be KERs and therefore not subject to impact assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species.

6.2.4.3 Characterisation of Impacts and Effects

The ecological effects of the impacts arising from the Proposed Project are characterised as per the CIEEM '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (2018). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative**. Assessment of whether the Proposed Project results in a positive or negative effect on the ecological receptor.

- **Extent**. Description of the spatial area over which the effect has the potential to occur.
- **Magnitude to size, amount, intensity and volume**. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing**. This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility**. This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

6.2.4.4 Determining the Significance of Effects

The ecological significance of the effects of the Proposed Project is determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed.
- There will be an effect on the nature, extent, structure and function of important ecological features or Key Ecological Receptors (KERs).
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

6.2.4.5 Incorporation of Mitigation

Section 6.5 of this Biodiversity chapter assesses the potential effects of the Proposed Project to ensure that all effects on sensitive ecological receptors are adequately addressed. Where significant effects on sensitive ecological receptors are predicted, mitigation is incorporated into the project design or layout to address such effects. The implemented mitigation measures avoid or reduce potential significant residual effects, post mitigation.

6.2.5 Limitations

The information provided in this document accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the Proposed Project; prescribes mitigation as necessary; and describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. While mammal surveys were undertaken in the summer months of 2026, with the exception of otter surveys along the Proposed 110kV Underground Cabling route, no significant limitations presented as all areas of the EIAR Site Boundary, particularly habitats within 150m of the Proposed Project, were accessible, given they predominantly consisted of open grassland and mature forestry. No significant limitations in the scope, scale or context of the assessment have been identified.

6.3 Desk Study

The following sections describe the findings of the desk study. It provides a baseline of the ecology known to occur in the existing environment based on data sources reviewed to inform the ecological impact assessment as outlined in Section 6.2.1.

6.3.1 Hydrology

Full details on the hydrology and hydrogeology of the Site are included in Section 9.3 of Chapter 9: Hydrology and Hydrogeology. Information pertinent to this Chapter has been reviewed, which includes the following from Chapter 9:

- Regional and Local Hydrology – Section 9.3.3.
- Surface Water Quality – Section 9.3.7.
- Surface Water Body Status – Section 9.3.13.
- Groundwater Body Status – Section 9.3.12.

6.3.2 Designated Sites

A map of all European Designated Sites within the vicinity of the Proposed Project is provided in Figure 6-1 with all the Nationally Sites shown in Figure 6-2.

Table 6-5 provides details of all relevant Nationally designated sites initially considered to potentially be within the ZoI of the Proposed Project.

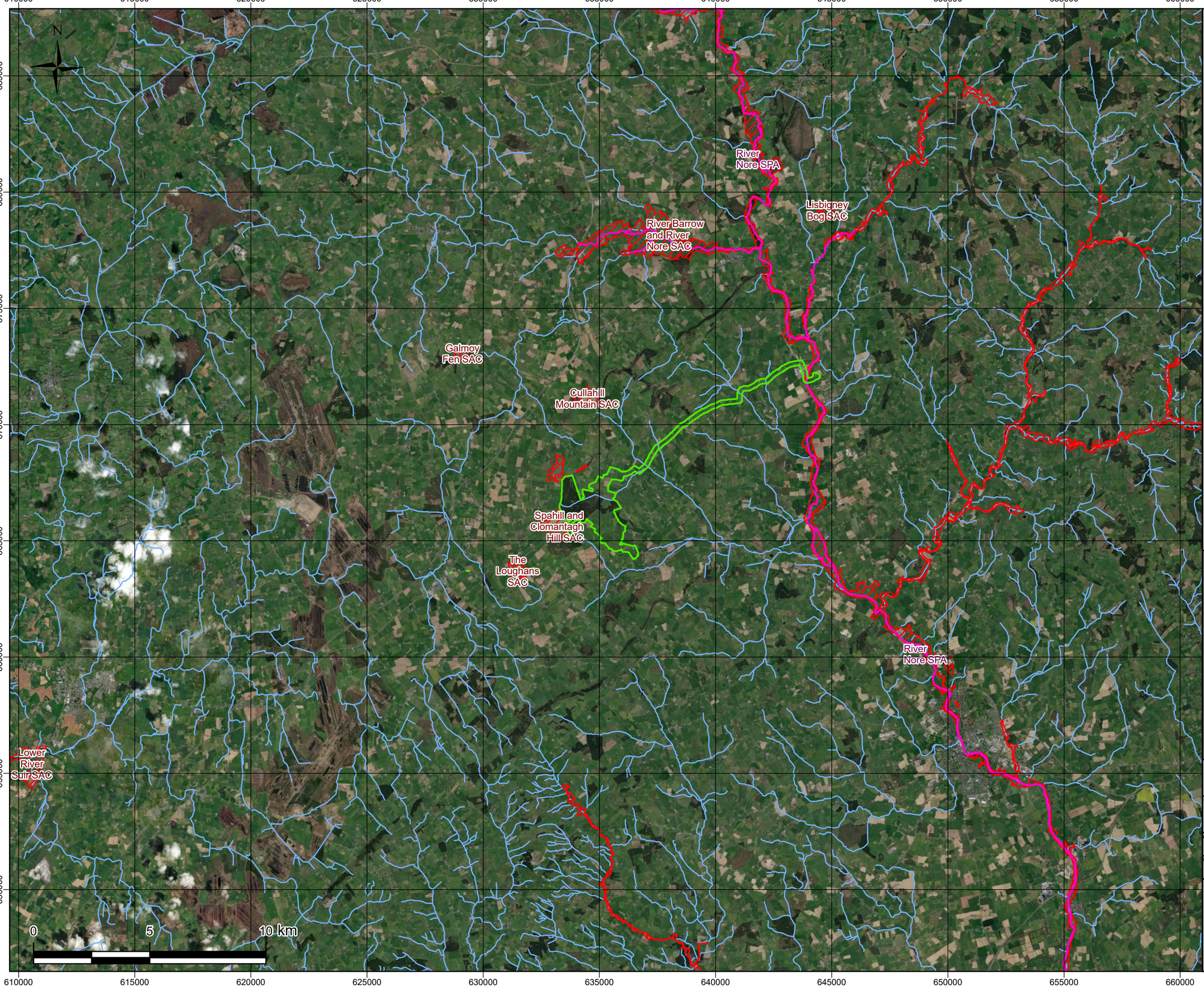
All European Designated Sites are fully described and assessed in the Natura Impact Statement submitted with the EIAR. In summary, two European sites were identified to be within the ZoI of the Proposed Project, namely:

- River Barrow and River Nore SAC (002162)
- River Nore SPA (004233)

Potential for likely significant effects on these European Sites was identified at the screening stage of the NIS via deterioration of water quality (and associated indirect effects on QI habitats and QI/SCI species) and disturbance/displacement during the construction, operation, and/or decommissioning phases of the Proposed Project in the absence of mitigation.

The following National Sites were identified as being within the likely ZoI of the Proposed Project, as assessed in Table 6-5:

- River Nore/Abbeyleix Woods Complex pNHA [002076]
- Inchbeg pNHA [000836]
- Ardaloo Fen pNHA [000821]

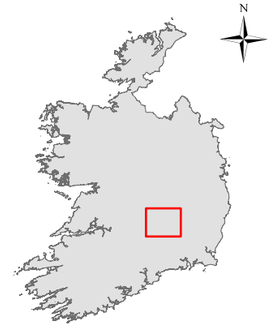


Map Legend

- EIAR Site Boundary
- Special Protection Areas
- Special Area of Conservation
- WFD Rivers

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

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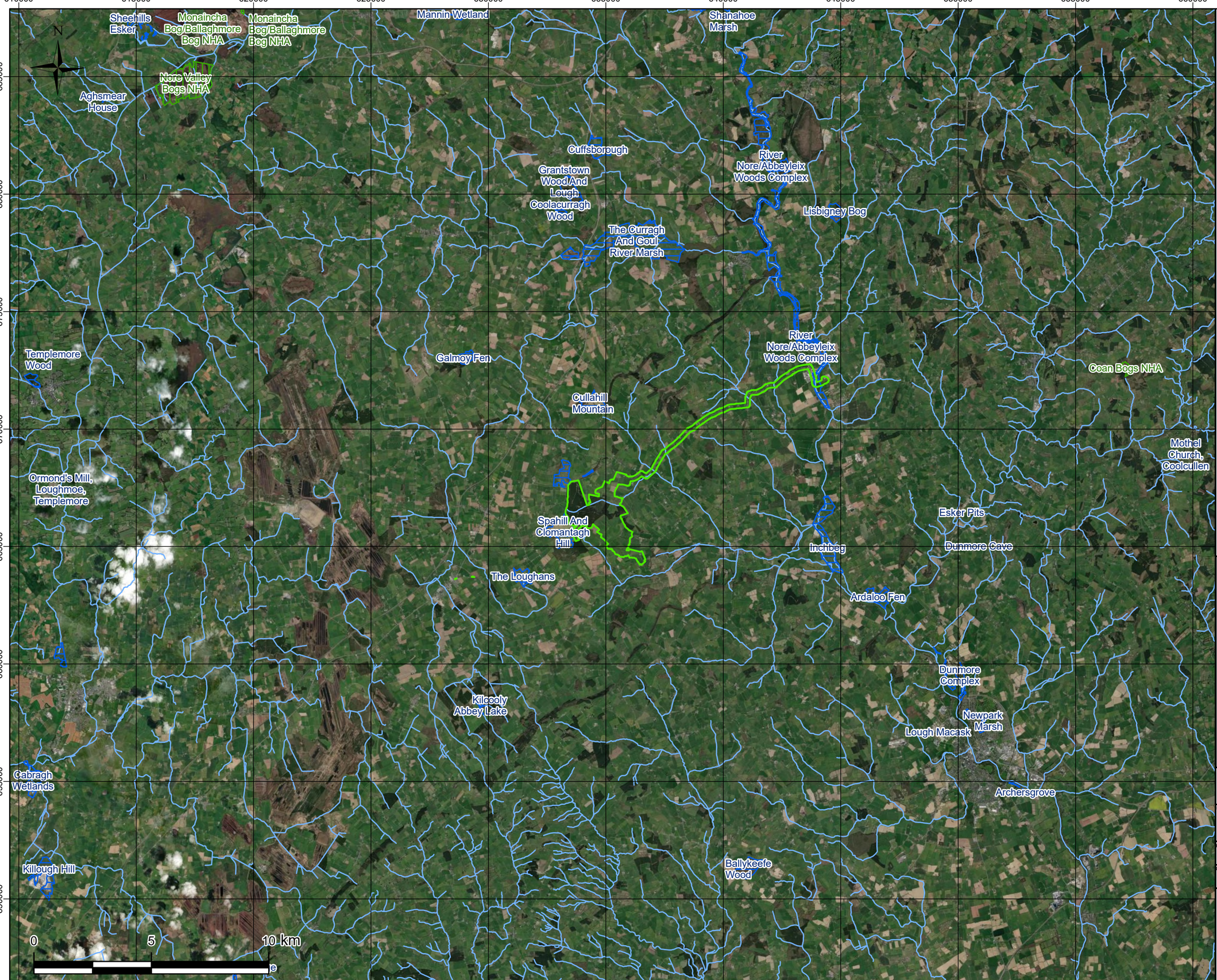
SITE LOCATION - NOT TO SCALE

Drawing Title: European Designated Sites in the vicinity of the Proposed Project

Project Title: Killoshulan Wind Farm, Co. Kilkenny

Project No.	Drawing No.	Scale
260172	6-1	1:150,000
Drawn By	**Checked By**	**Date**
AMcL	DM	28/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

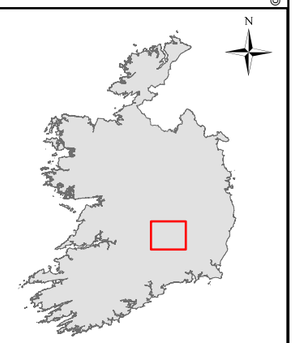


Map Legend

- EIAR Site Boundary
- Proposed Natural Heritage Areas
- Natural Heritage Areas
- WFD Rivers

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

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SITE LOCATION - NOT TO SCALE

Drawing Title: Nationally Designated Sites in the vicinity of the Proposed Project

Project Title: Killoshulan Wind Farm, Co. Kilkenny

Project No.	Drawing No.	Scale
260172	6-2	1:150,000
Drawn By	Checked By	Date
AMcL	DM	28/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

Table 6-5 Identification of Nationally designated sites within the Likely ZoI

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
Natural Heritage Areas (NHA)		
No Natural Heritage areas were identified to be within the Likely zone of Interest of the Proposed Project		
Proposed Natural Heritage Area (pNHA)		
Spahill And Clomantagh Hill pNHA [000849] **Approx. Distance:** Adjacent to site. **Hydrological Distance:** No connectivity	No NPWS site synopsis available. Overlaps with Spahill and Clomantagh Hill SAC which is designated for: › Semi-natural dry grasslands and scrubland facies on calcareous substrates	While the Proposed Project is located adjacent to this designated site, no works are proposed to take place within the pNHA boundary or within any Annex I grassland habitat. Therefore, there is no potential for the Proposed Project to have direct effects on the pNHA. The potential for indirect effects was also considered. However, given that this site is proposed to be designated for dry grassland habitats, and the Proposed Project has been designed to avoid important grassland habitats, no pathway for significant indirect effects have been identified. No pathway for significant effect was identified, and the site is **not** within the Likely Zone of Influence. No further assessment required.
The Loughans pNHA [000407] **Approx. Distance:** 2.6 km **Hydrological Distance:** no connectivity	No NPWS site synopsis available. Overlaps with The Loughans SAC which is designated for: › Turloughs	There is no potential for direct effects as the Proposed Project is located entirely outside of the boundary of this designated site. The potential for indirect effects was also considered. As detailed in Section 9.3.14 of Chapter 9, there is no surface water or groundwater connectivity between the Proposed Wind Farm site or the Proposed Grid Connection and this SAC. While there will be accommodation works associated with the proposed TDR approx. 110m from this pNHA, these works are minor, short term and require no excavations. Given the absence of surface water or groundwater connectivity between the Proposed Project and this pNHA, no potential for significant indirect effects have been identified. No pathway for significant effect was identified, and the site is **not** within the Likely Zone of Influence. No further assessment required.
Cullahill Mountain pNHA [000831]	No NPWS site synopsis available. Overlaps with	There is no potential for direct effects as the Proposed Project is located entirely outside of the boundary of this designated site.

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
Approx. Distance: 2.6 km **Hydrological Distance:** no connectivity	Cullahill Mountain SAC which is designated for: › Semi-natural dry grasslands and scrubland facies on calcareous substrates	The potential for indirect effects was also considered. However, given that this site is proposed to be designated for dry grassland habitats, and the Proposed Project has been designed to avoid important grassland habitats, no pathway for significant indirect effects have been identified. No pathway for significant effect was identified, and the site is **not** within the Likely Zone of Influence. No further assessment required.
River Nore/Abbeyleix Woods Complex pNHA [002076] **Approx. Distance: 0m** (overlapping grid connection) **Hydrological Distance: 0m** (overlapping grid connection)	No NPWS site synopsis available. Overlaps with the River Nore SPA and the River Barrow and River Nore SAC which are designated for: › Kingfisher › Aquatic receptors, riverine habitats and alluvial woodlands	There is potential for direct effects due to the Proposed 110kV Underground Cabling routecomponent of the Proposed Project overlapping with portions of this pNHA. The potential for indirect effects was also considered. The Proposed Project and the pNHA are hydrologically connected. This along with the aquatic nature of the pNHA results in a potential for indirect effects through water quality deterioration. **A pathway for effect on this pNHA was identified. The site is considered to be within the ZoI of the Proposed Project and is therefore considered further in this assessment.**
Inchbeg pNHA [000836] **Approx. Distance:** 7.3 km **Hydrological Distance:** ~11.5 km	No NPWS site synopsis available. Overlaps with the River Nore SPA and the River Barrow and River Nore SAC which are designated for: › Kingfisher › Aquatic receptors, riverine habitats and alluvial woodlands	There is no potential for direct effects as the Proposed Project is located entirely outside of the boundary of this designated site. The Proposed Project and the pNHA are hydrologically connected. This along with the aquatic nature of the pNHA results in a potential for indirect effects through water quality deterioration. **A pathway for effect on this pNHA was identified. The site is considered to be within the ZoI of the Proposed Project and is therefore considered further in this assessment.**
Galmoy Fen pNHA [001858] **Approx. Distance:** 6.7 km **Hydrological Distance:** No connectivity	No NPWS site synopsis available. Overlaps with The Galmoy Fen SAC which is designated for: › Alkaline fens	There is no potential for direct effects as the Proposed Project is located entirely outside of the boundary of this designated site. The potential for indirect effects was also considered. The Proposed Project and this pNHA are not hydrologically connected and are located in the separate ground water catchments (Shanahoe and Lisdowney). Given the lack of hydrological or hydrogeological connectivity and intervening

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		distance, no pathway for significant effect on this pNHA was identified. There is no potential for significant effects and this pNHA is **not** located within the Likely Zone of Influence. No further assessment required.
Kilcooly Abbey Lake pNHA [000958] **Approx. Distance**: 8.4 km **Hydrological Distance**: No	› Lake habitat › Otter (Lutra lutra) › Mallard *(Anas platyrhynchos)* › Coot *(Fulica atra)* › Heron *(Ardea cinerea)* › Lesser Bulrush *(Typha angustifolia)*	There is no potential for direct effects as the Proposed Project is located entirely outside of the boundary of this designated site. The potential for indirect effects was also considered. The Proposed Project and the pNHA are not hydrologically connected and are located in separate river sub basins (Ardreagh_010 And Nuenna_010). Given the lack of hydrological connectivity and intervening distance, no pathway for significant effect on this pNHA was identified. There is no potential for significant effects and this pNHA is **not** located within the Likely Zone of Influence. No further assessment required.
Ardaloo Fen pNHA [000821] **Approx. Distance:** 9.5 km **Hydrological Distance:** 14.3	No NPWS site synopsis available. Overlaps with River Barrow and River Nore SAC which is designated for: › Aquatic receptors, riverine habitats and alluvial woodlands	There is no potential for direct effects as the Proposed Project is located entirely outside of the boundary of this designated site. The potential for indirect effects was also considered. The Proposed Project and the pNHA are hydrologically connected. This along with the aquatic nature of the pNHA results in a potential for indirect effects on aquatic receptors through the deterioration of water quality as a result of the Proposed Project. **A pathway for effect on this pNHA was identified. The site is considered to be within the ZoI of the Proposed Project and is therefore considered further in this assessment.**

6.3.3 NPWS Article 17 Reporting

A review of available NPWS datasets for habitats of conservation value was carried out as part of this assessment (reviewed 14/05/2026).

In a search of the NPWS Article 17 datasets, Annex I habitats were identified to be adjacent to the EIAR Site Boundary. These include:

- European dry heaths (4030)
- Orchid rich calcareous grasslands (6210)

No other Annex I habitats, nor habitat of conservation value, were identified to be within or directly adjacent to the EIAR Site Boundary.

The location of these habitats is shown in Figure 6-3.

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665000

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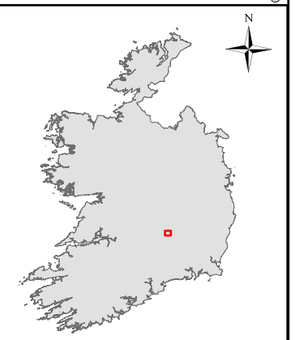
0 1 2 km

Map Legend

- EIAR Site Boundary
- Orchid rich calcareous grasslands
- European dry heaths

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

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SITE LOCATION - NOT TO SCALE

Drawing Title
Article 17 reporting habitats surrounding the Proposed Project site

Project Title
Killoshulan Wind Farm, Co. Kilkenny

Project No.	Drawing No.	Scale
260172	6-3	1:25,000
Drawn By	Checked By	Date
AMcL	DM	28/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

6.3.4 New Flora Atlas

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, The Irish Red Data Book – 1 Vascular Plants (Curtis, 1988) or the Flora (Protection) Order 2022 had been recorded in the relevant 10km square in which the EIAR Site Boundary is situated (S36). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are provided in Table 6-6.

Table 6-6: Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad S36.

Common Name	Scientific Name	Status
Frog Orchid	*Coeloglossum viride*	NT
Green-winged Orchid	*Orchis morio*	VU

Near Threatened (NT), Vulnerable (VU), Critically Endangered (CR), Regionally Extinct (RE), FPO (Flora Protection Order)

6.3.5 Bryophytes

The desktop search (NPWS bryophyte mapper) indicated that no protected bryophytes have been recorded within or adjacent to the EIAR Site Boundary.

6.3.6 Bats Records

The National Biodiversity Data Centre online database was searched for bat records within the relevant 10km grid squares (S36). The 10km search radius follows established best-practice guidance for wind farm bat assessments (NatureScot, 2021; BCI, 2026) (last search 24th February 2026). The results of the database search are provided in Table 6-7.

Full details of the desktop study in relation to bats are detailed in the Bat Survey Report, **Appendix 6-2**, which provides further records from Bat Conservation Ireland (BCI) and the Lesser Horseshoe Bat Database. The Site is located outside current known range for Lesser Horseshoe Bat's and no records were recorded within 10 km of the Proposed Project.

Table 6-7 NBDC Bat Records within 10 km of the Site.

Species	Database	Designation
Common pipistrelle (*Pipistrellus pipistrellus*)	National Bat Database of Ireland	HD Annex IV, WA
Soprano pipistrelle (*Pipistrellus pygmaeus*)	National Bat Database of Ireland	HD Annex IV, WA
Daubenton's bat *(Myotis daubentonii)*	National Bat Database of Ireland	HD Annex IV, WA
Natterer's bat *(Myotis nattereri)*	National Bat Database of Ireland	HD Annex IV, WA
Brown long-eared bat (*Plecotus auritus*)	National Bat Database of Ireland	HD Annex IV, WA
Leisler's bat (*Nyctalus leisleri*)	National Bat Database of Ireland	HD Annex IV, WA

6.3.7 Biodiversity Ireland Database

The National Biodiversity Data Centre database was accessed on 30/06/2026 and the following information was obtained.

Table 6-8 lists all records of the protected faunal species (excluding birds) recorded within the hectads pertaining to the EIAR Site Boundary (S36). The database was also searched for records of Third Schedule and First Schedule non-native invasive species within this hectad. Table 6-9 lists the non-native invasive species recorded within the hectad.

Table 6-8 NBDC records for protected species and species of conservation interest (excl. birds) in hectad S36

Common name	Scientific name	Designation
Badger	*Meles meles*	WA
Brown Long-eared Bat	*Plecotus auritus*	Annex IV, WA
Common Pipistrelle	*Pipistrellus pipistrellus sensu stricto*	Annex IV, WA
Fallow Deer	*Dama dama*	WA
Hedgehog	*Erinaceus europaeus*	WA
Irish Hare	*Lepus timidus subsp. hibernicus*	Annex V, WA
Irish Stoat	*Mustela erminea subsp. hibernica*	WA
Leisler's Bat	*Nyctalus leisleri*	Annex IV, WA
Natterer's Bat	*Myotis nattereri*	Annex IV, WA
Otter	*Lutra lutra*	Annex II, IV, WA
Pine Marten	*Martes martes*	Annex V, WA
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Annex IV, WA
Red Deer	*Cervus elaphus*	WA
Red Squirrel	*Sciurus vulgaris*	WA
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Annex I – Of EU Birds Directive, WA – Irish Wildlife Acts (1976 as amended)

Table 6-9 NBDC records for invasive species (hectad S36)

Common Name	Scientific Name
Japanese knotweed	*Reynoutria japonica*
Giant hogweed	*Heracleum mantegazzianum*
Fallow deer	*Dama dama*
Grey squirrel	*Sciurus carolinensis*

6.3.8 NPWS Protected Species Records

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad S36. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 12th of May 2026. A response was received on the 15th May 2026. Table 6-10 lists rare and protected species records obtained from NPWS.

Table 6-10 NPWS records for rare and protected species

Common name	Scientific name	Designation
Common Frog	*Rana temporaria*	Wildlife Act
Eurasian Badger	*Meles meles*	Wildlife Act
Eurasian Otter	*Lutra lutra*	Wildlife Act, Annex II, Annex V
Eurasian Red Squirrel	*Sciurus vulgaris*	Wildlife Act
Fallow Deer	*Dama dama*	Wildlife Act
Green-winged Orchid	*Orchis morio*	Wildlife Act, Annex II, Annex V
Irish Hare	*Lepus timidus subsp. hibernicus*	Wildlife Act

FPO = Flora Protection Order; VU = Vulnerable, NT=Near Threatened, WA = Wildlife Act

6.3.9 Freshwater Pearl Mussel (Margaritifera margaritifera)

On review of publicly available NPWS datasets, the Proposed Project is partially located within Nore Upper *Margaritifera* catchments, which is classified as 'Catchments of SAC populations of

Margaritifera'. The majority of the Proposed Project is located within the Nore Middle *Margaritifera* catchments, which is classified as 'Catchments of other extant populations' i.e. populations of FWPM are present in this catchment but are not a QI of any SAC.

6.3.10 Conclusions of the Desk Study

The desk study revealed that the site of the Proposed Wind Farm is located within an area that is dominated by upland forestry and intensive agricultural habitats. The Proposed Project has hydrological connectivity to several pNHAs. These National Sites have been considered within the likely Zone of Influence and for which further consideration is therefore required, and include the following:

- River Nore/Abbeyleix Woods Complex pNHA [002076]
- Inchbeg pNHA [000836]
- Ardaloo Fen pNHA [000821]

In addition, as per the NIS which accompanies this application, the Proposed Project has surface water connectivity with the following downstream European Sites:

- River Barrow and River Nore SAC (002162)
- River Nore SPA (004233)

These sites are further considered in the Natura Impact Statement (NIS) prepared for the Proposed Project.

The Proposed Wind Farm is located within two freshwater pearl mussel catchments, the Nore Upper catchment (Catchments of SAC populations of *Margaritifera*) and the Nore Middle catchment (Catchments of other extant populations). The Proposed 110kV Underground Cabling routeis located within the Catchments of other extant populations catchment.

A number of rare and protected habitats, flora and fauna have been recorded from the hectads in which the Proposed Wind Farm site is located. The field surveys were thus designed to identify habitats, flora and fauna, or additional ecological receptors occurring within the Site.

6.4 Baseline Ecological Survey Results

6.4.1 Description of Habitats and Flora

Detailed botanical data from relevés recorded at turbine base locations across the EIAR Site Boundary are provided in **Appendix 6-1** of this EIAR. A total of 14 habitats were recorded within the site which are listed in Table 6-11 below. A habitat map of the Proposed Project is presented in Figure 6-4, with a habitat map with the proposed layout overlain in Figure 6-5. The habitats recorded during the site visit are described in the sections below.

Table 6-11 Habitats recorded within the site.

Habitat Name	Fossitt Code
Conifer plantation	WD4
Improved agricultural grassland	GA1
Buildings and artificial surfaces	BL3
Wet grassland	GS4
Scrub	WS1
Hedgerows	WL1
Treelines	WL2
Stone walls and other stonework	BL1
Recolonising bare ground	ED3
Spoil and Bare Ground	ED2
Drainage ditches	FW4
Eroding/ upland rivers	FW1
Exposed calcareous rock	ER2
Dry calcareous and neutral grassland	GS1

Further, more detailed habitat mapping is provided in **Appendix 6-5.**

6.4.1.1 Habitats within the Proposed Wind Farm site

This section describes the habitats recorded within the Proposed Wind Farm site with associated Plates representative of the main habitats present. The majority of the site is located in an area dominated by commercial forestry and agriculture.

Improved agricultural grassland (GA1)

Improved agricultural grassland (GA1) represents one of the principal habitats recorded within the Proposed Wind Farm site and occurs around several turbine locations, associated access roads, and a site compound. Several fields within the Proposed Wind Farm site were classified as Improved agricultural grassland (GA1) (Plate 6-1 & Plate 6-2). This habitat was predominantly located within the southern and north-eastern portions of the Site.

The sward was dominated by perennial rye-grass (*Lolium perenne*), with frequent occurrences of Yorkshire fog (*Holcus lanatus*), sweet vernal-grass (*Anthoxanthum odoratum*), creeping bent (*Agrostis stolonifera*), red fescue (*Festuca rubra*), annual meadow-grass (*Poa annua*), cocksfoot (*Dactylis glomerata*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), dandelion (*Taraxacum officinale* agg.), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), broad-leaved dock (*Rumex obtusifolius*) and spear thistle (*Cirsium vulgare*).

These grasslands are subject to ongoing agricultural management and are used for both silage production and livestock grazing. Turbines 1, 2, 3, 4 and 9, together with their associated infrastructure,

as well as the Proposed 110kV Substation and construction compounds, are proposed to be located within areas of Improved agricultural grassland (GA1).

Given the modified nature and associated low biodiversity value of these habitats, they have been assigned Local Importance (lower value) only. The Proposed Project has been designed to utilise this habitat where possible, to reduce loss of higher value habitats within the Site.



Plate 6-1 Example of Improved agricultural grassland (GA1) with the Proposed Wind Farm site.



Plate 6-2 Example of Improved agricultural grassland (GA1) adjacent to Turbine 9 in the north of the Proposed Wind Farm site.

Wet Grassland (GS4)

Small areas of Wet grassland (GS4) were recorded both within and adjacent to fields of Improved agricultural grassland (GA1) (Plate 6-3). The habitat was generally dominated by rushes, particularly soft rush (*Juncus effusus*), jointed rush (*Juncus articulatus*) and floating sweet-grass (*Glyceria fluitans*). Yorkshire fog (*Holcus lanatus*), common bent (*Agrostis capillaris*), cuckooflower (*Cardamine pratensis*) and creeping buttercup (*Ranunculus repens*) were also abundant. Other herbaceous and grass species recorded frequently included meadow buttercup (*Ranunculus acris*), common sorrel (*Rumex acetosa*) and red fescue (*Festuca rubra*).

A relevé was undertaken in the Wet grassland (GS4) and analysed in accordance with the Irish Vegetation Classification (IVC) system. The Engine for Relevés to Irish Communities Assignment (ERICA) classified the surveyed area as the GL2B *Juncus effusus–Holcus lanatus* community. In accordance with the IVC classification, this community is not considered to exhibit an affinity with any Annex I habitat.

Although this habitat exhibited a moderate degree of botanical diversity, both the habitat and the constituent species are common and widespread within the local landscape. Accordingly, Wet grassland (GS4) has been assessed as being of Local Importance (Lower Value).



Plate 6-3 Wet grassland (GS4) habitat in the southeast area of the EIAR Site Boundary.

Conifer plantation (WD4)

Conifer plantation (WD4) (Plate 6-4 and Plate 6-5) was the dominant habitat across several parts of the Proposed Wind Farm site. It occurs throughout the central and north western portions of the site. These forestry blocks were predominantly dominated by Sitka spruce (*Picea sitchensis*), with occasional Japanese larch (*Larix kaempferi*) recorded along plantation boundaries. The ground flora was generally sparse beneath the closed canopy and comprised predominantly bryophytes, including *Sphagnum* spp., together with occasional tamarisk moss (*Thuidium tamariscinum*), common sorrel (*Rumex acetosa*), meadow-grass (*Poa* spp.), bramble (*Rubus fruticosus* agg.), common nettle (*Urtica dioica*), elder (*Sambucus nigra*), Yorkshire fog (*Holcus lanatus*), bracken (*Pteridium aquilinum*), foxglove (*Digitalis purpurea*), creeping buttercup (*Ranunculus repens*), soft rush (*Juncus effusus*) and horsetail (*Equisetum* spp.).

Mature and sapling willow (*Salix* spp.) were frequently recorded along the boundaries of the conifer stands, while mature ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) were also present. Moderate cover of ivy (*Hedera helix*) occurred on the trunks of mature broadleaved trees.

Given the modified nature and associated low biodiversity value of these habitats, they have been assigned Local Importance (lower value) only. The Proposed Wind Farm site has been designed to utilise this habitat where possible, to reduce loss of higher value habitats within the Site. Turbines 4, 5, 6, 7, 8 and 10 are proposed to be located within this habitat type.



Plate 6-4 Example of Conifer plantation (WD4) habitat, dominant in Picea species, in the south of the Proposed Wind Farm site.



Plate 6-5 Example of Conifer plantation (WD4) habitat within which Turbine 4 is proposed.

Scrub (WS1)

Several areas of Scrub (WS1) (Plate 6-6) were recorded within the Proposed Wind Farm site, including an area located southeast of the proposed Turbine 4 location and within the proposed enhancement lands adjacent to the Spahill and Clomantagh Hill SAC (000849). The scrub habitat was predominantly dominated by hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*), with frequent occurrences of hazel (*Corylus avellana*), willow (*Salix* spp.), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.). Scrub (WS1) recorded within the proposed enhancement areas was encroaching into open grasslands and was dominated by gorse.

The ground flora was characterised by abundant common nettle (*Urtica dioica*), while creeping buttercup (*Ranunculus repens*) occurred frequently throughout the habitat. Other species recorded included herb-robert (*Geranium robertianum*), vetch (*Vicia* spp.) and dog-violet (*Viola* spp.).

Although this habitat provides foraging, nesting and shelter opportunities for a range of fauna, the vegetation composition is typical of scrub habitats within the local area and is common and widespread throughout the wider landscape. Accordingly, Scrub (WS1) has been assessed as being of Local Importance (Lower Value).



Plate 6-6 Example of Scrub (WS1) habitat showing vegetation of bramble, willow. and gorse, establishing east of the Proposed Wind Farm site.

Hedgerows (WL1)

An extensive network of Hedgerows (WL1) (Plate 6-7) occurs throughout the Proposed Wind Farm site, forming field boundaries around agricultural grasslands and bordering existing access roads. These Hedgerows (WL1) were predominantly dominated by hawthorn (*Crataegus monogyna*), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.). Other species frequently recorded within the hedgerows included blackthorn (*Prunus spinosa*), ash (*Fraxinus excelsior*) and holly (*Ilex aquifolium*).

Hedgerows (WL1) provide important linear habitat features within the site, supporting botanical diversity and maintaining ecological connectivity between habitats of higher ecological value. They also provide valuable foraging, commuting and nesting habitat for a range of protected faunal species,

including birds, bats and small mammals. Accordingly, this habitat has been assessed as being of Local Importance (higher value).

Hedgerow appraisals were undertaken throughout the site, the results of which are presented in **Appendix 6-1**.



Plate 6-7 Examples of Hedgerows (WL1) throughout Proposed Wind Farm site.

Treelines (WL2)

Linear boundary features exceeding 5 m in height and comprising semi-mature to mature trees were classified as Treelines (WL2). Treeline habitat within the Proposed Wind Farm site (Plate 6-8) was predominantly composed of mature oak (*Quercus robur*) and hawthorn (*Crataegus monogyna*), with occasional sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*). An understorey of common shrub species, including hawthorn (*Crataegus monogyna*), ivy (*Hedera helix*) and bramble (*Rubus fruticosus* agg.), was occasionally present, particularly where the treelines were not directly adjacent to commercial conifer plantations.

Treelines (WL2) represent important ecological features within the site, providing structural connectivity between habitats and functioning as valuable ecological corridors for a range of protected faunal species. In addition to supporting botanical diversity, these features offer suitable nesting, foraging and commuting habitat for birds, bats and small mammals. Accordingly, this habitat has been assessed as being of Local Importance (Higher Value).



Plate 6-8 Conifer Treeline (WL2) along a field boundary separating agricultural grasslands, located in the southwestern portion of the Proposed Wind Farm site and within a proposed borrow pit location.

Stone walls and other stone works (BL1)

A small number of abandoned stone buildings categorised as Stone wall and other stone works (BL1) were recorded within the Conifer plantation (WD4) in the vicinity of the proposed Turbine 7 location. An example of such habitat is provided in Plate 6-9. Although these structures are no longer in use, they provide limited potential roosting, nesting and refuge opportunities for protected fauna, including bats and breeding birds, as well as shelter for small mammals. However, the buildings were largely open, exposed to light and weather, and exhibited a poor level of structural integrity, thereby reducing their suitability for use by protected species. Consequently, these features are considered to be of Local Importance (lower value).



Plate 6-9 Example of Stone wall and other stone works (BL1) in the vicinity of Turbine 8.

Buildings and artificial surfaces (BL3)

In the southern section of the Proposed Wind Farm site, several buildings were recorded, comprising residential houses and farm sheds. These were classified as Buildings and artificial surfaces (BL3). Given the low biodiversity of built structures, and the frequency of such buildings in the wider environment, this habitat was assessed as Local Importance (lower value).

Recolonising bare ground (ED3) and Spoil and Bare Ground (ED2)

Existing forestry roads within the Proposed Wind Farm site were typically classified as a mosaic of Recolonising bare ground (ED3) and Spoil and Bare Ground (ED2) (Plate 6-10).

Vegetation colonising these areas comprised frequent bramble (*Rubus fruticosus* agg.), gorse (*Ulex europaeus*), grey willow (*Salix cinerea*), fireweed (*Chamaenerion angustifolium*), *Sphagnum* spp., common bent (*Agrostis capillaris*), marsh thistle (*Cirsium palustre*) and soft rush (*Juncus effusus*).

Occasional to rare species recorded within this habitat included coltsfoot (*Tussilago farfara*), false oat-grass (*Arrhenatherum elatius*), eyebright (*Euphrasia* spp.), oxeye daisy (*Leucanthemum vulgare*), clubmoss (*Lycopodium* spp.), perforate St John's-wort (*Hypericum perforatum*), common centaury (*Centaurium erythraea*) and common knapweed (*Centaurea nigra*). These species were typically confined to road verges and the margins of forestry tracks, particularly where the roads bordered conifer plantation.

Recolonising bare ground (ED3) is an early successional habitat that provides some ecological value by supporting pioneer plant communities. However, the habitat is common and widespread throughout the local and wider landscape and supports relatively low botanical diversity. Accordingly, it has been assessed as being of Local Importance (lower value).

Areas of Spoil and Bare Ground (ED2) were primarily associated with existing access tracks and forestry roads throughout the Proposed Wind Farm site (Plate 6-11). This habitat comprised compacted mineral substrates with exposed gravel, crushed stone and locally disturbed soils resulting from existing forestry and site access infrastructure.

Where colonisation had occurred, vegetation was restricted to scattered ruderal and pioneer species established along road verges and track margins, while the majority of the habitat remained unvegetated. Small patches of grasses and common herbaceous species occasionally extended onto the track edges from adjacent habitats; however, these did not form a continuous vegetation cover. Consequently, the habitat supported low botanical diversity and provided limited ecological value.

Given its highly disturbed nature, low species richness and widespread occurrence throughout the site, Spoil and Bare Ground (ED2) has been assessed as being of Local Importance (lower value).



Plate 6-10 Example of Recolonising bare ground (ED3) habitat within the Proposed Wind Farm site.



Plate 6-11 Example of Spoil and bare ground (ED2) habitat within the Proposed Wind Farm site.

Drainage Ditches (FW4)

A number of manmade ditches/drains were recorded across the Proposed Wind Farm site. These drains were associated with areas of coniferous forestry and along sections of the existing forestry access roads (see Plate 6-10). Most were deep and narrow (30-40cm wide) and devoid of any significant aquatic vegetation. Pondweed (*Potamogeton spp.*) was recorded on occasion. Overall, these drains were considered to be of relatively low ecological value given their narrow, deep, shaded nature and lack of aquatic vegetation. However, these habitats do have potential to support wetland species such as amphibians and therefore, this habitat is assessed as Local Importance (higher value)



Plate 6-10. Example of typical drain recorded throughout the Proposed Wind Farm site (within areas of forestry)

Eroding/ upland rivers (FW1)

The Foyle River (EPA code: 15F07) originates within the western section of the Proposed Wind Farm site and flows in an easterly direction (Plate 6-11). This watercourse flows through areas of Conifer plantation (WD4) and agricultural grasslands and is characteristic of a typical upland stream, comprising sections of glides, riffles and pools. The stream was typically approximately 0.8 m in width and up to 1 m in depth, with a cobble and gravel substrate and moderate flow conditions.

Riparian vegetation along the riverbanks included willow (*Salix* spp.), hazel (*Corylus avellana*), gorse (*Ulex europaeus*), hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), blackthorn (*Prunus spinosa*) and bramble (*Rubus fruticosus* agg.). The watercourse is culverted beneath the existing access road leading to the proposed location of Turbine 9.

All watercourses recorded within the Proposed Wind Farm site have downstream hydrological connectivity to the River Barrow and River Nore SAC and provide important foraging and commuting corridors for protected fauna, including mammals, birds and bats. Accordingly, Eroding/Upland Rivers (FW1) have been assessed as being of Local Importance (higher value), with the exception of the River Nore, which has been assessed as International Importance, as it is a designated SAC and SPA.



Plate 6-12 Example of the River Foyle, an Eroding/ upland river (FW1) habitat within the Proposed Wind Farm site.

Exposed Calcareous Rock (ER2) and Dry calcareous and neutral grassland (GS1)

A mosaic of Exposed Calcareous Rock (ER2) and Dry calcareous and neutral grassland (GS1), as classified in accordance with Fossitt (2000), was recorded southeast of the proposed location of Turbine 4. The habitat comprises exposed limestone pavement interspersed with shallow, free-draining calcareous soils supporting species-rich calcareous grassland (Plate 6-13 and Plate 6-14). The exposed limestone presented with typically glint and grike formation, with grikes filled with vegetated shallow soils. Clints were typically exposed with very shallow soils recorded on the surface in places only.

The intimate mosaic of exposed bedrock, thin calcareous soils and scattered scrub creates a structurally diverse habitat with considerably greater botanical diversity than the surrounding Improved Agricultural Grassland (GA1).

Based on the botanical species composition recorded during the survey, as detailed in **Appendix 6-1**, the grassland component corresponds most closely to the GL3C *Festuca rubra–Plantago lanceolata* community under the Irish Vegetation Classification (IVC). This community is characteristic of species-rich calcareous grasslands occurring on limestone-derived substrates and is typified by a diverse assemblage of grasses, herbaceous species and bryophytes.

The vegetation is characterised by a diverse sward dominated by meadow buttercup (*Ranunculus acris*), sweet vernal-grass (*Anthoxanthum odoratum*) and Yorkshire fog (*Holcus lanatus*), with frequent occurrences of red fescue (*Festuca rubra*), common bent (*Agrostis capillaris*), sheep's fescue (*Festuca ovina*) and creeping bent (*Agrostis stolonifera*). The herb layer is well developed and includes common sorrel (*Rumex acetosa*), yarrow (*Achillea millefolium*), bird's-foot trefoil (*Lotus corniculatus*), mouse-ear hawkweed (*Pilosella officinarum*), white clover (*Trifolium repens*), lady's bedstraw (*Galium verum*), germander speedwell (*Veronica chamaedrys*) and creeping thyme (*Thymus polytrichus*), reflecting the calcareous and relatively nutrient-poor nature of the substrate. The bryophyte layer further enhances the habitat's botanical diversity and includes *Brachythecium rutabulum*, comb moss (*Ctenidium molluscum*) and spear moss (*Calliergonella cuspidata*).

The grassland occurs in a mosaic with exposed limestone pavement and scattered scrub dominated by hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus monogyna*), increasing structural diversity and providing a range of ecological niches. Occasional nutrient-demanding species, including creeping thistle (*Cirsium arvense*), broad-leaved dock (*Rumex obtusifolius*) and common nettle (*Urtica dioica*), were recorded in low abundance, indicating only minor localised nutrient enrichment.

The habitat mosaic exhibits an affinity with the Annex I Priority Habitat 8240 Limestone pavements, while the species-rich calcareous grassland component also exhibits characteristics consistent with Annex I Habitat 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*). However, this grassland does not conform to this Annex I grassland habitat as orchids and insufficient indicator species were recorded during the relevés (see **Appendix 6-1**) as per guidelines set out in Martin *et al.* (2018). Nonetheless, the exposed limestone pavement, calcareous grassland and scattered scrub form a high-quality calcareous habitat mosaic of significant botanical and ecological value. Accordingly, this habitat has been assessed as being of County Importance.



Plate 6-13 Example of Exposed Calcareous Rock (ER2) with Dry calcareous and neutral grassland (GS1) southeast of Turbine 4 within the Proposed Wind Farm site.



Plate 6-14 Further example of Exposed Calcareous Rock (ER2) with established hazel, blackthorn and hawthorn Scrub (WS1)

6.4.1.2 Habitats and Flora – Proposed Grid Connection

The Proposed 110kV Underground Cabling route between the Proposed Wind Farm and the national electricity grid will be necessary to export electricity from the Proposed Wind Farm. It is proposed to connect the Proposed Wind Farm development to the national electricity grid via a 110kV underground electrical cabling connection to the existing 110kV Ballyragget substation in the townland of Moatpark. The underground electrical cabling route measures approximately 12.6km along the public road network, farm tracks and agricultural lands.

The Proposed 110kV Underground Cabling route will predominantly follow existing roads classified as Buildings and artificial surfaces (BL3) (Plate 6-15). The Proposed 110kV Underground Cabling route will also cross fields classified as Improved agricultural grassland (GA1) on occasion (Plate 6-16). These habitats have been assessed as Local Importance (lower value) only, given their low ecological value.

Habitats recorded adjacent to the Proposed 110kV Underground Cabling routeincluded typical verge habitats such as Dry meadows and grassy verges (GS2), Hedgerows (WL1), Treelines (WL2), Improved agricultural grassland (GA1), Stonewalls and other stonework (BL1), Mixed broadleaved woodland (WD1) and Buildings and artificial surfaces (BL3).

The Proposed 110kV Underground Cabling route includes 5 no. EPA mapped watercourse crossing sites located across one hydrological catchment and three hydrological sub-catchments. These comprised Eroding/ upland rivers (FW1) (Plate 6-21). Smaller watercourses were typically highly vegetated banks, comprised of Scrub (WS1) and Treeline (WL2) species such as bramble, willow, sycamore, and alder.

The construction of the Proposed Grid Connection will require Horizontal Directional Drilling (HDD) under the River Nore, which is designated as the River Barrow and River Nore SAC and the River

Nore SPA, and as such has been assessed as International Importance. This will require the temporary construction of the launch and receptor pits either side of the river. The location of the western compound is proposed to be within the hard shoulder of the N77 national road (Plate 6-18), classified as Buildings and artificial surfaces (BL3). The location of eastern compound is located within an agricultural field assessed as Improved agricultural grassland (GA1) which was dominated by perennial ryegrass.

Full details on watercourses along the Proposed 110kV Underground Cabling route are provided in the Aquatic Baseline Report in **Appendix 6-3**.

The Proposed 110kV Substation (and BESS) is located within an area of improved grassland, best classified as Improved agricultural grassland (GA1). This was dominated by perennial rye-grass (*Lolium perenne*), with frequent occurrences of Yorkshire fog (*Holcus lanatus*), soft rush (*Juncus effusus*) and creeping buttercup (Ranunculus repens), with occasional cuckoo flower (*Cardamine pratensis*), mouse ear chickweed (*Cerastium fontanum*), and meadow buttercup (*Ranunculus acris*). Given the modified nature and associated low biodiversity value of this habitat, it has been assessed as Local Importance (lower value) only.



Plate 6-15 Existing roadway corridor classified as Buildings and Artificial surfaces (BL3) with Grassy verges (GS2) and Hedgerows (WL1).



Plate 6-16 Example of Improved agricultural grassland habitat (GA1) and Hedgerow (WL1) habitat along the Proposed Grid Connection underground cabling route.



Plate 6-17 Example of Eroding/ upland rivers (FW1) along the Proposed Grid Connection underground cabling route.



Plate 6-18 The N77 within which the western HDD compound will be constructed for HDD works beneath the River Nore.

6.4.1.3 Habitats and Flora along the proposed Turbine Delivery Route

It is envisaged that large wind turbine components will be delivered to the Proposed Wind Farm site, from the Port of Cork (Ringaskiddy) (other ports such as Galway Port, Shannon Foynes or Dublin Port could also be used), via the N28 and N40 national primary road, the M8 Motorway, R639 and R693 regional roads followed by the L1857 local road.

The current proposed Turbine Delivery Route (TDR) for the Proposed Wind Farm is predominantly located within existing public road infrastructure. The TDR will travel along the road network to the southeast of the EIAR Site Boundary and will require minor accommodation works at eight locations.

Where accommodation works are required along the proposed TDR, these points are delineated by similar habitat to that of the Proposed 110kV Underground Cabling route which predominantly contains ***Buildings and artificial surfaces (BL3), Dry meadows and grassy verges (GS2), Hedgerows (WL1), and Treelines (WL2),*** and bordered by agricultural grasslands and amenity grasslands. There were no watercourses recorded at any of the accommodation work areas.

Hedgerow habitat was dominated by bramble (*Rubus fruticosus agg*), and contained occasional occurrences of bracken, snowberry (*Symphoricarpos albus*), and willowherb (*Epilobium hirsutum*). Common species recorded within Treeline habitat included sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), oak (*Quercus robur*), birch (*Betula* sp.) and beech (*Fagus sylvatica*).

635000

665000

N

0 0.5 1 km

Map Legend

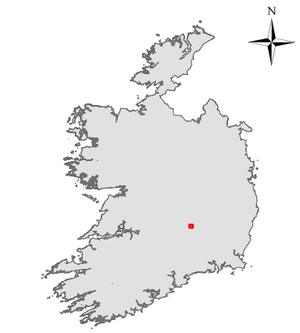
EIAR Site Boundary

Habitats within Proposed Wind Farm Site

- Buildings and artificial surfaces (BL3)
- Exposed calcareous rock (ER2)
- Improved agricultural grassland (GA1)
- Dry calcareous and neutral grassland (GS1)
- Wet grassland (GS4)
- Scrub (WS1)
- Immature woodland (WS2)
- (Mixed) conifer woodland (WD3)
- Conifer plantation (WD4)
- Arable crops (BC1)
- Mixed broadleaved woodland (WD1)
- Recently felled woodland (WS5)
- Hedgerows (WL1)
- Treelines (WL2)

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Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title
Habitat Map of the EIAR Site Boundary

Project Title
Killoshulan Wind Farm, Co. Kilkenny

Project No.	Drawing No.	Scale
260172	6-4	1:15,000
Drawn By	Checked By	Date
AMcL	DM	29/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

635000

665000

N

0 0.5 1 km

Map Legend

- EIAR Site Boundary
- Proposed Project Footprint

Habitats within Proposed Wind Farm Site

- Buildings and artificial surfaces (BL3)
- Exposed calcareous rock (ER2)
- Improved agricultural grassland (GA1)
- Dry calcareous and neutral grassland (GS1)
- Wet grassland (GS4)
- Scrub (WS1)
- Immature woodland (WS2)
- (Mixed) conifer woodland (WD3)
- Conifer plantation (WD4)
- Arable crops (BC1)
- Mixed broadleaved woodland (WD1)
- Recently felled woodland (WS5)
- Hedgerows (WL1)
- Treelines (WL2)

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Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

N

SITE LOCATION - NOT TO SCALE

Drawing Title
Habitat Map of the EIAR Site Boundary with Proposed Project footprint overlain

Project Title
Killoshulan Wind Farm, Co. Kilkenny

Project No.	Drawing No.	Scale
260172	6-5	1:15,000
Drawn By	Checked By	Date
AMcL	DM	29/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

6.4.1.4 Invasive species

No invasive species listed under the 'Third Schedule' of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) and/or the 'First Schedule' of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024) were recorded within the EIAR Site Boundary or along the Proposed 110kV Underground Cabling route.

6.4.2 Fauna in the Existing Environment

6.4.2.1 Non-volant mammals

Badger

Low levels of badger (*Meles meles*) activity were recorded within the site, with indications restricted to worn trails and latrines within forestry and some indications of foraging (snuffle holes). No badger setts were recorded within the site. However, given the nature of the habitats in the site, it is likely that this species occurs, at least on occasion, for foraging and commuting purposes.

Otter

No otter (*Lutra lutra*) breeding or resting sites, nor any indications such as spraint, were recorded within the Proposed Wind Farm site during the surveys undertaken. Only occasional indications, such as spraints, were recorded downstream of the Proposed Project, as discussed in Section 5.3 of the Aquatic Baseline Report in **Appendix 6-3**.

However, as the Proposed 110kV Underground Cabling routewill cross the River Barrow and River Nore SAC, which is designated for otter, it is assumed that this species utilises the River Nore, for breeding, foraging and commuting purposes.

Pine Marten

Mustelid scats were recorded within forestry close to the proposed location of Turbine 6. These can likely be attributed to pine marten (*Martes martes*), given their size, shape and location on top of fallen tree trunks.

Red squirrel

Evidence of red squirrel (*Sciurus vulgaris*) activity was recorded within the conifer plantation, particularly in the vicinity of the proposed location of Turbine 6 and to the south of the proposed location of Turbine 7 (Plate 6-19). Numerous feeding remains, comprising of stripped conifer cones, were recorded beneath mature conifer trees, indicating regular foraging activity within these areas. However, no dreys were recorded within the site.

The presence of feeding remains confirms that the conifer plantation is utilised by red squirrels for foraging and forms part of the species' wider habitat within the site. Although no breeding or resting sites were identified during the surveys, the habitat provides suitable foraging resources and connectivity for this protected species.



Plate 6-19 Feeding table recorded south of T7 and along the access road to T6 within Conifer plantation (WD4)

6.4.2.2 Other mammals

No other indications of protected mammals were recorded within the site. However, given the size and variety of habitats in the site, other mammals such as Pygmy Shrew (*Sorex minutus*), Hedgehog (*Erinaceus europaeus*) and Stoat (*Mustela erminea*) are also likely to be present, at least on occasion.

6.4.2.3 Marsh Fritillary

No evidence of marsh fritillary (*Euphydryas aurinia*) or suitable marsh fritillary habitat was recorded within the EIAR Site Boundary during the surveys undertaken. Furthermore, devil's-bit scabious (*Succisa pratensis*), the larval foodplant of marsh fritillary, was not recorded within the footprint of any proposed turbine location or associated infrastructure.

6.4.2.4 Bats

A dedicated bat survey and assessment report is provided in **Appendix 6-2** of this EIAR. The following provides a summary of the key findings.

Bat habitat appraisal

With regard to foraging and commuting bats, areas of Conifer plantation (WD4), Improved agricultural grassland (GA1), Building and artificial surfaces (BL3), Recolonised bare ground (ED3), Spoil and bare ground (ED2) and Exposed calcareous rock (ER2) habitats were considered *Low* suitability i.e. *Habitat that could be used by small numbers of bats as flightpaths such as a gappy hedgerow or unvegetated stream, but isolated* (Collins, 2023). Hedgerows (WL1), Treelines (WL2), Conifer plantation (WD4) edge habitat, Scrub (WS1), Stone walls (BL1), Eroding/upland rivers (FW1) and Drainage ditches (FW4) provide greater foraging and commuting opportunities, as such, these habitats were classified as *Moderate* suitability.

With regard to roosting bats, an assessment of the forestry habitats within the Proposed Wind Farm was undertaken. The site is dominated by Conifer plantation (WD4), primarily comprising Sitka spruce, with occasional Japanese larch and mature and sapling willow (*Salix spp.*) were frequently recorded along the boundaries of the conifer stands, while mature ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) were also present. Due to the relatively small stature and uniform structure of the plantation, the trees lack features typically associated with bat roosting, such as cavities, rot holes, lifted bark, splits or other suitable roosting opportunities. The dense, even-aged nature of the plantation further limits the development of trees with roosting potential. The willow, ash and sycamore present along the boundaries of the conifer stands did not offer suitable roosting features for bats. Consequently, the conifer forestry across the site was assessed as having *Negligible* suitability for roosting bats. Five structures were identified within the site and are discussed further below. All other habitats present were assigned *None* roosting value.

Roost Surveys

A search for roosts was undertaken within 200m plus the maximum rotor radius (i.e. 81.5 m) of each proposed turbine location (NatureScot, 2021). Five structures/building were identified within and in the vicinity of the Proposed Wind Farm during 2025.

Four of the structures identified were within the Proposed Wind Farm while the Round Tower was outside the EIAR Site Boundary. Bat roosts were identified within two of the structures, within the Farm Complex and within the Round Tower (K22C).

Of the five structures inspected, three were assessed as having *Negligible* bat roost potential and two were assessed as having *Moderate* bat roost potential. All surveyed structures will be retained and avoided as part of the Proposed Project. Further details of the structures are provided in **Appendix 6-2.**

Emergence Surveys

Following the daytime roost suitability assessments detailed in Section 4.3.2.1, dusk emergence surveys were carried out on the structures in May, July and August 2025. The results are summarised in Table 6-12 below.

Table 6-12 Emergence Survey Summary 2025

Date	Structure ID	Structure surveyed	Irish Grid Reference	Emergence survey findings
13th May 2025	K22A	Farm Complex	S 35658 65462	57 bats: 50 soprano pipistrelles from one stone shed, five soprano pipistrelles from a second stone shed and two common pipistrelles from the cattle shed.
1st July 2025	K22A	Farm Complex	S 35658 65462	39 bats: 37 soprano pipistrelles from the stone shed that supported 50 individuals in May, and two common pipistrelles from the cattle shed.
14th July 2025	K22C	Round Tower	S 36100 65075	Approximately 20 bats estimated, with repeated emergence and re-entry preventing a reliable individual count. Mixed-species use was indicated, with *Myotis* spp., soprano pipistrelle and common pipistrelle considered likely occupants. Brown long-eared bat was confirmed during the April daytime inspection.
26th August 2025	K22A	Farm Complex	S 35658 65462	Nine bats: four soprano pipistrelles from the stone shed, and four soprano pipistrelles and one Leisler's bat from the cattle shed.

Night-time bat walkover surveys

Bat activity was recorded on all surveys, with a total of 3,331 bat passes. Common pipistrelle (n=1,566) was the species recorded most frequently, followed by Soprano pipistrelle (n=844), *Myotis* spp. (n=562), Leisler's bat (n=339) and Brown long-eared bat (n=20). Further details are provided in **Appendix 6-2**.

Ground-level Static Surveys

In total, 293,884 bat passes were recorded across all deployments in 2025. In general, Common pipistrelle (n=225,460) was recorded much more frequently than all other species. The second and third most frequently recorded species were Soprano pipistrelle (n=40,278) and Leisler's bat (n=21,038), respectively. *Myotis* spp. (n=6,474) and Brown long-eared bat (n=634) were recorded significantly less frequently on site. Further details are provided in **Appendix 6-2**.

Please refer to the Bat Report in **Appendix 6-2** for full details on all bat survey results.

6.4.2.5 Reptiles and Amphibians

Common frog (*Rana temporaria*) and frog spawn were recorded at a number of locations throughout the site in areas of standing water such as drainage ditches. One occurrence was recorded on a stone wall in close proximity to the proposed location of Turbine 8. Whilst no smooth newts (*Lissotriton vulgaris*) or common lizard (*Zootoca vivipara*) were recorded, given the suitability of habitats (Drainage ditches (FW4), Stonewalls and other stonework (BL1), and grasslands) recorded during the surveys undertaken, these species are likely to occur within the site, at least on occasion.

6.4.2.6 Fisheries and Aquatic Fauna

The watercourses surveyed in the vicinity of the Proposed Project were typically small upland and lowland channels which had been historically straightened and or deepened. Whilst good instream recovery was evident across most modified survey sites, siltation and eutrophication pressures were considerable and had impacted aquatic habitats and resulted in a reduction of biological water quality.

Nearly half of the riverine survey sites were of low fisheries and aquatic value and were evaluated as local importance (lower value) given an absence of aquatic species or habitats of high conservation value. However, a range of high conservation value species were recorded during the surveys including Annex II Atlantic salmon, lamprey (*Lampetra* sp.), white-clawed crayfish and otter (indications only) in addition to Red-listed European eel, particularly up and downstream of the Proposed 110kV Underground Cabling route. Aquatic receptors recorded ranged from Local Importance (higher value) to International Importance.

No rare or protected macrophytes/aquatic bryophytes, rare or protected macro-invertebrates (except white-clawed crayfish), otter breeding/resting areas or aquatic invasive species were recorded during the aquatic surveys undertaken. Broadly speaking, the highest value watercourses in terms of aquatic ecology within vicinity of the Proposed Project were the River Goul, Gorteenahilla River, Nuenna River, River Erkina and River Nore.

Full details of results of aquatic surveys undertaken in 2025 are provided in the Aquatic Baseline Report (**Appendix 6-3**)

6.4.3 Identification of Key Ecological Receptors

Table 6-13 below summarises the ecological evaluation of all receptors as outlined in Section 6.2.4. It provides the rationale for the determination and identifies the habitats and fauna that are considered to be KERs and therefore those receptors that are subject to impact assessment and considered in Section 6.5 of this report. Following impact assessment, mitigation measures are incorporated into the Proposed Project, where required, to avoid potential significant impacts on these KERs.

Table 6-13 Identification of Key Ecological Receptors within the ZoI of the Proposed Project

Ecological feature or species	Reason for inclusion as a KER	KER
Designated Sites		
European Designated Sites International Importance	The EIAR Site Boundary is hydrologically linked to downstream European site, namely the: › River Barrow and River Nore SAC [002162] › River Nore SPA [004233] Potential for Likely Significant Effects (LSEs) on these European sites was identified within the AA screening for the Proposed Project. Potential impacts on these European sites are assessed fully in the NIS for the Proposed Project. In the context of this Biodiversity Chapter these sites have been assigned International Importance and included as a KER as there is potential for indirect effects on these European sites via water pollution and or disturbance.	Yes
Nationally Designated Sites National Importance	As per Section 6.2.1.1.1, the Proposed Project has hydrological connectivity to the following National sites: › River Nore/Abbeyleix Woods Complex pNHA [002076] › Inchbeg pNHA [000836] › Ardaloo Fen pNHA [000821] Therefore, following the precautionary principle, a potential pathway for indirect effects on these Nationally Important sites was identified via the deterioration of water quality, arising from the construction, operational and decommissioning phases of the Proposed Project. **Therefore, these Nationally important sites are considered KERs.**	Yes
Habitats (Terrestrial)		
Linear Habitats - Treelines (WL2), Hedgerows (WL1) Local importance (higher value)	Hedgerows, treelines, stone walls have, together, been assessed as being of Local importance (higher value) as these linear habitats provide connectivity to the wider landscape and provide supporting habitat for a wide variety of faunal species. In order to facilitate construction of the Proposed Project there will be loss of hedgerow (often associated with stone walls within the site) and treeline habitat within the EIAR Site Boundary. For this reason, these habitats have been identified for further assessment as a KER.	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
Scrub (WS1) Local importance (lower value)	This habitat is classified as of Local Importance (lower value). Despite containing small areas of semi-natural habitat that are of some local importance for wildlife, these are common and widespread in the local and wider landscape. Areas of scrub (WS1) are located completely outside of the Proposed Project infrastructure and are therefore not considered further as a KER.	No
Improved agricultural grassland (GA1)/Wet grassland (GS4) Local importance (lower value)	Much of the Proposed Wind Farm infrastructure is located within Improved agricultural grassland (GA1). These are highly modified habitats, common throughout the wider landscape and of relatively low biodiversity value. These habitats have been classified as Local Importance (Lower Value). For these reasons, these habitats have not been identified as a KERs.	No
Conifer plantation (WD4) Local importance (lower value)	This habitat is classified as of Local Importance (lower value). Despite containing some local importance for wildlife, it is common and widespread in the local and wider landscape. Whilst there will be some loss of some of this habitat to facilitate the Proposed Project, this habitat is not included as a KER, given its limited ecological value.	No
Buildings and artificial surfaces (BL3) and Stoen walls and other stonework (BL1) Local importance (lower value)	These habitat types are largely associated with artificial site access tracks throughout the EIAR Site Boundary and along the Proposed 110kV Underground Cabling route, it has little biodiversity value. For these reasons, this habitat has not been identified as a KER.	No
Recolonising bare ground (ED3) and Spoil and Bare Ground (ED2) Local importance (lower value)	This habitat type is largely associated with artificial site access tracks throughout the EIAR Site Boundary and within the Wind Farm Site, it has little biodiversity value. For these reasons, these habitats have not been identified as KERs	No
Exposed Calcareous Rock (ER2) and Dry calcareous and neutral grassland (GS1) County Importance	An area of Exposed Calcareous Rock (ER2) is located southeast of the proposed location of Turbine 5. The habitat comprises exposed limestone pavement interspersed with shallow calcareous soils supporting species-rich calcareous grassland. The exposed limestone pavement exhibits an affinity with the Annex I Priority Habitat Limestone pavements* [8240] under the Habitats Directive (92/43/EEC) while the associated dry grasslands has an affinity with 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*). Accordingly, owing to the high conservation significance and Priority Annex I status, these habitats have been assessed as being of County Importance. However, the Proposed Project has been designed to completely avoid this habitat and therefore, it is not considered further as a KER.	No
Aquatic habitats		

Ecological feature or species	Reason for inclusion as a KER	KER
Eroding/upland rivers (FW1) Local importance (lower value)	One watercourse is located within the EIAR Site Boundary. This river has been assigned Local importance (Higher Value) as it connects to downstream waterbodies, including the Gorteenahilla and Nuenna River which forms part of the River Barrow and River Nore SAC River, which is of International importance.	Yes
Drainage ditches (FW4) Local importance (lower value)	Drainage ditches are found throughout the EIAR Site Boundary along field boundaries and particularly throughout Conifer plantations. They are highly modified and species poor where they occur, but do provide some connectivity with natural watercourses within the EIAR Site Boundary. As such they are assessed as being local importance (lower value) but **are considered further as a KER due to potential for connectivity with higher value watercourses.**	Yes
Fauna		
Badger Local importance (higher value)	Badger as an ecological receptor has been assigned Local Importance (higher value) on the basis that the habitats within the EIAR Site Boundary are utilised by a locally occurring badger population of Local Importance. Given that the species is known to inhabit the area, potential for direct and indirect impacts on badger are therefore considered further in this assessment and the species **has been included as a KER for further assessment.**	Yes
Otter International Importance	While no signs of otter were recorded within the EIAR Site Boundary, signs of otter were identified in the wider study area including along the Dinin River which forms part of the River Barrow and River Nore SAC to which the Proposed Project is hydrologically linked. As otter are a QI of the SAC, this population is assigned International Importance and **as such they are considered as a KER.**	Yes
Pine marten Local importance (higher value)	The EIAR Site Boundary provides suitable foraging and breeding habitat for pine marten. Pine marten as an ecological receptor has been assigned Local Importance (Higher value) on the basis that a locally occurring population of Local Importance is likely utilising the site. Given that the species is known to inhabit the area, potential for direct and indirect impacts on pine marten are therefore considered further in this assessment and the species **has been included as a KER for further assessment.**	Yes
Red squirrel Local importance (higher value)	The EIAR Site Boundary provides suitable foraging and breeding habitat for red squirrel. Red squirrel as an ecological receptor has been assigned Local Importance (Higher value) on the basis that a locally occurring population of Local Importance is likely utilising the EIAR Site Boundary. Given that the species is known to inhabit the area, potential for direct and indirect impacts on red squirrel are therefore considered further in this assessment and the species **has been included as a KER for further assessment.**	Yes
Bats Local importance (higher value)	All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland, bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Act 1976 (as amended).	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	The following bat species were recorded within the Proposed Wind Farm site: › Common pipistrelle › Soprano pipistrelle › Leisler's bat › *Myotis* spp. › Brown long-eared bat The Proposed Wind Farm supports a regularly occurring bat assemblage comprising common pipistrelle, soprano pipistrelle, Leisler's bat, brown long-eared bat and Myotis spp. Activity was recorded along hedgerows, treelines, forestry edges and tracks, with spatial and seasonal variation. Common pipistrelle predominated overall, while Leisler's bat activity was greatest during spring. Three confirmed roosts were identified within the Farm Complex (K22A) in 2025, comprising two stone sheds and a cattle shed. The stone sheds supported soprano pipistrelles, with maximum emergence counts of 50 and five individuals respectively. The cattle shed supported two common pipistrelles during both spring and summer, and four soprano pipistrelles and one Leisler's bat during autumn. A common pipistrelle roost supporting three individuals was previously confirmed within K22A in 2022, demonstrating use of the complex in both survey years. At the Round Tower within K22C, outside the Proposed Wind Farm, four brown long-eared bats were confirmed roosting in April 2025. The July survey indicated mixed-species use by an estimated 20 bats, with Myotis spp., soprano pipistrelle and common pipistrelle considered likely additional occupants. Repeated emergence and re-entry prevented a reliable individual count. In 2022, four brown long-eared bats were recorded roosting in the adjacent K22C outbuildings, rather than the tower. A further common pipistrelle roost supporting two individuals was confirmed at the inhabited dwelling K22E, outside the Proposed Wind Farm near the TDR accommodation works, in 2022. Taking account of the regularly occurring bat assemblage, the confirmed and historical roosts, and the supporting commuting and foraging habitats, the bat population associated with the Proposed Wind Farm and its surroundings is assessed as being of Local Importance (Higher Value). Bats are therefore included as a Key Ecological Receptor in the assessment of potential effects of the Proposed Project. Given the nature of the Proposed Project, the potential for significant effects on bats, as a result of both the construction and operational phases of the development, requires consideration. **Therefore, bats are considered a KER for further assessment.**	

Ecological feature or species	Reason for inclusion as a KER	KER
Reptiles and amphibians Local importance (higher value)	It is considered that the Proposed Project will not result in a significant loss of suitable habitat for reptiles and amphibians. No evidence of populations of amphibians or lizards being significant at more than a local scale was recorded. However, as both reptiles and amphibians are likely to be within the Site, and taking a precautionary approach, there is potential for direct effects on these receptors as a result of disturbance or direct mortality, as a result of the construction phase of the Proposed Project, and they **have been included as KERs for further assessment.**	Yes
Other fauna Local Importance (*higher value*)	No additional species of conservation concern or protected under any Annexes of the EU Habitats Directive were recorded. Although other common species may occur within the site, at least on occasion, no potential for significant effect has been identified on any other faunal species associated with the site and other species are thus not included as KERs.	No
Aquatic and Fisheries Species		
Aquatic receptors (surface/ groundwater and associated aquatic faunal species, including, lamprey, aquatic invertebrates, European eel, salmonids, coarse fish, and other aquatic species **International importance**	The Proposed Project has downstream connectivity to National Sites and European Sites via several mapped watercourses and drainage ditches (FW4). Therefore, aquatic receptors have been assessed as Local Importance (*higher value*) to International Importance. No instream works are proposed and therefore, there is no potential for direct effects on any aquatic receptor. There is potential for impacts on surface and groundwater systems via the deterioration of water quality arising from runoff during the construction, operation and decommissioning phases of the Proposed Project. The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from a degradation of water quality. **Therefore, Aquatic receptors have been considered as KERs.**	Yes

6.5 Ecological Impact Assessment

6.5.1 Do-Nothing Effect

If the Proposed Project were not to proceed, no changes would be made to the current land-use practice of active conifer forestry and agriculture practices, and the site would continue to be managed under the existing arrangements. The biodiversity on the site would likely remain similar to its current state as activity levels and land use would not change significantly.

However, if the Proposed Project doesn't proceed, the opportunity to capture the available renewable energy resource within a highly suitable location 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.

Furthermore, as this application includes a Biodiversity Enhancement and Management Plan (BEMP) to be implemented during the development's operation, the opportunity to enhance the site for biodiversity, via a structured implementation and monitoring plan, at a local scale, would also be lost.

At a global scale, climate change has been proven to have negative impacts on biodiversity, either through reduced quality of habitat, displacement due to the changing baselines, and reduced or altered food sources. With Ireland's climate action plans in mind and the potential contribution of this Proposed Project in reducing dependency on fossil fuels, should it not proceed, this would contribute to the inhibition of the national targets in reducing greenhouse gas emissions in Ireland.

6.5.2 Likely Significant Effects During Construction Phase

6.5.2.1 Effects on Habitats During Construction

The Site is dominated by habitats considered to be of low ecological value. Such habitats include Conifer plantation (WD4) and Improved Agricultural grassland (GA1). These habitats have not been identified as KERs and although there will be loss of these habitats as a result of the Proposed Project, the loss is not considered to represent a significant effect at any geographic scale.

The loss, degradation or fragmentation of habitats that have been identified as Key Ecological Receptors to facilitate construction of the Proposed Project is described in the following sections.

6.5.2.1.1 *Assessment of Potential Effects on Treeline (WL2) and Hedgerow (WL1)*

Table 6-14 Assessment of Potential Effects on Treeline (WL2) and Hedgerow (WL1)

Description of Effect	The Proposed Project has been designed to minimise the loss of existing linear features within the Site, using existing forestry tracks and field entrances, where feasible. However, to facilitate the Proposed Project, there will be the requirement for the loss of linear features within the Site. These losses are primarily to facilitate the construction of road infrastructure, creating new field entrances. It is anticipated that the construction phase of the Proposed Wind Farm will require the loss of approximately 1.28 km of Hedgerow (WL1) habitat and approximately 59m of Treeline (WL2). Approximately 10.86 km of Hedgerow (WL1) and 2.87 km of Treeline (WL2) were recorded within the Proposed Wind Farm site. Therefore, the unmitigated combined loss of these linear features (1.34 km) would constitute 9.78% loss of these habitats within the Proposed Wind Farm site. These losses would constitute a permanent negative effect on these habitats, as they are within the footprint of the Proposed Project. Additionally, to facilitate the Proposed 110kV Underground Cabling route and the Turbine Delivery Route, there will be an additional loss/cutting back of approx. of 270m of Hedgerow (WL1) and 20m of Treelines (WL2). However, these losses would be temporary and will be reinstated or allowed to grow back post construction. To note, as per hedgerow appraisals undertaken and detailed in **Appendix 6-1**, the ecological value of all hedgerows proposed to be lost were of slight or low significance.

Assessment of Significance prior to mitigation	The total permanent loss of approximately 1.28 km of Hedgerow (WL1) habitat and approximately 59m of Treeline (WL2) within the Proposed Wind Farm site and the temporary loss of approximately 270m of Hedgerow (WL1) habitat and 20m of Treeline (WL2) along the Proposed 110kV Underground Cabling route and the Turbine Delivery Route is not considered to be a significant effect at any scale greater than local, as these habitats are widespread and common within the Site and in the wider environment. Removal of these habitats at this scale would not cause any significant fragmentation of habitat connectivity within the landscape. These losses are considered significant at the local geographic scale only.
Mitigation	As part of the Proposed Project, a Biodiversity Enhancement and Management Plan (BEMP) has been prepared and detailed in **Appendix 6-4**. The BEMP has been included in the planning application to ensure that the Proposed Project will result in a net gain in biodiversity, should it proceed. The BEMP provides for the following: › Management of 11.7 ha of species-rich grasslands. › Bolstering of approx. 3.4 km of existing Hedgerow (WL1) and Treeline (WL2) habitat › Planting of approx. 225m of existing Hedgerow (WL1) and Treeline (WL2) habitat These measures are first intended to mitigate to losses of habitats assessed as Local Importance (higher value) associated with the construction phase of the Proposed Project. The proposed bolstering and planting of Hedgerow (WL1) habitat will mitigate the permanent loss of 1.34 km of linear features within the Proposed Wind Farm site by improving the foraging, commuting and breeding corridor network for protected fauna utilizing the Site. Additionally, the proposed bolstering and planting of Hedgerow (WL1) habitat have been developed to ensure that the measures will result in an overall net gain in quality of linear features within the site. Furthermore, the provision of the grassland measures are intended as enhancement only, as there will be no loss of diverse grasslands to facilitate the Proposed Project. The implementation of the above measures, as detailed in the BEMP, will be undertaken prior to any proposed tree felling associated with the Proposed Project, to minimise any short-term losses and to ensure maximum time to establish. With the implementation of the above, the losses of linear habitats to facilitate the Proposed Wind Farm will be offset, and a net gain in such habitat will be achieved.
Residual Effect following Mitigation	Following implementation of mitigation, no potential for significant residual effect exists at any geographic scale. The planting of additional linear habitats as outlined above will result in a net gain of linear habitats within the EIAR Site Boundary.

6.5.2.1.2 *Assessment of Potential Effects on Rivers, Streams, wetlands and Sensitive Aquatic Faunal Species during construction*

Table 6-15 Potential for Impact on Rivers, Streams, wetlands and Sensitive Aquatic Faunal Species during construction.

Description of Effect	Chapter 9: Hydrology and hydrogeology of the EIAR assesses the potential for significant effects on water quality as a result of the following pathways during construction:

- Potential Effects on the Clomantagh/Killoshulan Group Water Scheme and Other Local Wells (Proposed Wind Farm)
- Clear Felling of Coniferous Plantation and Potential Surface Water Quality Effects (Proposed Wind Farm)
- Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters (Proposed Project)
- Potential Impacts on Groundwater Levels During Excavations (Proposed Project)
- Potential Impacts on Groundwater Levels During Excavations (Proposed Project)
- Potential Release of Hydrocarbons During Construction and Storage (Proposed Project)
- Groundwater and Surface Water Contamination from Wastewater Disposal (Proposed Project)
- Release of Cement-Based Products
- Morphological and Hydrological Effects due to New Watercourse Crossing Works (Proposed Wind Farm)
- Potential Hydrological Effects on Designated Sites (Proposed Project)
- Potential Effects on Local Groundwater Well Supplies from Excavations (Proposed Project)
- Potential Effects on Local Groundwater Well Supplies from Excavations (Proposed Project)
- Effects of Construction Works on the WFD Status of Downstream Waterbodies (Proposed Project)
- Use of Siltbuster and Impacts on Downstream Surface Water Quality (Proposed Project)
- Potential Surface Water Quality Effects of the Proposed Grid Connection Earthworks and Watercourse Crossings (Grid Connection)

The effects on water quality are fully described in Chapter 9: Hydrology and Hydrogeology and are described here in relation specifically to ecology. This section assesses the potential for significant effects on surface water/ groundwater and associated aquatic faunal species during construction, including, otter, lamprey, aquatic invertebrates, European eel, salmonids, coarse fish, otter, and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur within or downstream of the site.

Proposed Wind Farm - Direct impacts

Direct impacts on watercourses and associated aquatic receptors within the EIAR Site Boundary can occur during construction if works result in the disturbance of stream banks or substratum. This can arise via instream works, use of machinery within or in close proximity to stream or creating barriers to water flows and connectivity. Direct effects can also arise due to direct disturbance or mortality to species within watercourses, as a result of construction activity.

Within the Proposed Wind Farm, there is the requirement for the creation of 3 no. watercourse crossings along proposed access roads. However, there will be no instream works as part of the Proposed Project as clear span methods will be utilized at each crossing point and a self-imposed 50m buffer to all watercourses has been applied to the design of the Proposed Project, with the exception of existing road upgrades and proposed watercourse crossings. No sensitive aquatic receptors were recorded within any of the watercourses within the EIAR Site Boundary during the surveys. Watercourses within the Proposed Wind Farm were deemed to have low fisheries value. Therefore, there is no potential for significant direct impacts on any sensitive aquatic receptors associated with the Proposed Project.

Proposed Wind Farm - Indirect impacts (water quality)

A direct surface water pathway exists between the wind farm site to downgradient watercourses and wet wetlands. Within the wind farm site there are 2 no. mapped watercourses (the Foyle South Stream and the Clomantagh Lower Stream), and a number of forestry Drainage ditches (FW4) which flow into these watercourses. There is a risk that pollutants and sediment laden surface water run-off could discharge to surrounding ditches and watercourses impacting on sensitive watercourses and aquatic receptors downstream,

	including, otter, lamprey, aquatic invertebrates, European eel, salmonids, coarse fish, and other aquatic species. Potential sources of pollution to surface and ground waters within the EIAR Site Boundary and Proposed Enhancement Site include: › Slit laden surface water run-off; › Release of chemicals, including hydrocarbons, from onsite machinery, concrete and other cement-based products. › Drainage and seepage of water resulting from infrastructure excavations; › Stockpiled excavated material providing a point source of exposed sediment; › Erosion of sediment from emplaced site drainage channels. **Proposed Grid Connection Site - Direct impacts** Direct impacts on watercourses and associated aquatic receptors within the Proposed Grid Connection Site can occur during construction if works result in the disturbance of stream banks or substratum. This can arise via instream works, use of machinery within or in close proximity to stream or creating barriers to water flows and connectivity. Direct effects can also arise due to direct disturbance or mortality to species within watercourses, as a result of construction activity. The proposed 33kV underground cabling crosses 5 no. EPA mapped watercourse crossings, with 4 no. being existing bridges/culverts along public roads and the 5th a proposed HDD crossing below the River Nore near Ballyragget, as detailed in Chapter 9. The River Nore forms part of the River Barrow and River Nore SAC and the River Nore SPA. There are no in-stream works proposed to facilitate the proposed 33kV underground cabling, with appropriate methods to be used to cross these watercourses, as detailed in Section 4.3.2.4.2 of Chapter 4. Therefore, there is no potential for direct impacts on any sensitive aquatic receptor associated with the Proposed Grid Connection site. **Proposed Grid Connection Site - Indirect impacts (water quality)** The watercourses surveyed along the Proposed Grid Connection Site were comprised of moderate gradient Eroding/upland rivers (FW1) and presented low fisheries potential and water quality was poor. Full assessments are provided in **Appendix 6-3**. There is a risk that pollutants and sediment laden surface water run-off could discharge into the 15 no. watercourses which the grid route will cross, or adjacent wetland habitats impacting on sensitive watercourses and aquatic species.
Assessment of Significance prior to mitigation	In the absence of mitigation, and following the precautionary principle, there is potential for the Proposed Project to result in significant indirect effects on the identified aquatic habitats and species assessed as Local importance (higher value) to International Importance, in the form of pollution to surface and groundwater during the construction phase of the Proposed Project.
Mitigation	**Proposed Wind Farm** Detailed mitigation measures in relation to the protection of surface and ground water during construction are provided in Section 9.5.2 of Chapter 9 (Hydrology and Hydrogeology). In summary the key mitigation measure during the construction phase is the avoidance of sensitive hydrological features, by application of suitable buffer zones. A self-imposed buffer zone of 50m has been put in place for on-site streams and rivers, where possible. Manmade forestry drains at the Site are not considered a hydrological constraint and therefore no buffering of forestry drains has been undertaken. All of the proposed turbine locations, and where possible turbine associated infrastructure such as hardstanding areas, will be located outside of the delineated 50m watercourse buffer zones with the exception of proposed roads and roads to be upgraded. Detailed control measures in

	relation to the protection of surface and ground waters during construction are detailed in Section 9.5.2. of Chapter 9 (Hydrology and Hydrogeology). In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4-3 of the EIAR, provides the details of exactly how the measures will be implemented during construction. A drainage management plan for the Proposed Project is provided the Surface Water Management Plan (SWMP), included as Appendix 4-5 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. The maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works with regular inspections of all installed drainage systems undertaken throughout the Site. **Proposed 110kV Underground Cabling route** Mitigations around the protection of watercourses from the construction of the Proposed 110kV Underground Cabling route are provided in Section 9.5.2.15 of Chapter 9. The mitigations include for: › Pre-commencement of works › Underground cabling watercourse crossing works › Fracture Blow-out (Frac-out) Prevention and Contingency Plan for Horizontal Directional Drilling (HDD) **TDR** There will be no significant effects on aquatic receptors as a result of accommodation works associated with the proposed TDR.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no residual effects on aquatic habitats or species, at any geographic scale, as a result of the Proposed Project.

6.5.2.2 Effects on Fauna

The Proposed Project has the potential to result in habitat loss, and disturbance impacts on faunal species included as KERs, see Table 6-13. Therefore, these species were taken forward for further assessment, and include the following:

- Bats
- Otter
- Badger
- Pine marten
- Red Squirrel
- Reptiles and Amphibians

As no instream works are proposed as part of the Proposed Project, the potential for significant effects on sensitive aquatic species, with the exception of otter, is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Table 6-15 in Section 6.5.2.1.2 above and is not repeated below.

6.5.2.2.1 *Assessment of Potential Effects on Bats during Construction*

A full and comprehensive impact assessment on bats has been undertaken and is included in the Bat Report in **Appendix 6-2** and summarised below. The impact assessment has been undertaken in

accordance with NatureScot Guidance[13]. As per the NatureScot Guidance, wind farms present four potential risks to bats:

- Collision mortality, barotrauma and other injuries
- Loss or damage to commuting and foraging habitat
- Loss of, or damage to, roosts
- Disturbance/Displacement of individuals or populations

For each of these four risks, the detailed knowledge of bat distribution and activity within the site has been utilised to predict the potential effects of the Proposed Project on bats. Potential risk of collision, barotrauma and other injuries relate to the operational phase and are presented in Section 6.5.3.2.1. Further details are available in the Bat Report in **Appendix 6-2**.

Table 6-16 Impacts of construction phase on bats

Description of Effect	**Loss or Damage to Commuting and Foraging Habitat** <u>Proposed Wind Farm site</u> The Proposed Wind Farm is predominantly located within Improved agricultural grassland (GA1) and commercial Conifer plantation (WD4). Improved agricultural grassland and closed-canopy commercial forestry were assessed as having *Low* suitability for commuting and foraging bats. Hedgerows (WL1), Treelines (WL2), Scrub (WS1), forestry edges, stone walls and drainage features provide comparatively greater habitat value by offering shelter, connectivity and concentrations of invertebrate prey. These features were assessed as having *Moderate* suitability for commuting and foraging bats. The Proposed Project has been designed to minimise the loss of existing linear features and broadleaved woodland within the Site, using existing forestry tracks and field entrances, where feasible. However, construction of the Proposed Wind Farm will require the removal of approximately 1.28km of Hedgerows (WL1) and 59m of Treelines (WL2), to accommodate turbine foundations, access roads and associated infrastructure. This loss accounts for 9.8% of all linear features recorded within the Proposed Wind Farm site. Vegetation will also be removed or managed where necessary to maintain the required separation between turbine blade tips and habitat features used by bats. The removal of these features will result in a permanent loss of existing commuting and foraging habitat within the affected areas, with the potential for localised reductions in habitat connectivity and the availability of sheltered flight routes. However, the majority of the existing linear habitat network will be retained, with habitat removal concentrated within the development footprint and prescribed turbine buffer areas, as detailed in Section 5.2 of the Bat Survey Report (**Appendix 6-2**). <u>Proposed 110kV Underground Cabling route and TDR Accommodation works</u> Features along the Proposed 110kV Underground Cabling route, such as Hedgerow (WL1) and Treeline (WL2), were assessed as having *Low* to *Moderate* suitability for commuting and foraging bats. Approximately 290m of linear habitat across several locations will be lost through the combined Proposed 110kV Underground Cabling route and TDR accommodation works. TDR accommodation works at Urlingford, Mountfinn, Balief Lower and Balief Upper will affect trees, hedgerows and field boundaries. Affected features will be reinstated, replanted or allowed to regrow following construction, as appropriate.

[13] *NatureScot published Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Version: August 2021 (NatureScot, 2021).*

Therefore, no significant effects on bats arising from the loss of or damage to commuting and foraging habitat associated with the Proposed 110kV Underground Cabling route and TDR Accommodation works are anticipated at any geographical scale.

Loss of, or Damage to, Roosts

Proposed Wind Farm site

The Proposed Wind Farm site is predominantly characterised by Improved agricultural grassland (GA1) and commercial Conifer plantation (WD4), with Hedgerows (WL1), Treelines (WL2), Scrub (WS1) and a number of buildings and structures also present. The Conifer plantation (WD4) habitats were assessed as having Negligible suitability for roosting bats due to their relatively uniform structure and absence of suitable potential roost features (PRFs). However, a number of structures within the Proposed Wind Farm and surrounding area were identified as having potential to support roosting bats and were subject to detailed inspections and, where appropriate, dusk emergence surveys.

Three confirmed roosting buildings were identified within the Farm Complex (K22A) during the 2025 surveys, comprising two stone sheds and a cattle shed. The stone sheds supported soprano pipistrelles, with maximum emergence counts of 50 and five individuals respectively. The cattle shed supported two common pipistrelles during spring and summer, and four soprano pipistrelles and one Leisler's bat during autumn. Common pipistrelle roosting was also confirmed within the complex in 2022, when three individuals were recorded. The Farm Complex is approximately 230 m from the nearest proposed turbine, T02.

The Round Tower within structure group K22C, approximately 370 m from T02 and outside the Proposed Wind Farm, supported four brown long-eared bats during the April 2025 inspection. The July survey indicated mixed-species use by an estimated 20 bats, although repeated emergence and re-entry limited count accuracy. A separate brown long-eared bat roost, supporting four recorded individuals, was confirmed within the adjacent K22C outbuildings in 2022. A further historical common pipistrelle roost supporting two individuals was recorded at dwelling K22E, near the TDR accommodation works, in 2022.

The historical roost records identified through the desk study have been considered irrespective of whether occupancy was reconfirmed in 2025. All assessed buildings and structures will be retained, and no demolition or works to the confirmed or historically recorded roost buildings are proposed. No direct loss of these roosts is therefore anticipated.

Proposed 110kV Underground Cabling route

The Proposed Grid Connection comprises approximately 12.6 km of underground cabling, predominantly located within existing public road corridors, with sections extending through improved agricultural grassland. The habitats along the Proposed Grid Connection were assessed as providing no suitable roosting opportunities for bats. In addition, structures associated with watercourse crossings along the route were inspected for bat roost potential, with the assessed features classified as having *Negligible* suitability. No evidence of roosting bats was identified during these inspections. The Proposed 110kV Substation and construction compounds are located within areas of improved agricultural grassland.

TDR

Accommodation works will also be required along the Proposed Turbine Delivery Route, including tree felling, hedgerow removal and vegetation clearance at locations in Urlingford, Mountfinn, Balief Lower, Balief Upper and Barna, Co. Kilkenny. Trees within the proposed accommodation works areas were assessed for their potential to support roosting bats, with no suitable PRFs or potential tree roosts identified. Following completion of turbine deliveries, affected areas will be reinstated, including replacement planting of trees and

	hedgerows. As no potential tree roosts were identified within the assessed areas, no direct loss of identified tree roosting habitat is anticipated in association with these works.
	Disturbance/Displacement of Individuals or Populations The Bat Habitat Suitability Appraisal, as detailed in Section 3.3.1 and in **Appendix 6-2**, identified that the Proposed Wind Farm site is predominantly characterised by Improved agricultural grassland (GA1) and commercial Conifer plantation (WD4), which were assessed as having *Low* suitability for commuting and foraging bats. Bat activity varied spatially and seasonally, with the highest levels generally recorded during spring and summer and comparatively lower levels during autumn. Bat activity was concentrated along forestry edges, hedgerows and linear road and track habitats, with localised areas of elevated activity rather than consistently high activity across the Site. Three roosting buildings were confirmed within the Farm Complex (K22A), approximately 230 m from T02, with a further confirmed roost in the Round Tower within K22C, approximately 370m from T02. All assessed structures will be retained. No removal of connecting linear features or vegetation clearance for bat felling buffers is proposed around T02, maintaining the adjoining connections between these roosts and the wider landscape. These retained features also provide outward connections towards the landscape east of the Proposed Wind Farm, potentially supporting seasonal movements towards Dunmore Cave, although such movements have not been demonstrated. The historical roosts within the K22C outbuildings and dwelling K22E will also be retained. Measures controlling lighting and construction disturbance will apply where works could affect these locations. Along the Proposed Grid Connection and at TDR accommodation works areas, vegetation removal or trimming and construction activity may temporarily alter habitat use. Given the baseline activity levels, limited extent of habitat removal, the retention of confirmed roosts, and the retention of functional ecological corridors throughout the Site, the habitats will continue to support bat activity. Therefore, no significant displacement of individual bats or local populations is anticipated as a result of the Proposed Project.
Assessment of Significance prior to mitigation	**Loss of, or Damage to, Commuting and Foraging Habitat** Given the extensive area of habitat that will remain undisturbed throughout the Site and the avoidance of the most significant areas of faunal habitat, short term significant effects on bats, as a result of loss or damage to commuting and foraging habitat, are anticipated on populations assessed of Local Importance (higher value) only. No significant effects at any higher geographical scale are anticipated.
	Loss of, or Damage to, Roosts On the basis of the survey findings and the proposed development design, no confirmed bat roosts will be directly lost or damaged as a result of the Proposed Project. The retention of the identified roost structures, together with the absence of potential tree roosts within the assessed areas of proposed vegetation removal, will avoid direct impacts on identified roosting resources. Accordingly, no significant effects relating to the loss of, damage to or disturbance of bat roosts are anticipated as a result of the Proposed Project at any geographical scale.
	Disturbance/Displacement of Individuals or Populations No potential for significant effect with regard to the disturbance/displacement of bats as a result of the construction phase of the Proposed Project is anticipated at any geographical scale.
Mitigation	**Loss or Damage to Commuting and Foraging Habitat**

To compensate for the loss of linear habitat and strengthen connectivity across the site, the Biodiversity Enhancement and Management Plan (BEMP) in **Appendix 6-4** provides for the establishment of approximately 225 m of new native hedgerow and the bolstering and enhancement of approximately 3.38 km of existing hedgerow habitat. These measures will provide approximately 3.6 km of newly established or enhanced linear habitat, compared with the approximately 2.5 km of linear habitat proposed for removal. While the enhancement of existing hedgerows does not represent an equivalent replacement of established habitat, the proposed measures will increase the structural diversity and ecological value of retained linear features and provide additional commuting and foraging opportunities for bats.

The locations of the proposed hedgerow planting and enhancement measures have been strategically selected to connect existing areas of recorded bat activity and maintain habitat connectivity throughout the Proposed Wind Farm site.

Loss of, or Damage to, Roosts

No potential for significant effect with regard to the loss of, or damage to, roosting habitat as a result of the Proposed Project is anticipated. No mitigation required.

Disturbance/Displacement of Individuals or Populations

No mitigation required. However, the below best practices measures will be implemented during the construction phase of the Proposed Project.

In accordance with the Institution of Lighting Professionals Note 08/23 (ILP, 2023), lighting associated with the Proposed Project will be designed to maintain dark commuting corridors and minimise light spill onto woodland, scrub, treelines, hedgerows, and other habitats used by bats. Lighting will not illuminate retained bat roost entrances or their adjoining habitat connections.

During the construction phase, lighting requirements will be temporary and limited to areas where required for health, safety and security purposes, including temporary construction compounds and works associated with the Proposed 110kV Substation. Where works are required during hours of darkness, lighting will be directed away from retained woodland, treelines, hedgerows, and bat commuting or foraging habitats. Directional accessories, including baffles, hoods, cowls and louvres, will be used where appropriate to reduce light spill and focus illumination only where required. The same restrictions will apply during decommissioning.

During the operational phase, lighting associated with the Proposed Project will be kept to the minimum necessary for operation, maintenance, safety and security purposes. Turbines will not be continuously illuminated, other than where aviation lighting is required.

All permanent lighting (excluding aviation lighting) will utilise warm-spectrum LED sources with a correlated colour temperature of 3000K or less. Lighting will be designed and operated to maintain dark commuting corridors along retained habitat features and avoid fragmentation of bat commuting routes. A buffer of dark, unlit habitat will be maintained between the Proposed 110kV Substation fence line and the nearest retained treeline or hedgerow.

The lighting measures will also follow Dark Sky Ireland principles by ensuring that lighting is used only where necessary, appropriately directed and maintained at the minimum intensity required for operational and safety purposes.

With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post-construction monitoring will be carried out to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated. If monitoring

	identifies adverse effects associated with lighting, the lighting arrangements will be reviewed and appropriate corrective measures implemented. Full details of best practice measures during construction is provided in Section 6.1 of the Bat Survey Report.
Residual Effect following Mitigation	A temporary residual effect at the local geographic scale is anticipated in relation to the loss of commuting and foraging habitat during the construction phase, due principally to the removal of sections of treelines and hedgerows required to facilitate infrastructure and turbine buffers. The Proposed Project will be located predominantly within Improved agricultural grassland (GA1) and Conifer plantation (WD4) of *Low* suitability for commuting and foraging bats. Although this overall habitat loss will be offset through the hedgerow enhancement and replanting programme, it will take approximately 3–10 years for newly planted vegetation to establish and restore full habitat functionality. During this period, a minor and temporary reduction in ecological connectivity may occur. Overall, taking into account the mitigation measures implemented and the proposed habitat enhancement strategy, the Proposed Project will not adversely affect the conservation status of local bat populations.

6.5.2.2.2 *Assessment of Potential Effects on Badger during Construction*

Table 6-17 Assessment of Potential Impacts on badger

Description of Effect	**Habitat Loss/Fragmentation** Given the nature of the Proposed Project, there will be some loss of suitable badger foraging habitat i.e., Improved agricultural grassland (GA1), Conifer plantation (WD4) Treelines (WL2), and Hedgerows (WL1) associated with the footprint of the Proposed Wind Farm infrastructure. However, this habitat loss will not be significant in the context of the widespread alternative foraging habitat available within the site and the wider area surrounding the site. There will be no significant loss/fragmentation of badger habitat as a result of the Proposed Project. **Disturbance/Mortality** No badger setts were identified during the ecological surveys undertaken of the EIAR Site Boundary. However, numerous signs of badger activity within the site (latrines, snuffle holes, prints) in close proximity to the Proposed Wind Farm infrastructure including the new access road to the proposed location of Turbine 1 were identified. There is potential for badger setts to be established during the interim between baseline ecological surveying and commencement of construction. Therefore, a potential for significant effects via disturbance/mortality of badger exists should new setts be established in close proximity to the Proposed Project development works. Noise and earth works during construction have the potential to disturb badgers occupying setts in close proximity to Proposed Wind Farm infrastructure during construction. Badger tunnel systems can extend some distance from sett entrances (over 20m in some cases[14]) and therefore any excavation by heavy machinery in close proximity to sett entrances risks causing damage to setts and/or direct harm to badgers in the absence of mitigation. In the event that a new badger sett is established within or near the footprint of the Proposed Wind Farm during the interim between baseline ecological surveys and commencement of construction, there is potential for disturbance/mortality to badger using the setts as a result of noise/tunnel or sett collapse during construction.

[14] *National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.*

	There is also potential for direct mortality to badger should they fall into open excavations with no exit points. Excavations may be left unattended for periods of time, trapping the badger within, which may also fill with water.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** No significant overall loss or fragmentation of badger foraging habitat is anticipated at any geographic scale. **Disturbance/Mortality** Whilst no badger setts were recorded within the EIAR Site Boundary, baseline surveys identified that the EIAR Site Boundary is being utilised by a local badger population. Any potential for physical damage or significant disturbance of occupied setts (if established prior to construction) would be considered significant at the local geographic scale in the absence of mitigation.
Mitigation	**Habitat Loss/Fragmentation** No specific mitigation is required for habitat loss. **Disturbance/Mortality** Owing to the potential interval between the surveys undertaken, receipt of planning consent and commencement of construction, a pre-construction badger survey will be undertaken by a suitably qualified ecologist. The survey will cover all suitable habitat within 50 m of the proposed infrastructure and within 150 m of any proposed piling or blasting works. It will be undertaken sufficiently in advance of construction to allow any consultation or mitigation requirements to be addressed and will be supplemented by an inspection immediately before works. Any sett identified will be assessed and, where necessary, monitored using appropriate methods, which may include remote cameras, to determine its status, extent and level of use. The monitoring methodology and duration will be determined by the suitably qualified ecologist, having regard to season, sett type and the precautionary principle. Where an active sett can be retained without damage or disturbance, a construction exclusion buffer will be established by the ecologist in accordance with the TII guidance and any project-specific requirements agreed with NPWS. As a minimum, unless otherwise agreed with by the NPWS, heavy machinery will not operate within 30 m of a sett entrance, lighter machinery within 20 m, or hand works and scrub clearance within 10 m. During December to June inclusive, such works will not take place within 50 m of an active sett, and piling or blasting will not take place within 150 m, unless agreed with NPWS and subject to appropriate mitigation. The exclusion buffer will be clearly delineated using robust fencing and signage, and site personnel will be informed of the restrictions. Any works requiring disturbance, closure or destruction of a sett will proceed only after consultation with the NPWS, during the appropriate seasonal period, and under the supervision of suitably qualified ecologist. Where open excavations are left unattended, a ramp will be placed from the pit floor to ground level to allow safe egress of the excavation should any badger fall in. The bottom of the ramp will be weighted down or secured, to ensure it remains in place should the excavation fill with water.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative residual effects to badger is anticipated at any geographic scale.

6.5.2.2.3 Assessment of Potential Effects on Otter during Construction

Table 6-18 Assessment of Potential Impacts on otter

Description of Effect	The Proposed Project has been designed to minimise impacts on the receiving environment and maximises the use of existing access roads and low value habitats such as Conifer plantation (WD4) at the site. Consequently, the Proposed Project is predominantly located in areas of these modified habitats. No indication of otter was recorded within the wind farm site, with spraint recorded just twice along the Proposed 110kV Underground Cabling route. Based on the surveys undertaken within the Proposed Wind Farm site, the watercourses which drain the wind farm site do not provide significant supporting habitat for otter. Whilst there is the requirement for the creation of 3 no. watercourse crossings along proposed access roads, as well as a number of forestry drains/ditches with connectivity to the watercourses, within the Proposed Wind Farm site, these are small streams and only provide marginal commuting habitat for otter and there is no requirement for instream works. **Habitat Loss/Fragmentation** Given the nature of the proposed works and the findings of the baseline surveys for otter within the Site, no significant habitat destruction and no loss of breeding or resting habitat for this species is anticipated. **Disturbance, Mortality** In relation to disturbance and direct mortality related impacts, no significant commuting, foraging, or breeding habitat for otter was recorded within the Proposed Wind Farm site. Additionally, otters are predominantly crepuscular in nature, and it is anticipated that construction activity associated with the Proposed Project will be confined to daytime hours, thus minimising potential disturbance related impacts to the species. However, given that otter is a mobile species which could establish holts between planning permission being granted (if approved) and works commencing, taking a precautionary approach, should a breeding/ resting site establish within or in close proximity to the Proposed Grid Connection Site, there is potential for significant effects on otter, as a result of disturbance/ direct mortality. **Habitat Degradation (impacts on water quality)** Taking a precautionary approach, it is assumed that otter may occur within and near the Site on occasion, particularly the lower reaches of the main watercourses downstream. There is potential for construction works to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Site. This represents a potential indirect effect on otter in the form of habitat degradation/loss of prey resource through water pollution. The potential for significant impacts on water quality as a result of the construction phase of the Proposed Project is fully considered above in Table 6-15.
Assessment of Significance prior to mitigation	**Habitat Loss** Significant effects regarding habitat loss are not currently anticipated as a result of the Proposed Project. **Disturbance, Mortality**

	Significant effects regarding disturbance and/or mortality are not anticipated as a result of the Proposed Project. However, should a breeding/resting site for otter establish within or in close proximity to the Proposed Project, there is potential for significant effects on otter, as a result of disturbance/ direct mortality. **Habitat Degradation (impacts on water quality)** Otter are known to occur downstream of the Site. As there is a potential for deterioration to water quality, as a result of the construction phase of the Proposed Project, there is a potential for significant effects on otter, assessed as International Importance, via deterioration of supporting habitat.
Mitigation	**Habitat Loss** Significant effects regarding habitat loss are not currently anticipated as a result of the Proposed Project. No mitigation required **Disturbance, Mortality** No significant effects are anticipated. However, taking a precautionary approach, and due to the time that can elapse between the original surveys, any future planning consent and commencement of construction, a pre-construction otter survey will be carried out by a qualified ecologist to identify the presence of any breeding/ resting sites within 150m of proposed works, that may have been established in the intervening period. As such, prior to the commencement of construction works associated with the installation of watercourse crossings, particularly the Proposed 110kV Underground Cabling route, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys were undertaken (TII, 2008b): A pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. Should the surveys identify the presence of an otter holt, the following measures will be undertaken. › A National Parks and Wildlife Service derogation licence will be applied for (although compliance with such a licence has not been relied on in this assessment). › No works will be undertaken within 150m of any holts at which breeding females or cubs are present. › No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence (TII, 2008b). › All of the above works will be undertaken or supervised by an appropriately qualified ecologist. Currently based on the finding of the surveys and current information regarding the Site, no derogation licence is required for this application, as no breeding/resting sites have been recorded in close proximity to the Site. However, should the pre-commencement surveys identify a new breeding/resting site and exclusion is required, a derogation licence will be obtained from the NPWS prior to any works being carried out. **Habitat Degradation (impacts on water quality)**

	The potential for deterioration of water quality, and degradation of otter habitat, during construction has been considered in Table 6-15 above, which assesses the potential for significant impacts on aquatic receptors, and provides mitigations to prevent any such effects.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative residual effects to otter are anticipated at any geographic scale.

6.5.2.2.4 *Assessment of Potential Effects on Red squirrel/Pine marten during Construction*

Table 6-19 Assessment of Potential Impacts on red squirrel/pine marten

Description of Effect	**Habitat Loss/Fragmentation** Red squirrel and pine marten are known to occur within the EIAR Site Boundary. Conifer plantation (WD4) provides suitable foraging and breeding habitat for both species. Approximately 255 ha of Conifer plantation (WD4) was recorded within the EIAR Site Boundary. The Proposed Project will result in the loss of 27.5 ha of Conifer plantation (WD4). This equates to 10.78% of the total area for this habitat type within the site. This habitat loss will not be significant in the context of the widespread alternative foraging/breeding habitat available within the site and the wider area surrounding the Site. As noted above there will be no significant fragmentation of red squirrel or pine marten habitat as a result of the Proposed Project. **Disturbance, Mortality** The EIAR Site Boundary provides suitable foraging and breeding habitat for both species. No breeding or resting sites (e.g. dreys, dens) were identified for either species during the ecological surveys undertaken of the EIAR Site Boundary. However, there is a potential for breeding sites to be established during the interim between baseline ecological surveying and commencement of construction. Tree felling works associated with the Proposed Wind Farm have the potential to disturb or destroy occupied dreys and or dens during construction. Both species would be a particularly vulnerable to the risk of mortality when young are to be found within breeding sites (spring/summer period). In the event that new breeding sites were established within or near the clear-felling footprint there is potential for disturbance/mortality to red squirrel or pine martin through destruction of breeding sites during construction.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** No significant overall loss or fragmentation of red squirrel or pine marten habitat is anticipated at any geographic scale. **Disturbance/Mortality** Whilst no breeding sites for these species were recorded within the EIAR Site Boundary, baseline surveys identified that the EIAR Site Boundary is being utilised by a local red squirrel and pine marten population. Any potential for physical damage or significant disturbance of occupied breeding sites (if established prior to construction) for these species has been identified as significant at the local geographic scale, in the absence of mitigation.
Mitigation	**Habitat Loss/Fragmentation** No specific mitigation is required for habitat loss.

	Disturbance/Mortality Due to time that can elapse between the original surveys, any future planning consent and commencement of construction, a pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any breeding sites. These surveys will focus on areas of Conifer plantation (WD4) to be felled and all suitable habitat within 50m of the felling blocks. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with Nature Scot[15] and TII[16] guidelines. Should active dreys/dens be identified within the blocks to be felled, the following mitigations and best practice procedures will be followed to ensure that no breeding site for either red squirrel or pine marten are impacted: › Felling works to be undertaken in October–January inclusive, this will avoid the main breeding season (February-September) when vulnerable young are most likely to be found within breeding sites for both species. › Any breeding sites identified within the 50m buffer that wouldn't be directly affected by felling works or disturbance related activity should be clearly marked out with an exclusion zone and works/access through these areas avoided as much as possible. › Plant machinery will be turned off when not in use. › Operating machinery will be restricted to the Proposed Project works site area (and outside any exclusion zone)
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative residual effects to pine marten and red squirrel are anticipated at any geographic scale.

6.5.2.2.5 *Assessment of Potential Effects on Reptiles and Amphibians during Construction*

Table 6-20 Assessment of Potential Impacts on Reptiles and Amphibians

Description of Effect	**Habitat Loss/Fragmentation** The Site provides potential supporting habitat for reptiles and amphibians, including Wet grassland (GS4), Drainage ditches (FW4), and Stone walls (BL1). Given the nature of the Proposed Project, there will be some minimal loss of reptile and amphibian supporting habitat. However, this habitat loss will not be significant in the context of the widespread alternative foraging habitat available within the site and the wider area surrounding the site. There will be no significant fragmentation of supporting habitat for reptiles or amphibians as a result of the Proposed Project. **Disturbance, Mortality** The Proposed Wind Farm site supports a number of heavily vegetated stone walls which may be utilised by viviparous lizards in the winter months when they are in brumation. Additionally, standing water within the site, such as that recorded within the drainage channels, provides potential breeding habitat for common frog and smooth newt. The removal of sections of such habitats to facilitate the construction of the Proposed Project has the potential to have a direct impact (risk of mortality) on these species.

[15] https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20red%20squirrel.pdf
[16] *TII guidance (TII, 2009, Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. Dublin: National Roads Authority).*

Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** The loss of supporting habitat for viviparous lizard, common frog, and smooth newt is not considered to be significant at any geographic scale given the small scale of the habitat loss and the extensive area of available habitat locally. **Disturbance/Mortality** In the absence of mitigation, the potential for a direct effect on viviparous lizard, common frog, and smooth newt in relation to mortality risk during construction would be considered significant at the local geographic scale only.
Mitigation	**Habitat Loss/Fragmentation** No specific mitigation is required for habitat loss. **Disturbance/Mortality** Prior to construction of the Proposed Project, pre-commencement surveys for viviparous lizard, common frog, and smooth newt will be undertaken within potential supporting habitat identified within the Site. Surveys will be undertaken by a suitably qualified ecologist and during the optimal season for each species, as per TII (2008) guidelines. Any individuals or population of these species will then be translocated outside of the works area to other areas of suitable habitat. An Ecological Clerk of Works will also be appointed for the construction works, who will translocate any further individuals recorded during the construction works.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative residual effects to viviparous lizard, common frog, and smooth newt are anticipated at any geographic scale.

6.5.3 Likely Significant Effects During Operational Phase

6.5.3.1 Effects on Habitats during Operation

The operation of the Proposed Project will not result in any additional loss of habitats considered as KERs and as such, there is no potential for any significant effects in this regard. These habitats are not considered to be KERs in the context of the operation of the Proposed Project.

Potential for effects on rivers, streams and sensitive aquatic species remains a KER during operation and is assessed in detail in the following subsection.

6.5.3.1.1 *Effects on water quality during operation*

Table 6-21 Assessment of potential effects on surface watercourses during operation

Description of Effect	Chapter 9: Hydrology and hydrogeology of the EIAR assess the potential for significant effects on water quality as a result of the following pathways during operation: › Removal of Vegetation Cover and Progressive Replacement of Natural Surface with Low Permeability Surfaces (Proposed Project) › Runoff Resulting in Suspended Solids Entrainment in Surface Waters › Potential Effects on the Clomantagh/Killoshulan Group Water Scheme and Other Local Wells (Proposed Project)

	This section assesses the potential for significant effects on aquatic receptors including aquatic habitats (i.e. watercourses), salmonids, otter, lamprey, coarse fish, aquatic invertebrates, European eel, aquatic invertebrates, and other aquatic species during the operation of the Proposed Project. The Proposed Project has been designed to minimise impacts on the receiving environment and maximises the use of existing access roads at the Site. Consequently, the Site is predominantly located in areas of modified habitats, associated with the existing access roads and Conifer plantation (WD4). The relatively small-scale increase in the amount of hard standing associated with the turbine hardstands has the potential to result in faster water runoff from the Proposed Wind Farm site to the surrounding watercourses in comparison to existing conditions. This may have the indirect effect of causing erosion, which could lead to deterioration of surface water and supporting habitat quality as a result of sedimentation. Additionally, there is the potential for the faster run off of any pollutants that may be associated with the operation of the Proposed Project, including hydrocarbons associated with the operational maintenance, potentially impacting on supporting aquatic faunal habitats. The impacts on water quality during operation are fully described in Section 9.5.3 of Chapter 9: Hydrology & Hydrogeology of this EIAR and are discussed here specifically in relation to biodiversity. Given the relatively minor increase in hardstanding as a result of the Proposed Project, significant effects on water quality are not anticipated at any geographic scale during the operation of the Proposed Project. Whilst no significant effects on water quality are anticipated, potential for effects on water quality associated with the operational phase drainage of the Proposed Wind Farm site has been fully mitigated through appropriate design and mitigation as fully described in Section 9.5.3 of Chapter 9: Hydrology & Hydrogeology.
Assessment of Significance prior to mitigation	Significant effects on water quality are not anticipated at any geographic scale during the operation of the Proposed Project. However, mitigation will be employed to ensure that there will be no negative effects on sensitive aquatic receptors.
Mitigation	The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described in Section 9.5.3 of Chapter 9 and as shown on the drainage drawings (Appendix 4-3) submitted with this planning application. With regards potential impacts on water quality, and associated aquatic receptors, as a result of the runoff during operations, the mitigations provided in Sections 9.5.3 of Chapter 9 will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the Proposed Project.

6.5.3.2 Effects on Fauna during Operation

The operation of the Proposed Project will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity due to its location and scale and, as such, there is no potential for any significant effects in on fauna as result of these pathways.

There is no potential for significant negative effects on terrestrial faunal KERs, with the exception of bats, during the operational phase of the Proposed Project. The Proposed Project maximises the existing infrastructure within the Proposed Wind Farm site and there will be minimal requirement for operational works along the Proposed Grid Connection Site. Any maintenance works associated with the operation of the project will be confined to the Proposed Wind Farm site.

Operational lighting will be confined to the site of the Proposed 110kV Substation and aviation lighting (lights on top of nacelle). Lighting at the substation will be minimal and will include a security spotlight on a timer. Given the proposed minimal lighting, no significant disturbance effects as a result of lighting on any faunal species is anticipated.

It should be noted that no significant habitat for salmonids, lamprey, macroinvertebrates, European eel, or other aquatic species was recorded within the Proposed Wind Farm site and all new major infrastructure such as turbine bases are located over 50 metres from the watercourses within the Site. The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.5.3.1.1 and is not repeated here.

Potential for effects on bat species resulting from the operation of the Proposed Project was identified and therefore, bat species are discussed and assessed in relation to the operational phase below.

6.5.3.2.1 Assessment of Potential Effects on Bats during operation

Table 6-22 Assessment of Potential Effects on Bats during operation

Description of Effect	The Proposed Project has been designed to minimise impacts on the receiving environment and maximises the use of existing infrastructure at the Site including internal access tracks and field entrances. The Site is dominated by modified habitats associated with the existing Conifer plantation (WD4) and agricultural grasslands. A full impact assessment for bats is provided in the Bat Survey Report in **Appendix 6-2** and is summarised below. As per NatureScot (2021), wind farms present four potential risks to bats: › Collision mortality, barotrauma and other injuries; › Loss or damage to commuting and foraging habitat; › Loss of, or damage to, roosts; › Displacement of individuals or populations. No significant residual effects in relation to 1) Loss or damage to commuting and foraging habitat; 2) Loss of, or damage to, roosts; and 3) Displacement of individuals or populations is anticipated as a result of the operation of the Proposed Project, as per Section 6.5.2.2.1. **Collision mortality, barotrauma, and other injuries** Low-risk species recorded within the Site included *Myotis* species and brown long eared bat. As per NatureScot (2021), these species are not particularly vulnerable to collision mortality. Given the overall low levels of activity recorded for these species, no significant effects are anticipated as a result of Collision mortality, barotrauma, and other injuries. The following high-risk species were recorded during the dedicated surveys: › Leisler's bat, › Common pipistrelle › Soprano pipistrelle

	Site-level collision risk for high collision risk bat species with proposed turbines was typically *Low* to *Medium.* Overall bat activity levels were typical of the nature of the Proposed Wind Farm, which is predominantly improved agricultural grassland, conifer plantation and scrub, treelines and hedgerow. However, due to the proximity of Turbine 2 to the confirmed Soprano pipistrelle roosts in the Farm Complex, a site-specific displacement and mortality risk has been identified at this location. While Soprano pipistrelle did not record site-wide High Median Activity at the static detectors during the 2025 survey programme, the proximity to a known roost impacts the risk threshold. A mandatory curtailment programme is therefore recommended for Turbine 2 to eliminate collision risk during periods of high bat emergence and activity.
Assessment of Significance prior to mitigation	A potential for long-term negative effects was identified for bats due to the *Low* to *Medium* collision risk of high-risk bat species. The potential unmitigated effects on these high-risk species as a result of their potential interaction with wind turbines are considered significant at a local geographic scale only, for both peak and typical activity levels. However, given the proximity of an operational turbine (T2) to a confirmed roost of a high-collision-risk species (*Soprano pipistrelle*) significantly alters local vulnerability. Due to the reduced separation distance and the species' biological vulnerability to both blade collision and barotrauma, the unmitigated operational risk specifically at Turbine 2 is elevated to *High*. No significant effects are anticipated at any other geographic scale.
Mitigation	In order to reduce the value of the habitat for high-risk bat species in the areas surrounding the turbines, a felling buffer of at least 50m between the tip of the blade and any trees or other tall vegetation that could provide foraging habitat for bat species will be implemented except for Turbine 2. Detailed mitigation measures in relation to bats is provided in Section 6 of the Bat Survey Report in **Appendix 6-2** and summarised below. Mitigation measures are proposed together with post-construction monitoring: › Introduce felling buffers around turbines (except for T2) › Implement blade feathering as a standard › Lighting restrictions › Site-wide curtailment for Leisler's bat › Turbine 2 specific curtailment › A minimum of three years operational monitoring, including carcass searches and bat surveys to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy. › Adaptive mitigation strategy based on the results of the post-construction monitoring. A bat monitoring and mitigation strategy has been devised in line with Appendix 5 of NatureScot (2021). To assess the effects of the Proposed Project on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision and roost monitoring. The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy. At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This

	approach allows for an evidence-based review of the potential for bat fatalities at the Proposed Wind Farm site, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally.
Residual Effect following Mitigation	For collision mortality and barotrauma, habitat separation at turbines other than T02, blade feathering, site-wide curtailment for Leisler's bat and the additional full-night curtailment at T02 will reduce collision risk. These measures will apply from the commencement of operation. Acoustic, fatality and roost monitoring will assess their effectiveness, with mitigation strengthened where necessary. Subject to implementation of these commitments, no significant residual collision-related effects on local bat populations are predicted.

6.5.4 Likely Significant Effects During Decommissioning phase

Decommissioning is fully described in Chapter 4 (Section 4.10). There will be no additional habitat loss associated with the decommissioning of the Proposed Project and therefore there will be no significant effects in this regard.

The wind turbines proposed as part of the Proposed Project are expected to have a lifespan of approximately 35 years. Following the end of the operational life of the wind farm, the wind turbines may be retained and the operational life extended or replaced with a new set of turbines, subject to planning permission being obtained. In the event that neither of the above options are implemented, the Proposed Wind Farm will be decommissioned fully as agreed with the Planning Authority. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Upon decommissioning of the Killoshulan Wind Farm, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environment emissions such as noise, dust and/or vibration.

Site roadways could be in use for purposes other than the operation of the Proposed Wind Farm by the time the decommissioning of the Proposed Wind Farm is to be considered, and therefore it may be more appropriate to leave the Site roads in situ for future use. It is envisaged that the roads will provide

a useful means of transport as agricultural/forestry roads for the pastoral farming/commercial forestry on the Site.

A Decommissioning Plan has been prepared and included as Appendix 4-6 of this EIAR, which will be agreed with the local authority prior to any decommissioning. The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works.

The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the proposed renewable energy development have been assessed in this EIAR.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

> *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".*

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase. It can be concluded that following the implementation of preventative mitigation, there is no potential for the decommissioning of the Proposed Project to result in significant effects on biodiversity.

6.5.5 Effects on Designated Sites

6.5.5.1 European Designated Sites

The Proposed Project is located completely outside of the boundary of any European site. The Proposed 110kV Underground Cabling route runs adjacent to the River Barrow and River Nore SAC, while watercourses within the EIAR Site Boundary have a direct hydrological link to the River Barrow and River Nore SAC and River Nore SPA. A potential for likely significant effect was therefore identified on the following European sites:

- River Barrow and River Nore SAC
- River Nore SPA

In relation to European sites, an Appropriate Assessment Screening Report and Natura Impact Statement (NIS) have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the Proposed Project in compliance with Article 6(3) of the Habitats Directive.

As per the EPA Guidance (2022), *"A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive".* This section provides a summary of the key assessment findings with regard to potential impacts on European sites.

The Stage 1 Screening Assessment concluded as follows:

'It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Project, individually or in combination with other plans and projects, would be likely to have a significant effect on the following European Sites:

- *River Barrow and River Nore SAC*
- *River Nore SPA*

As a result, an Appropriate Assessment is required and a Natura Impact Statement shall be prepared in respect of the Proposed Project.'

The findings presented in the NIS are that:

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

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

6.5.5.2 Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report.

The following pNHAs were identified to be within the Likely Zone of Influence of the Proposed Project as they are hydrologically connected to either the Proposed Wind Farm site or the Proposed Grid Connection Site

- River Nore/Abbeyleix Woods Complex pNHA [002076]
- Inchbeg pNHA [000836]
- Ardaloo Fen pNHA [000821]

With the implementation of the mitigations and best practice procedures for the construction, operational and decommissioning phases of the Proposed Project, as described in Table 6-14 and 6-15, respectively, which aim to negate potential impacts from deterioration of surface water quality, as well as those in Chapter 9: Hydrology & Hydrogeology and in the CEMP (Appendix 4-3), no significant impacts on these National Sites are anticipated. Additionally, the potential for significant effects on these National Sites as a result of disturbance are provided in Tables 6-17 to 6-20.

6.6 Cumulative Impact

The Proposed Project was considered in combination with other plans and projects in the area that could result in cumulative impacts on the KERs identified in Section 6.4.3 of this report, including European Designated Sites and Nationally designated sites. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Project. The full list of projects has been considered and relevant ones from this list are discussed in this section.

6.6.1 Assessment of Plans

The following development plans have been reviewed and taken into consideration as part of this assessment:

- Kilkenny Biodiversity Action Plan 2025-2030
- Kilkenny City and County Development Plan 2021-2027
- 4th National Biodiversity Action Plan 2023-2027
- Regional Spatial and Economic Strategy for the Southern Region (2020-2032)

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of Annex I habitats were also reviewed. An overview of the search results with regard to plans is provided in Table 6-23.

Potential for cumulative impacts on European sites are considered within the Natura Impact Statement that accompanies this application.

Table 6-23 Assessment of Plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
Kilkenny Biodiversity Action Plan 2025-2030	**4.1:** Identify and map non-designated sites of Local Biodiversity Importance sites, in line with Heritage Council Guidance, to aid the implementation of County Development Plan biodiversity policies.	The Biodiversity Action Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The overall aim of the policies and objectives set out in the Biodiversity Action Plan in relation to Biodiversity aim to protect and enhance biodiversity within the county. No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project. The BEMP for the Proposed Project aims to implement and align with Green Infrastructure policies outlined in the Kilkenny County Development Plan by enhancing biodiversity within the EIAR Site Boundary, in particular through providing an overall net gain in linear habitats throughout the EIAR Site Boundary. The AA Screening for the Biodiversity Action Plan identified potential for likely significant effects on the following SACs and SPAs: › River Barrow and River Nore SAC › River Nore SPA As such the potential for cumulative impacts were identified in-combination with the Proposed Project specifically in relation to the River Barrow and River Nore SAC. However, with the implementation of mitigation
	4.2 Promote the development of Community Biodiversity Action Plans that include habitat mapping of urban areas that highlight the importance of ecological connectivity. This is particularly important to improving the ecological coherence of the Natura 2000 network, to encourage the management of features in the landscape which are a major importance for flora and fauna as required under Article 10 of the Habitats Directive.	
	4.5: Complete audit of Kilkenny hedgerows and prioritise future projects on enhancing ecological connectivity between biodiversity rich sites.	

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
		measures outlined within this Biodiversity Chapter and the NIS for the Proposed Project and the mitigation measures outlined within the NIS[17] for the Kilkenny County Development plan **no potential for in-combination effects are identified.**
Kilkenny City and County Development Plan 2021-2027	**It is the Policy of the Council to**: **Objective 1A:** To implement the provisions of Articles 6(3) and 6(4) of the EU Habitats Directive and ensure that any plan or project within the functional area of the Planning Authority is subject to appropriate assessment in accordance with the Guidance Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 or any subsequent version, and is assessed in accordance with Article 6 of the Habitats Directive in order to avoid adverse impacts on the integrity and conservation objectives of the site. **Objective 9A:** Continue to identify and map habitats and green infrastructure of county importance, and raise awareness and understanding of the county's natural heritage and biodiversity identifying green corridors and measures to connect them. - To ensure that development proposals, where relevant, improve the ecological coherence of the Natura 2000 network and encourage the retention and management of landscape features that are of major importance for wild fauna and flora as per Article 10 of the Habitats Directive. - To protect and where possible enhance wildlife habitats and landscape features which act as ecological corridors/networks and stepping stones, such as river corridors, hedgerows and road verges, and to minimise the loss of habitats and	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The overall aim of the policies and objectives set out in the County Development plan in relation to Biodiversity aim to protect and enhance biodiversity within the county. The BEMP for the Proposed Project aligns with Objective 9B of the County Development plan by enhancing the Proposed Development site for local biodiversity including marsh fritillary, red squirrel and pine marten. No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project.

[17] https://consult.kilkenny.ie/ga/consultation/kilkenny-county-development-plan-2021-2027/chapter/ii-natura-impact-report-support-appropriate-assessment

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
	features of the wider countryside (such as ponds, wetlands, trees) which are not within designated sites. - To ensure that appropriate mitigation and/or compensation measures to conserve biodiversity, landscape character and green infrastructure networks are required in developments where habitats are at risk or lost as part of a development. **Objective 9B:** To identify and map green infrastructure assets and sites of local biodiversity value over the lifetime of the Plan. - Require all developments in the early pre-planning stage of the planning process to identify, protect and enhance ecological features and habitats, and making provision for local biodiversity (e.g. through protection of existing breeding sites, and provision of appropriate new infrastructure such as swift, bat and barn owl boxes, bat roost sites, green roofs, etc.) and provide links to the wider Green Infrastructure network as an essential part of the design process. **Objective 10B:** To implement the measures of the River Basin Management Plan, including continuing to work with communities through the Local Authority Waters Programmes to restore and improve water quality in the identified areas of action.	The AA Screening for the Kilkenny City and County Development Plan identified potential for likely significant effects on the following SACs and SPAs: • River Barrow and River Nore SAC As such the potential for cumulative impacts were identified in-combination with the Proposed Project specifically in relation to the River Barrow and River Nore SAC. However, with the implementation of mitigation measures outlined within this Biodiversity Chapter and the NIS for the Proposed Project and the mitigation measures outlined within the NIS[18] for the Kilkenny County Development plan **no potential for in-combination effects are identified.**
4th National Biodiversity Action Plan 2023-2027	Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "**NBAP**"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives. The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows.	The objectives set out in the NBAP aim to protect and enhance and promote biodiversity, nature restoration on the Island of Ireland and also contribute to International biodiversity initiative. Mitigation and enhancement measures as outlined in the EIAR and NIS for the Proposed Project also aim to protect and enhance biodiversity as such no cumulative impacts were identified upon review of the Plan in conjunction with the Proposed

[18] https://kilkennycoco.ie/eng/services/planning/development-plans/city-and-county-development-plan/adopted-city-and-county-development-plan.html

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
		Project. The Proposed Project will not contravene the proposed outcomes of the NBAP.
	Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity. Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan.	
	Objective 2: Meet Urgent Conservation and Restoration Needs. Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government.	
	Objective 3: Secure Nature's Contribution to People. Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy.	
	Objective 4: Enhance the Evidence Base for Action on Biodiversity. This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.	
	Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives. Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.	
Regional Spatial and	**RPO 1.b.** The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region.	The Regional Spatial and Economic Strategy for the Southern Region was comprehensively reviewed, with

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
Economic Strategy for the Southern Region (2020-2032)	**RPO 5. Population Growth and Environmental Criteria Increased population growth should be planned with regard to environmental criteria, including:** • Assimilative capacity of the receiving environment; • Proximity of Natura 2000 sites and potential for adverse effects on these sites, and their conservation objectives; • Areas with flood potential.	particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative effects when considered in conjunction with the current proposed development were identified.
	RPO 117 Flood Risk Management and Biodiversity It is an objective to avail of opportunities to enhance biodiversity and amenity and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned. Plans and projects that have the potential to negatively impact on Natura 2000 sites are subject to the requirements of the Habitats Directive	
	RPO 124 Green Infrastructure a. It is an objective to promote the concept of connecting corridors for the movement of wildlife and encourage the retention and creation of features of biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks, watercourses and wetlands. The RSES recognises the necessity of protecting such corridors and the necessity to encourage the management of features of the landscape that support the Natura 2000 network; b. Green infrastructure will be integrated into the preparation of statutory land-use plans in the Region, which will include identifying Green infrastructure and strengthening this network;	

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
	c. All Development Plans and Local Area Plans shall protect, enhance, provide and manage Green infrastructure in an integrated and coherent manner addressing the themes of biodiversity protection, water management and climate action; and should also have regard to the required targets in relation to the conservation of European sites, other nature conservation sites, ecological networks, and protected species; d. Any future development of greenways, blueways, peatways, cycleways or walkways will include an assessment by the relevant authorities of any impacts that may arise from increased visitor pressures, in particular, on sensitive European sites and the design of the network will consider the provision of protective measures on sites sensitive to disturbance/visitor pressure.	

6.6.2 Assessment of Projects

As described in Section 2.9 of the EIAR, relevant projects have been assessed cumulatively with the Proposed Project and include planning applications in the vicinity of the site, within the likely zone of influence of all habitats and species considered in this report and include other wind energy applications within the wider area. These have not been repeated here to reduce the duplication of information within this EIAR. However, they have been fully considered in the assessment with further detail provided below. In addition, Section 6.6.6 concludes on their potential for impact on biodiversity.

Table 6-24 provides the cumulative study areas for individual EIAR topics that are also relevant in relation to ecological receptors i.e., hydrological connectivity is important for assessing potential for effects on designated sites. Potential for cumulative effects in relation to birds is assessed separately within Chapter 7: Ornithology of this EIAR.

Table 6-6 Cumulative Study Areas in relation to ecological receptors (birds are assessed separately within Chapter 7 of this EIAR)

Individual Topic	Maximum Extent	Justification
Biodiversity (including Bats)	**Proposed Wind Farm:** 10 km from the Proposed Wind Farm Consideration for the Biodiversity cumulative extent is also given to the Birds and Water Cumulative geographical boundaries. **Proposed 110kV Underground Cabling route:** Within a 200m buffer zone of the Proposed 110kV Underground Cabling route.	Using the precautionary approach and given the nature and scale of the Proposed Project, the geographical boundary for terrestrial ecological aspects, i.e. habitats and species, is 10km for cumulative assessment for the Proposed Wind Farm site, and 250m from the Proposed Grid Connection site. In particular, this approach aligns with Nature Scot (2021) guidance: Bats and Onshore Wind Turbines.
Water	**Proposed Wind Farm:** Nore Catchment for large infrastructural developments such as wind farms, energy and public transport developments. River Sub Basins for all smaller proposed, permitted or existing plans or projects (i.e. private and commercial type developments). **Proposed 110kV Underground Cabling route:** Within a 200m buffer zone of the Proposed 110kV Underground Cabling route.	Regional surface water catchments are used for cumulative impact assessment with regard large infrastructural developments such as wind farms, energy and public transport developments. The potential for cumulative effects for these developments likely exists on a regional catchment scale (i.e. significant works likely existing in several sub-basins). Therefore, other wind-farm developments are considered within the Nore Catchment for cumulative effects. River Sub Basins are used for smaller developments (i.e. private & commercial type developments). These developments are not likely to present a significant cumulative impact risk on a regional catchment scale as any effects would likely be imperceptible as a result of the setback distances and localised nature of the associated works. Given the nature and

Individual Topic	Maximum Extent	Justification
		scale of the proposed works and the lack of hydrological cumulative impact potential beyond the river sub basin scale, the Water cumulative study area is defined by river sub basins in which the Proposed Wind Farm is located. Due to the narrow nature of the Proposed 110kV Underground Cabling route trench (~0.6m wide), a 200m buffer zone is an appropriate scale when considering potential cumulative effects on the water environment.

6.6.2.1 Other Wind Farm Projects

For the purposes of this cumulative assessment, wind farms within a 10-kilometre radius of the EIAR Site Boundary were considered in further detail below. Details of wind farm projects within 10km of the EIAR Site Boundary are provided in Appendix 2-3 of this EIAR and are summarised below also in the context of terrestrial ecology. 13 no. wind farms were identified as being within the cumulative study boundary as outline in Table 6-25 below. Potential for in-combination effects in relation to European sites are fully assessed in the NIS accompanying this application.

Table 6-5 Wind farm projects considered to be within the cumulative study area (Biodiversity) of the Proposed Project.

Wind Farm	Planning Status	Number of Turbines	Separation Distance (to EIAR Site boundary)	County
Lisdowney Wind Farm	Existing	4	c. 0.3 km	Co. Kilkenny
Seskin Renewables Wind Farm	Proposed	8	c. 0.6 km	Co. Kilkenny
Gathabawn Wind Farm	Proposed	12	c. 0.4 km	Co. Kilkenny
Ballybay Wind Farm	Existing	6	c. 8 km	Co. Kilkenny
Lisheen Wind Farm III	Existing	8	c. 9.4 km	Co. Kilkenny
An Cnoc Wind Farm	Existing	5	c. 9.8 km	Co. Tipperary
Foyle Wind Farm Extension	Permitted	3	c. 9.1 km	Co. Kilkenny
Foyle Wind Farm	Existing	4	c. 9.8 km	Co. Tipperary
Briskalagh Wind Farm	Permitted	7	c. 9.9 km	Co. Kilkenny
Ballynalacken Wind Farm	Permitted	12	c. 4.3 km	

Lisdowney Wind Farm

This wind farm consists of 4 no. turbines and is approx. 0.3 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Lisdowney Wind Farm was considered. The conclusion of the Biodiversity Chapter for Lisdowney Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. In additional, this is an existing wind farm and therefore the is no potential for cumulative impacts during construction. Given the lack of residual effects predicted as a result of the Proposed Project and Lisdowney Wind Farm, there is no potential for significant cumulative effects.

Seskin Renewables Wind Farm

This wind farm consists of 8 no. turbines and is approx. 0.6 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Seskin Wind Farm was considered. The conclusion of the Biodiversity Chapter for Seskin Renewables Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation

measures outlined in the report. No potential for in-combination effects is predicted given that the projects will unlikely be constructed at the same time.

Potential for cumulative effects during operation is limited to impacts on bats. The Proposed Project is not predicted to result in any significant residual effects on bats when considered alone. Collision risk has been assessed as Low under typical activity conditions and Medium at peak activity levels for a small number of species, with adaptive post-construction monitoring proposed to confirm predictions. No loss or damage to bat roosts is anticipated, no high-value commuting or foraging habitat will be affected, and no displacement of individual bats or local bat populations is predicted.

Given the lack of residual effects predicted as a result of the Proposed Project and Seskin Renewables Wind Farm, there is no potential for significant cumulative effects.

Gathabawn Wind Farm

This wind farm consists of 12 no. turbines and is approx. 0.4 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Gathabawn Wind Farm was considered. The conclusion of the Biodiversity Chapter for Gathabawn Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. No potential for in-combination effects is predicted given that the projects will unlikely be constructed at the same time.

Potential for cumulative effects during operation is limited to impacts on bats. The Proposed Project is not predicted to result in any significant residual effects on bats when considered alone. Collision risk has been assessed as Low under typical activity conditions and Medium at peak activity levels for a small number of species, with adaptive post-construction monitoring proposed to confirm predictions. No loss or damage to bat roosts is anticipated, no high-value commuting or foraging habitat will be affected, and no displacement of individual bats or local bat populations is predicted.

Given the lack of residual effects predicted as a result of the Proposed Project and Gathabawn Wind Farm, there is no potential for significant cumulative effects.

Ballybay Wind Farm

This wind farm consists of 6 no. turbines and is approx. 8 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Ballybay Wind Farm was considered. The conclusion of the Biodiversity Chapter for Ballybay Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. In additional, this is an existing wind farm and therefore the is no potential for cumulative impacts during construction. Given the lack of residual effects predicted as a result of the Proposed Project and Ballybay Wind Farm, there is no potential for significant cumulative effects.

Lisheen Wind Farm III

This wind farm consists of 8 no. turbines and is approx. 9.4 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Lisheen III Wind Farm was considered. The conclusion of the Biodiversity Chapter for Lisheen III Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. In additional, this is an existing wind farm and therefore the is no potential for cumulative impacts during construction. Given the lack of residual effects predicted as a result of the Proposed Project and Lisheen III Wind Farm, there is no potential for significant cumulative effects.

An Cnoc Wind Farm

This wind farm consists of 5 no. turbines and is approx. 10 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Cnoc Wind Farm was considered. The conclusion of the Biodiversity Chapter for Cnoc Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. In additional, this is an existing wind farm and therefore the is no potential for cumulative impacts during construction. Given the lack of residual effects predicted as a result of the Proposed Project and Cnoc Wind Farm, there is no potential for significant cumulative effects.

Foyle Wind Farm Extension

This wind farm consists of 3 no. turbines and is approx. 9.1 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Foyle Wind Farm Extension was considered. The conclusion of the Biodiversity Chapter for Foyle Wind Farm Extension was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. No potential for in-combination effects is predicted given that the projects will unlikely be constructed at the same time.

Potential for cumulative effects during operation is limited to impacts on bats. The Proposed Project is not predicted to result in any significant residual effects on bats when considered alone. Collision risk has been assessed as Low under typical activity conditions and Medium at peak activity levels for a small number of species, with adaptive post-construction monitoring proposed to confirm predictions. No loss or damage to bat roosts is anticipated, no high-value commuting or foraging habitat will be affected, and no displacement of individual bats or local bat populations is predicted.

Given the lack of residual effects predicted as a result of the Proposed Project and Foyle Wind Farm Extension, there is no potential for significant cumulative effects.

Foyle Wind Farm

This wind farm consists of 4 no. turbines and is approx. 9.8 km from the Site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Foyle Wind Farm was considered. The conclusion of the Biodiversity Chapter for Foyle Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. In additional, this is an existing wind farm and therefore the is no potential for cumulative impacts during construction. Given the lack of residual effects predicted as a result of the Proposed Project and Foyle Wind Farm, there is no potential for significant cumulative effects.

Briskalagh Wind Farm

This wind farm consists of 7 no. turbines and is approx. 9.9 km from the Proposed Wind Farm site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Briskalagh Wind Farm was considered. The conclusion of the Biodiversity Chapter for Briskalagh Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. No potential for in-combination effects is predicted given that the projects will unlikely be constructed at the same time.

Potential for cumulative effects during operation is limited to impacts on bats. The Proposed Project is not predicted to result in any significant residual effects on bats when considered alone. Collision risk has been assessed as Low under typical activity conditions and Medium at peak activity levels for a small number of species, with adaptive post-construction monitoring proposed to confirm predictions. No loss or damage to bat roosts is anticipated, no high-value commuting or foraging habitat will be affected, and no displacement of individual bats or local bat populations is predicted.

Given the lack of residual effects predicted as a result of the Proposed Project and Briskalagh Wind Farm, there is no potential for significant cumulative effects.

Ballynalacken Wind Farm

This wind farm consists of 12 no. turbines and is approx. 4.3 km from the Proposed Wind Farm site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Ballynalacken Wind Farm was considered. The conclusion of the Biodiversity Chapter for Ballynalacken Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. No potential for in-combination effects is predicted given that the projects will unlikely be constructed at the same time.

Potential for cumulative effects during operation is limited to impacts on bats. The Proposed Project is not predicted to result in any significant residual effects on bats when considered alone. Collision risk has been assessed as Low under typical activity conditions and Medium at peak activity levels for a small number of species, with adaptive post-construction monitoring proposed to confirm predictions. No loss or damage to bat roosts is anticipated, no high-value commuting or foraging habitat will be affected, and no displacement of individual bats or local bat populations is predicted.

Given the lack of residual effects predicted as a result of the Proposed Project and Ballynalacken Wind Farm, there is no potential for significant cumulative effects.

6.6.2.2 Existing Habitats and Land Uses

The potential for the Proposed Project to result in a cumulative loss or deterioration of habitats, or impact on the KER species identified, was considered in relation to the existing land uses in the area.

The Proposed Project is located primarily on Improved agricultural grassland (GA1) and Conifer plantation (WD4) habitats. The Proposed Project will result in the loss of 27.5 ha Conifer plantation (WD4) which supports some protected species such as red squirrel and pine marten. However, the loss of this habitat within the EIAR Site Boundary will be minimal (10% of total habitat within the EIAR Site Boundary) in the context of this habitat in the wider landscape. The loss of this habitat associated with other wind farm developments in the wider area will also be minimal and cumulative loss of this habitat type in the wider landscape is not considered significant. Furthermore, forestry re-planting is ongoing within the EIAR Site Boundary and wider landscape and a replanting plan will be implemented. The Proposed Wind Farm is also located within agricultural grassland, which generally provides low value habitats for faunal species. The loss of linear habitats including Treelines (WL2) and Hedgerow (WL1) (9.76% of total linear features within the EIAR Site Boundary) will be mitigated through the replanting measures described in the BEMP. The Proposed 110kV Underground Cabling route will not result in significant loss of any habitat or change in land use as works are proposed within the existing road corridor or farm access tracks. The Proposed Project will not contribute to any overall loss of high value habitat, as it has been deliberately designed to be located on habitats of low ecological value.

The review of the relevant planning registers documented relevant general development planning applications in the vicinity of the site, the majority of which relate to the provision and/or alteration of one-off housing and the provision of agricultural buildings. The OPW (www.floodinfo.ie) does not record the presence of any Arterial Drainage Schemes or Benefited Lands within the EIAR Site Boundary or along the Proposed 110kV Underground Cabling route.

6.6.2.3 Other Projects Within 250m of Proposed Grid Connection Site

A desk-based planning search was undertaken to identify permitted developments within 250m vicinity of the Proposed 110kV Underground Cabling route using the Kilkenny County Council planning portal.

Given the lack of significant residual effects predicted as a result of the Proposed Project, and the small nature of the developments within 250m of the Proposed 110kV Underground Cabling route there is no potential for likely significant cumulative effect when considered in-combination with these projects. The works along the Proposed Grid Connection Site are minor and transient, similar to roadworks being completed across the country and have no potential for significant cumulative effects on ecology.

6.6.3 Cumulative Effects with Agriculture

Agricultural practices such as the movement of soil and the addition of fertilizers and pesticides can lead to nutrient losses and the entrainment of suspended solids in local surface watercourses. This can have a negative effect on local and downstream surface water quality.

In an unmitigated scenario the Proposed Project would have the potential to interact with these agricultural activities and contribute to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

However, the mitigation measures detailed in Section 9.5 of Chapter 9 for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

For these reasons, we consider that there will not be a significant cumulative effect associated with agricultural activities.

6.6.4 Cumulative Effects with one Off Housing Developments

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within the cumulative assessment area described above.

There are applications are for new dwellings or renovations of existing dwellings, as well as for the erection of farm buildings. Based on the scale of the works, their proximity to the Site and the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Project (construction, operation and decommissioning phases).

6.6.5 Cumulative Effects with Commercial Forestry

The most common water quality problems arising from forestry relate to the release of sediment and nutrients to the aquatic environment and impacts from acidification. Forestry works can also give rise to modified stream flow regimes caused by associated land drainage.

However, the mitigation measures detailed for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

For these reasons we consider that there will not be a significant cumulative effect associated with commercial forestry activities.

6.6.6 Assessment of Cumulative Effects

The residual construction, operational and decommissioning impacts of the Proposed Project are considered cumulatively with other plans and projects as described in Sections 6.6.2. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Project and those that could potentially result in cumulative impacts on designated sites, surface water, habitats and species. A cumulative impact assessment specific to the potential for impacts on bats is provided in **Appendix 6-2** and summarised here also.

Following the detailed surveys undertaken and impact assessment provided in Section 6.6 (including mitigation measures), it is concluded that there will be no significant residual habitat loss, disturbance, deterioration of water quality associated with the Proposed Project and therefore it cannot contribute to any cumulative effect when considered in-combination with other plans and projects. The other wind farms in the area were considered (among other projects) but the Proposed Project has been deliberately designed to minimise the effects on biodiversity through the siting of the Proposed Wind Farm on habitats of low ecological value and an emphasis on protection of surface water features (and associated aquatic fauna) during construction of the Proposed Project. The Proposed Project also includes a Biodiversity Management and Enhancement Plan, which further minimises /mitigates any potential for individual or cumulative negative effects on biodiversity and proposes enhancement measures for habitats and species within the EIAR boundary.

No significant effects as a result of the Proposed Project in relation to disturbance, displacement or mortality of faunal species has been identified. Therefore, there is no potential for the Proposed Project to contribute to any cumulative effect in this regard.

In the review of the projects and plans that was undertaken, no connection that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Proposed Project.

6.7 Conclusion

Following consideration of the residual effects (post mitigation) it is concluded that the Proposed Project will not result in any significant effects on any of the identified KERs. No significant effects on receptors of International, National, County Importance or Local importance (higher value) were identified.

The potential for effects on the European Designated Sites is fully described in the Natura Impact Statement that accompanies this application. The NIS concludes that in view of best scientific knowledge and on the basis of objective information, the Proposed Project either individually or in combination with other plans or projects, is not likely to have adverse effects on the European Sites that were assessed as part Appropriate Assessment process. Similarly, with the prescribed mitigations in place, there is no potential for impact on any nationally designated site.

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