Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Lackareagh Wind Farm, Co. Clare

Chapter 6 – Biodiversity

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6. BIODIVERSITY

6.1 Introduction

This chapter 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), EU Habitats Directive 92/43/EEC. Impacts on avian features 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 features.
- A description of the Baseline Ecological Conditions and Feature 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 and associated foundations and hardstanding areas, including access roads, underground cabling, permanent meteorological mast, temporary construction compounds, carriageway strengthening works, junction accommodation works, peat and spoil management, tree felling, site drainage, operational stage signage, battery energy storage system, proposed onsite 38kV substation, a single-story control building with welfare facilities, all associated electrical plant and equipment, security fencing, entrance on to existing track, all associated underground cabling, wastewater holding tank 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 Route' is referred to, this refers to underground 38kV cabling connecting to the existing Ardnacrusha 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection Route 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.

In addition:

- The 'EIAR Site Boundary' comprises the entire area shown in Figures 6-1 and 6-2 and is also referred to as the 'study area' in this Chapter.
- '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 features 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 features.

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.

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).

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

[1] https://www.npws.ie/protected-sites/nha (accessed May 2024).

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 features 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 Management Plan (BEMP) (see Appendix 6-4).

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 SAC. 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

[2] https://pollinators.ie/wp-content/uploads/2022/12/Wind-Farm-Pollinator-Guidelines-2022-WEB.pdf *(accessed April 2024).*
[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.*

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 Ecological Impact Assessment. 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:

- 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).

6.1.2 Review of Relevant Guidance and Sources of Consultation

The assessment methodology is based primarily upon the National Road Authority (NRA) *'s Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2* (NRA, 2009a) and the survey methodology is based on the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 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.

In addition, the following guidelines were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

[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.*

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2022).

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Chapter 1 of this EIAR.

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

- Clare County Development Plan 2023-2029
- 4th National Biodiversity Action Plan 2023-2027
- 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

This EIAR chapter has been prepared by Neansaí O'Donovan (B.Sc.) and Timothy O'Ceallaigh (B.Sc.). Neansaí has over three years' experience in ecological consultancy and has worked on Appropriate Assessments and Ecological Impact Assessments for a range of project types, including commercial infrastructure, transport infrastructure and forestry. Timothy O'Ceallaigh has relevant academic qualifications and is competent in undertaking habitat and ecological assessments. This report has been reviewed by Rachel Walsh (B.Sc.,) and John Hynes (B.Sc., M.Sc., MCIEEM). Rachel is a Senior Ecologist with 4 years' experience in professional ecological consultancy and holds a BSc (Hons) in Environmental Science from National University of Ireland, Galway. Rachel's key strengths are in terrestrial flora and fauna ecology, including Irish Vegetation Classification surveys, habitat mapping, invasive species surveys, mammal surveys, Appropriate Assessment reporting and Ecological Impact Assessment. Since joining MKO, Rachel has worked widely on renewable energy infrastructure projects, wastewater infrastructure projects and residential projects and manages a team of ecologists within the company. John Hynes is the Ecology Director at MKO, with over 12 years' professional experience in the public and private sector. John oversees MKO's Ecology, Ornithology, Forestry, Bats, and GIS teams. John holds a B.Sc. in Environmental Science and a M.Sc. in Applied Ecology. John's key strengths and areas of expertise are in Appropriate Assessment of plans and projects, Ecological Impact Assessment, Flora and Fauna survey methods and design, project management and project strategy. John is experienced as a coordinator or large multi-disciplinary teams on complex ecological projects.

The baseline ecological surveys including bat habitat assessment and activity surveys were conducted by MKO ecologists; Neansaí O'Donovan (B.Sc.), Rachel Walsh (B.Sc.), Timothy O'Ceallaigh (B.Sc.), Kieran Sugrue (B.Sc.), Sara Fissolo (BSc) and Stephanie Corkery (BSc, MSc). 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.).

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.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS)[5], EPA maps[6], Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI)[7].
- Inland Fisheries Ireland (IFI) Reports.
- Data on potential occurrence of rare plant and bryophytes – as per NPWS online map viewers; Flora Protection Order 2022 Map Viewer[8].
- 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 Biodiversity 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.

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:

[5] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba Accessed 30/04/2024
[6] https://gis.epa.ie/EPAMaps/ Accessed: 30/04/2024
[7] https://ifigis.maps.arcgis.com/apps/webappviewer/index.html?id=9a31fedb077c4fb29911848842b7ef025 Accessed 30/04/2024
[8] https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=a41ef4e10227499d8de17a8abe42bd1e Accessed: 30/04/2024

- All designated sites within the vicinity of the Proposed Project site 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 Article 17 Reporting

A review of the 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 datasets was carried out as part of this assessment.

6.2.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this EIAR, as described in Chapter 2, Section 2.7 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.

Table 6-1 Organisations consulted with regard to biodiversity.

Consultee	Response date	Response received	Addressed in Chapter
An Taisce	06/12/2022	Acknowledgement of request	
Bat Conservation Ireland	-	No response received to date	
Birdwatch Ireland	-	No response received to date	
Commission for Regulation of Utilities, Water and Energy	-	No response received to date	
Clare County Council - Environment	06/12/2022	Acknowledgement of request	
Department of Agriculture, Food and the Marine	22/12/2022	"The Felling Division of the Dept responded with the following points: If the Proposed Development will involve the felling or removal of any trees, the developer must obtain a felling licence from this department before any trees are	Chapter 4

Consultee	Response date	Response received	Addressed in Chapter:
		felled or removed. The document provides a link to where the felling licences can be applied for. The developer should take note of the contents of the Felling and Reforestation policy document which provide a consolidated source of information on the legal and regulatory framework relating to tree felling. Where an application is lodged, the following is considered: 1. the interaction of the proposed works with the environment locally and more widely, in addition to the potential direct and indirect impacts on designated sites and water, is assessed. Consultation with the relevant environmental and planning authorities may be required where specific sensitivities arise. 2. where an application is received, the Dept will publish notice of the application before making a decision on the matter. this gives anyone a chance to make comments on the application within 30 days. 3. Third parties that make a submission or observation will be informed of the decision to grant or refuse the licence, the main reasons, and considerations on which the decision to grant or refuse the licence was based, and the conditions attached to the licence. It is important that when applying to a Local Authority or ABP for planning permission where developments are: a) subject to EIA b) Subject to AA or NIS c) the proposed development in its construction or operational phase would directly or indirectly involve the felling and replanting of trees 1. that there is a requirement under the EIA Directive to assess the effects of the project in relation to felling and deforestation. and,	

Consultee	Response date	Response received	Addressed in Chapter:
		2. any EIAs and NISs should include an assessment and provide any necessary mitigation etc pursuant to the felling and deforestation. "	
Department of Communications, Climate Action and the Environment	-	No response received to date	
Department of Housing, Local Government and Heritage	06/12/2022 19/01/2023	Nature Conservation - NPWS Bird surveys for all species should cover bird usage and facilitate assessment of potential collision risk, habitat loss, barrier effect and displacement for these species and should be based around the daily and seasonal activity patterns of the species being surveyed. Survey work should be year-round and cover at least 2 years. There are breeding Peregrines roughly 1km east of Broadford - the nest site is 3.8km from the boundary of the Proposed Development. Hinterland surveys should include breeding raptor surveys, including roost watches, surveys for nocturnal species and other species-specific surveys as appropriate. Vantage point surveys should be done in a manner that ensures sufficient data is collected to allow an assessment of the importance of all the flight paths into, out of and between sites to assess migratory movements. The Dept recommends that a visibility analysis of topography and vegetation is used in the selection of Vantage Points for ornithological surveys. Technological solutions should also be considered in conjunction with VP surveys to ensure sufficient data is compiled for assessment. Cumulative impact on birds from wind farms needs to be considered. Damage/disturbance to any roosts must be avoided in the first instance. While a derogation licence may be issued, a licence can only be granted once a number of strict criteria have been met (see Regulation 54). An assessment of the impact of the proposed wind farm should be carried out noting recent guidelines	Chapter 6, NIS, Appendix 6-2 Bat Report, Appendix 6-4 Biodiversity Management and Enhancement Plan, Chapter 7, Chapter 8, Chapter 9, Appendix 8-2 Geotechnical and Peat Stability Report, CEMP *Note – cumulative effects assessed in EIAR chapters 5-16.

Consultee	Response date	Response received	Addressed in Chapter:
		available 'Bat and Onshore Wind Turbines: Survey, Assessment and Mitigation, 2019' published jointly by Scottish Natural Heritage and Bat Conservation Trust and other stakeholders. the Dept highlighted new research patterns of bat activity on uplands sites which indicates it is more appropriate to use 30-day survey periods with static automated detectors, in each season, and in different weather conditions to reduce sampling bias and to accurately determine when the curtailment mitigation is required in the operational phase. The EIAR should include a detailed assessment of the hydro impacts on wetlands from the proposed development. Any watercourse or wetland which may be impacted should be surveyed for the presence of protected species and species listed on Annexes II and IV of the Habitats Directive. Species such as Otter, salmon, lamprey, freshwater pearl mussel, white-clawed crayfish, frogs, newts, and Kingfishers. Flood plains, if present, should be identified in the EIAR and left undeveloped to allow for the protection of these valuable habitats and provide areas for flood water retention. If applicable, the EIAR should take account of the guidelines entitled 'The Planning System and Flood Risk Management' published by the Department of the Environment Heritage and Local Government in November 2009. Peat stability should be assessed where required. Marsh fritillary surveys should be carried out as per standard Marsh Fritillary Larval Web Survey methodology. Ballygareen wood is 1.7km east of the proposed site. It is considered to be an important site nationally and was listed as one of the top ten woodland sites in Co Clare. it is currently being assessed for potential NHA designation.	

Consultee	Response date	Response received	Addressed in Chapter:
		Hedgerows and scrub should be maintained where possible, as they form wildlife corridors and provide areas for birds to nest in. The EIAR should provide an estimate of the length/area of any hedgerow/scrub that will be removed. Where it is proposed that trees or hedgerows will be removed, there should be suitable planting of native species in mitigation incorporated into the EIAR. vegetation should not be removed during the nesting season (i.e. March to August). The EIA should assess the issue of alien plant species such as Japanese knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during construction. If applicants are not in a position to state the exact location and details of cable routes at the time of application, then they need to consider the range of options that may be used in their assessment. Should the exact height and rotor diameter not be known at the EIAR stage then the assessment of impacts must be applicable to a variety of turbine heights and rotor diameters which could be used. All potential cumulative projects (especially Carrownagowan wind farm) should be assessed. Complete project details (including a CEMP) should be provided in the EIAR. Ecological enhancement methods should be considered as part of the development. Any enhancement should have sufficient detail to be implemented sufficiently. It is suggested that a habitat management plan (HMP) or Ecological Design Strategy (EDS) is carried out with sufficient detail included. The national biodiversity action plan aims to conserve and restore Ireland biodiversity. A key objective is to achieve no net contribution to biodiversity loss arising from development projects occurring within the lifetime of the plan.	

Consultee	Response date	Response received	Addressed in Chapter:
		The EIAR should outline how the project will avoid net loss of biodiversity. In order to carry out the AA Screening and NIS, information about relevant European Designated Sites their conservation objectives should be collected. "	
Geological Survey of Ireland	15/12/2022	"GSI provided us with a number of datasets they recommend are used in the EIAR. **Geo heritage:** GSI records show that there are no County Geological Sites in the vicinity of the Proposed Wind Farm. **Groundwater:** The groundwater data viewer indicates an aquifer classed as a 'Poor Aquifer - Bedrock which is Generally unproductive except for local zones' underlies the proposed development. The Groundwater Vulnerability map indicates the range of groundwater vulnerabilities within the area covered as 'variable'. GSI would recommend the use of the Groundwater Viewer to identify areas of High to Extreme vulnerability and 'Rock at or near Surface' in our assessments, as any groundwater-surface water interactions that might occur would be greatest in these areas. The groundwater protection response and overview should be reviewed also. **Geological Mapping** GSI advise that they have recently launched QGIS compatible bedrock layers, which would be convenient for our use. **Geohazards:** landslides are common in areas of peat, rock near surface and in fine to coarse range materials (such as glacial tills), areas which are found within the Proposed	Chapter 8, Chapter 9

Consultee	Response date	Response received	Addressed in Chapter:
		Development Site. GSI has info on landslides on the National Landslide Database and Landslide susceptibility Map which are available on their Map Viewer. **Natural Resources (Minerals/Aggregates):** GSI recommend the use of the Aggregate Potential Mapping Viewer to identify areas of High to Very High source aggregate potential within the area. In keeping with a sustainable approach, GSI recommend the use of their data and mapping viewers to identify and ensure natural resources used in the Proposed Development are sustainably sources from properly recognised and licenced facilities, and that consideration on future resource sterilization is considered. "	
Inland Fisheries Ireland	05/01/2023	IFI reserves the right to make further comment at the planning stage of this project. Prevention of discharges of polluting matter such as cement: uncured concrete can kill fish by altering the pH of the water. Pre-cast concrete should be used whenever possible, to eliminate the risk to fish and aquatic life. When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from any water that may enter watercourses for a period sufficient to cure the concrete. Prevention of silt deposition in streams: One of the potential impacts from the development is the discharge of silt-laden water to streams. The silt can clog salmonid spawning beds and can also precipitate further riverbank erosion downstream thereby escalating the deleterious impact. Inevitably, this can lead to loss or degradation of valuable habitat. It is important to incorporate best practices into construction methods and strategies to minimise discharges of silt/suspended solids to waters. Silt traps should be constructed at locations that will intercept run-off to	Chapter 4, Appendix 4-2 CEMP, Chapter 6, Chapter 9

Consultee	Response date	Response received	Addressed in Chapter:
		streams and appropriately sized to provide sufficient retention time both during normal and flood flow conditions. the silt traps should not be constructed immediately adjacent to natural watercourses. A buffer zone should remain between the silt trap and the watercourse with natural vegetation left intact so as to assist silt interception. Given the size of watercourses in the vicinity of the wind farm, a suspended solids limit discharge of 10mg/l should be the objective. All natural watercourses that have to be transversed during the site development work should be effectively bridged prior to commencement. The crossing of watercourses at fords is an unacceptable because of the amount of uncontrolled sedimentation that can be generated by their use. measures must be put in place to prevent silt run-off during road construction. All road drainage channels or swales should have low rock dams located at appropriate intervals in order to reduce erosive energy and allow precipitation of solids. Stream Crossings: Bridging should be of a nature that will not interfere with the natural streambed, stream width or its gradient. Clear span designs maintain the stream channel profile, do not alter stream gradients, readily pass sediment and debris, and retain natural stream bed and gradient. Embedded culvert pipes are acceptable in fish-bearing waters. Embedded pipe culverts are intended to maintain natural channel gradient, stream width and substrate configuration. On fisheries waters, they should be buried to a minimum of 0.5m, below the stream bed at the natural gradient, and sized to maintain the natural stream channel width. Non-embedded culverts are not recommended. Hardcore areas: The increased volumes of surface water run-off from hardcore areas	

Consultee	Response date	Response received	Addressed in Chapter:
		must not impact on any aquatic habitat by giving rise to erosion. Storage of fuels/oils etc: All storage areas must be adequately bunded and hydrocarbon interceptors placed in locations to contain potential spillages on loading/working areas. Having particular regard to the foregoing, ground stability should be kept under constant review, and that tree felling operations and site development works should be carried out in such a manner as not to result in creation of unstable ground conditions. The Owenogarney system is an important Salmonid spawning river with salmon and trout recorded in the upper reaches of streams draining in both the Sliabh Ghleann na gCailleach/Lackareagh Mountain and Sliabh Bearnach areas of the development site and as such is especially sensitive to silt losses emanating from site works.	
Irish Peatland Conservation Council	-	No response received to date	
Irish Red Grouse Association	-	No response received to date	
Irish Raptor Study Group	-	No response received to date	
Irish Peatland Conservation Council	-	No response received to date	
Irish Wildlife Trust	-	No response received to date	
SW LAWPRO	06/12/2022	LAWPRO doesn't provide responses to statutory matters and recommended we contact the local authority instead.	
The Heritage Council	-	No response received to date	

Consultee	Response date	Response received	Addressed in Chapter
Waterways Ireland	-	No response received to date	

6.2.3 Field Surveys

Comprehensive surveys of the biodiversity within the EIAR Site Boundary were 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 carried out within the Proposed Wind Farm site were carried out between September 2022 and March 2024 and are summarised in Table 6-2 below. An assessment of the Proposed Grid Connection Route was also undertaken on the 5th of January 2023. 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. Infrastructure at five of these watercourse crossing points was further assessed for potential to support roosting bats (further detailed provided in Bat Report, Appendix 6-2).

Table 6-2: Ecology Surveys Informing the EIAR

Survey Type	Dates	Appendix
Multi-disciplinary walkover (incl. habitats)	21st and 23rd September 2022 28th September 2023 21st February 2024	N/A
Detailed Botanical Surveys – Irish Vegetation Classification (IVC)	21st and 23rd September 2022 28th September 2023 21st February 2024	Botanical Report, Appendix 6-1
Badger/Mammal survey and camera trap set up	4th November 2022, 1st December 2022 5th January 2023	N/A
Marsh fritillary survey	21st and 23rd September 2022 28th September 2023	N/A
Bat Surveys	Various (detailed in Bat Report)	Bat Report, Appendix 6-2
Aquatic surveys (including otter)	6th, 7th and 8th July 2022 6th March 2024	Aquatics Report, Appendix 6-3
Survey of Blackwater Bridge	Various (detailed in Bat Report) 6th March 2024 (Otter)	Bat Report, Appendix 6-2

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

Multidisciplinary walkover surveys were undertaken within the Proposed Wind Farm site. Surveys were undertaken within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire Proposed Wind Farm site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys. During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected species. The survey included a search for mammal signs (bats, badger, red squirrel etc.) and areas of suitable habitat to support these species, potential features likely to be of significance to bats and additional habitat features for the full range of other protected species that are likely to occur in the vicinity of the Proposed Project (e.g. otter etc.). Bird species observed during the multi-disciplinary surveys were also recorded.

The multi-disciplinary walkover surveys comprehensively covered the Proposed Wind Farm site and Proposed Grid Connection Route and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. Other targeted surveys undertaken within the Proposed Project are described in the following subsections.

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.

Detailed botanical surveys/relevé assessments of the Proposed Wind Farm site were also undertaken throughout multidisciplinary walkover surveys carried out from 2022 to 2024. 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. Euro 27. European Commission DG Environment.
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014). Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, 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, 2019).

6.2.3.2.1 Vegetation composition assessment

Detailed habitat classification and assessment was undertaken at targeted locations within the site, with relevés undertaken within 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 field maps app. A representative photograph was also taken for each of the habitats recorded on site, including all relevés. The location of all quadrats is shown in Appendix 6-1.

The survey results were then analysed in accordance 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)[9] 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 below 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.

6.2.3.3 Terrestrial Fauna Surveys

The results of the desk study, scoping replies, incidental records of protected species during ecological survey work and multidisciplinary walkover surveys were used to inform the scope of targeted

[9] *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: 30/04/2024*

ecological surveys required. Dedicated surveys for badger and marsh fritillary were undertaken as part of the walkovers on the dates set out in Section 6.2.3.1 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 Proposed Wind Farm site 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 Grid Connection Route were undertaken by MKO. 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

The badger survey was conducted adhering to best practice guidance (NRA, 2009b) and CIEEM best practice competencies for species surveys[10]. Areas identified as providing potential habitat for badger were subject to specialist targeted surveys. The badger surveys aimed to determine the presence or absence of badger within the Proposed Wind Farm site and wider survey area. This involved a search for all potential badger signs (latrines, badger prints, mammal tracks and setts). Where potential setts were identified these were mapped and classified according to their status (i.e. main, annexe, subsidiary, outlier) and level of usage (disused, well-used, active). Where setts were identified as potentially being used/active camera traps were set up to confirm if they were in active use by badger. The badger survey was not constrained by vegetation given the nature of the habitats within the site and the timing of the surveys.

6.2.3.3.2 Otter Survey

Otter surveys were conducted adhering to best practice guidance (NRA, 2009b) and CIEEM best practice competencies for species surveys[11]. All watercourses within the Proposed Wind Farm site, and along the Proposed Grid Connection 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. Where otter signs were observed these were mapped.

6.2.3.3.3 Marsh Fritillary Surveys

Taking account of the findings of the desk study, which showed records of marsh fritillary in hectad R67, during baseline ecological walkover surveys, targeted larval web surveys for the species were undertaken. The surveys were undertaken within the optimal period i.e. August – September, on dry days, with no rain and no to little wind. The survey methodology followed best practice guidance (NRA, 2009b). Where potentially suitable marsh fritillary habitat was identified a systematic search of the area to locate larval webs was undertaken.

6.2.3.3.4 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.

Survey design and effort in 2022 was created in accordance with the best practice guidelines available, '*Bat Surveys: Good Practice Guidelines'* prepared by the Bat Conservation Trust (Collins, 2016). Surveys were undertaken in strict accordance with those prescribed in NatureScot (2021) '*Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*'. This is in line with standard best practice

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

industry guidelines. A new edition of the BCT Guidelines (Collins, 2023) was published after the site surveys were undertaken and was taken into consideration when undertaking this assessment. The assessment and scope of surveys were considered appropriate for the site.

6.2.3.4 Aquatic surveys

Dedicated aquatic baseline surveys were undertaken by Triturus Environmental along with follow up surveys undertaken by MKO Ecologists. 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 site. 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 survey), Macro-invertebrates (biological water quality), Otter (*Lutra lutra*) 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 and Section 6.4.2.6 below.

6.2.4 Methodology for Assessment of Impacts and Effects

6.2.4.1 Identification of Target Features 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'* (NRA, 2009a) and '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine'* (CIEEM, 2022). The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, site visits were undertaken on the dates listed in Section 6.2.3 (not including bat surveys and stakeholder consultation). "Target features" likely to occur in the zone of influence of the development were identified. The target features included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the likely Zone of Influence.
- Species protected under the Wildlife Acts
- Species protected under the Flora Protection Order 2022

6.2.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the site was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the '*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*' (NRA, 2009). 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 feature. The guidelines provide a basis for determination of whether any particular feature 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. Locally Important (lower value) features contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. 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 features.

Any ecological features that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any features that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

6.2.4.3 Characterisation of Impacts and Effects

The construction, operation and subsequent decommissioning of the Proposed Project will result in a range of impacts. The ecological effects of these impacts are characterised as per the CIEEM '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (2022). 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 feature.
- **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 features 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 are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2022).

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, 2022).

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.
- 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

Constraint studies, as described in Section 3.2.6 and 3.2.7 of Chapter 3 of this EIAR, have been carried out to ensure that turbines and all ancillary infrastructure are located in the most appropriate areas of the site. Section 6.6 of this Biodiversity chapter assesses the potential effects of the Proposed Project to ensure that all effects on sensitive ecological features are adequately addressed. Where significant effects on sensitive ecological features 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. No significant limitations in the scope, scale or context of the assessment have been identified.

6.3 Establishing the Ecological Baseline

6.3.1 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.

6.3.1.1 Designated Sites

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

Table 6-4 provides details of all relevant Nationally designated sites initially considered to potentially be within the Zone of Influence (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, four European sites were identified to be within the ZoI of the Proposed Project, namely:

- Slieve Bernagh Bog SAC
- Glenomra Wood SAC [001013]
- Lower River Shannon SAC [002165]
- Lough Derg (Shannon) SPA [004058]

- River Shannon and River Fergus Estuaries SPA [004077]

The Slieve Bernagh Bog SAC is located directly to the north of the Proposed Wind Farm site. However, this SAC is located upgradient of the Proposed Project and no works are proposed upgradient of this designated site. Due to the terrestrial nature of the QIs designated for the Slieve Bernagh Bog SAC, no connectivity between the development site and the SAC was identified. Therefore, there is no potential for direct or indirect effect and further assessment is not required.

The Proposed Grid Connection Route overlaps with Glenomra Wood SAC via local road L3046 which bisects the SAC. The potential for likely significant effects was identified in relation to potential habitat loss during construction in the absence of mitigation.

The Lough Derg (Shannon) SAC is located approximately 5km from the EIAR Site Boundary at its nearest point and was considered for likely significant effects on the core foraging range for Cormorant (5.2km, Thaxter et al. 2012).

The Lower River Shannon SAC is located approximately 5.8km downstream of the Proposed Grid Connection Route at its closest point and is hydrologically linked to the Proposed Wind Farm site approx. 29.4km downstream. The River Shannon and River Fergus Estuaries SPA is located approximately 14.4km downstream of the Proposed Grid Connection Route and is hydrologically linked to the Proposed Wind Farm site approx. 32.1km downstream. Potential for likely significant effects was identified in relation to deterioration on water quality (and associated indirect effects on QI/SCI species) during construction in the absence of mitigation. Further information is provided in the Appropriate Assessment Screening Report (AASR), which is included as Appendix 1 to the Natura Impact Statement (NIS).

Doon Lough NHA was identified as being within the likely ZoI of the Proposed Project along with the Glenomra Wood, Castle Lake and Fergus Estuary and Inner Shannon, North Shore pNHAs. According to the NPWS scoping exercise, Ballygareen Wood which is located approx. 1.7km east of the Proposed Wind Farm site is considered to be an important site nationally and is currently being assessed for potential NHA designation; however, as it is not currently a designated site it is not assessed further below in Table 6-4.

Table 6-4 Identification of Nationally designated sites within the Likely ZoI

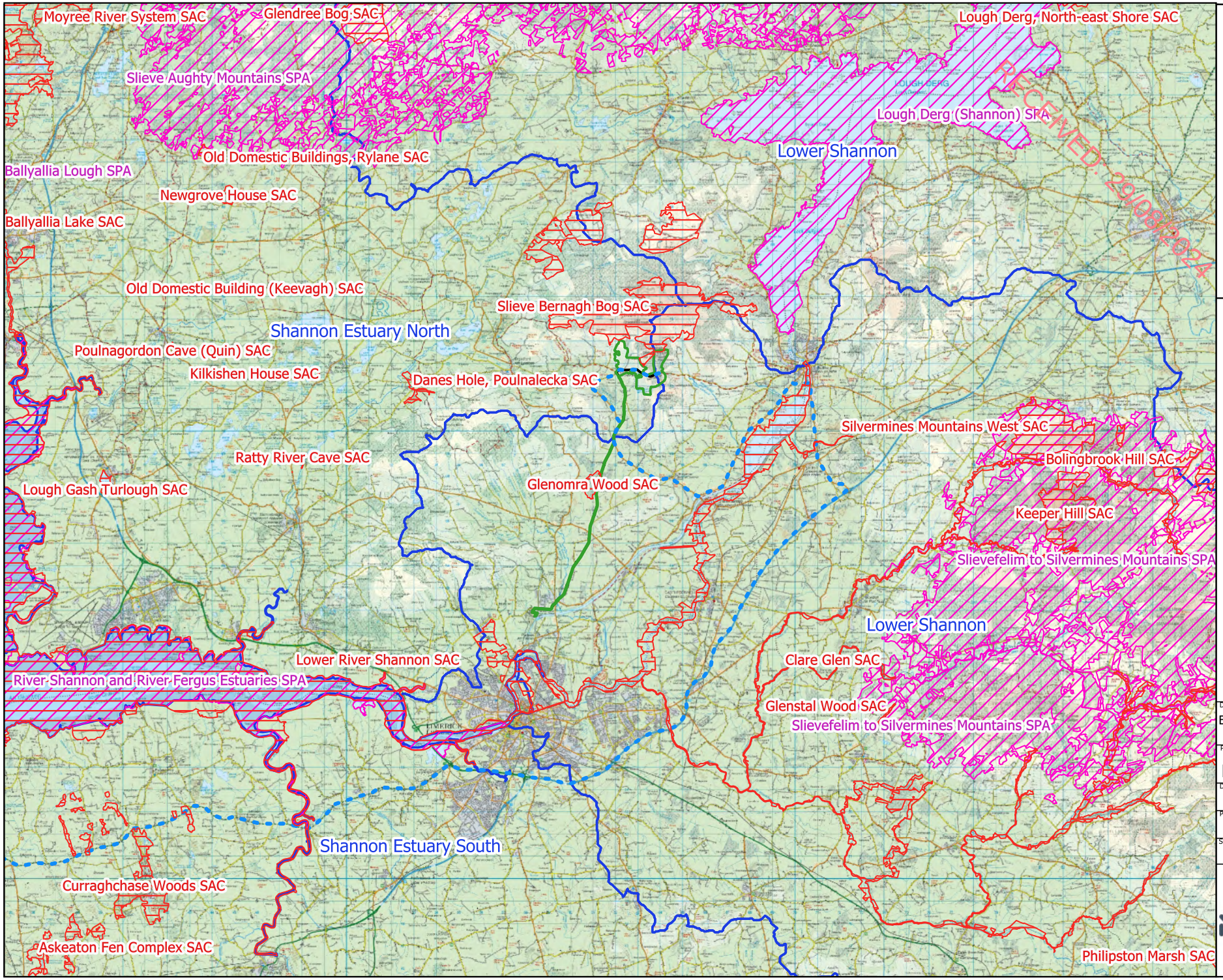
Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
Natural Heritage Areas (NHA)		
Doon Lough NHA [000337]	5km	No pathway for direct effects on the terrestrial habitats for which the NHA has been designated exists. The NHA and the Proposed Project partially lie within the same groundwater body (Tulla Newmarket-on-Fergus). Areas of the site of proposed works range from moderate to extremely high groundwater vulnerability. The NHA and the Proposed Project lie within the same hydrogeological catchment. The study area drains into the Broadford River which flows directly into Doon Lough 5km west of the study area.

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		As the QI listed for this NHA is potentially sensitive to surface water and groundwater disturbance it is likely that **this NHA is within the likely Zone of Influence and will require further assessment.**
Gortacullin Bog NHA [002401]	5.6km	No pathway for direct effects on the terrestrial habitats for which the NHA has been designated exists. The NHA and the Proposed Project site lie within the same hydrogeological catchment, however, no source pathway-feature chain was identified due to the distance between the NHA and the study area and the lack of surface water connectivity. **This NHA is therefore not within the Likely Zone of influence.**
Cloonloum More Bog NHA [002307]	9.3km	No pathway for direct effects on the terrestrial habitats for which the NHA has been designated exists. The NHA and the Proposed Project site lie within the same hydrogeological catchment, however, no source pathway-feature chain was identified due to the distance between the NHA and the study area and the lack of surface water connectivity. **This NHA is therefore not within the Likely Zone of Influence.**
Loughanilloon Bog NHA [001020]	9.5km	No pathway for direct or indirect effects on the terrestrial habitats for which the NHA has been designated exists. **This NHA is therefore not within the Likely Zone of Influence.**
Ayle Lower Bog NHA [000993]	11.5km	No pathway for direct or indirect effects on the terrestrial habitats for which the NHA has been designated exists. **This NHA is therefore not within the Likely Zone of Influence.**

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
Woodcock Hill Bog NHA [002402]	12.5km	No pathway for direct or indirect effects on the terrestrial habitats for which the NHA has been designated exists. No direct or indirect hydrological connectivity has been identified between the Proposed Project site and the NHA as they are located within separate hydrogeological sub catchments. No pathway for indirect effects on the terrestrial habitats for which the NHA has been designated exists. **This NHA is therefore not within the Likely Zone of Influence.**
Proposed Natural Heritage Area (pNHA)		
Glenomra Wood [001013]	3.6km	There is potential for direct effects as the Proposed Grid Connection Route overlaps with this site via the local road L3046 which bisects this pNHA. **This pNHA is within the likely Zone of Influence and will require further assessment.**
Lough Derg [000011]	5.3km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. This pNHA is in a separate hydrological catchment as the Proposed Project. No hydrological connectivity to the Proposed Project site exists. **This pNHA is therefore not within the Likely Zone of Influence.**
Lough O'Grady [001019]	8.9km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. This pNHA is in a separate hydrological catchment as the Proposed Project. No hydrological connectivity to the Proposed Project site exists, therefore there is no potential for indirect effects. **This pNHA is therefore not within the Likely Zone of Influence.**
Danes Hole, Poulnalecka [000030]	9.5km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. No pathway for

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		indirect effects on the feature for which the pNHA has been designated exists. **This pNHA is therefore not within the Likely Zone of Influence.**
Cloonlara House [000028]	9.6km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. No pathway for indirect effects on the feature for which the pNHA has been designated exists. **This pNHA is therefore not within the Likely Zone of Influence.**
Castleconnell (Domestic Dwelling, Occupied) [000433]	10.4km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. No pathway for indirect effects on the feature for which the pNHA has been designated exists. **This pNHA is therefore not within the Likely Zone of Influence.**
Knockalisheen Marsh [002001]	11.7km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. No pathway for indirect effects on the terrestrial habitats for which the pNHA has been designated exists. **This pNHA is therefore not within the Likely Zone of Influence.**
Castle Lake [000239]	12.4km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. Taking a precautionary approach a potential for indirect effect to the pNHA was identified via a direct surface water pathway between the pNHA and the Proposed Wind Farm site as they are hydrologically linked. As this pNHA is potentially sensitive to surface water and groundwater disturbance it is likely that **this pNHA is within the likely Zone of Influence and will require further assessment.**
Lough Cullaunyheeda [001017]	12.6km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. No pathway for

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		indirect effects on the feature for which the pNHA has been designated exists. **This pNHA is therefore not within the Likely Zone of Influence.**
Fergus Estuary and Inner Shannon, North Shore [002048]	14.6km	There is no potential for direct effects as the Proposed Project is located entirely outside of this site. Taking a precautionary approach a potential for indirect effect to the pNHA (and associated species) was identified via a direct surface water pathway between the pNHA and the Proposed Project, both the Proposed Wind Farm site and Proposed Grid Connection Route are hydrologically linked to the pNHA. As the habitats and species associated with this pNHA are potentially sensitive to surface water and groundwater disturbance it is likely that **this pNHA is within the likely Zone of Influence and will require further assessment.**



Map Legend

- Proposed Site Boundary
- Proposed Turbine Delivery Route
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- WFD Hydrological Catchments

Drawing Title
European Designated Sites Within the Likely Zone of Influence

Project Title
Lackareagh Wind Farm

Drawn By	Checked By
NOD	RW
Project No.	Drawing No.
220245	Figure 6.1
Scale	Date
1:220,000	12.08.2024

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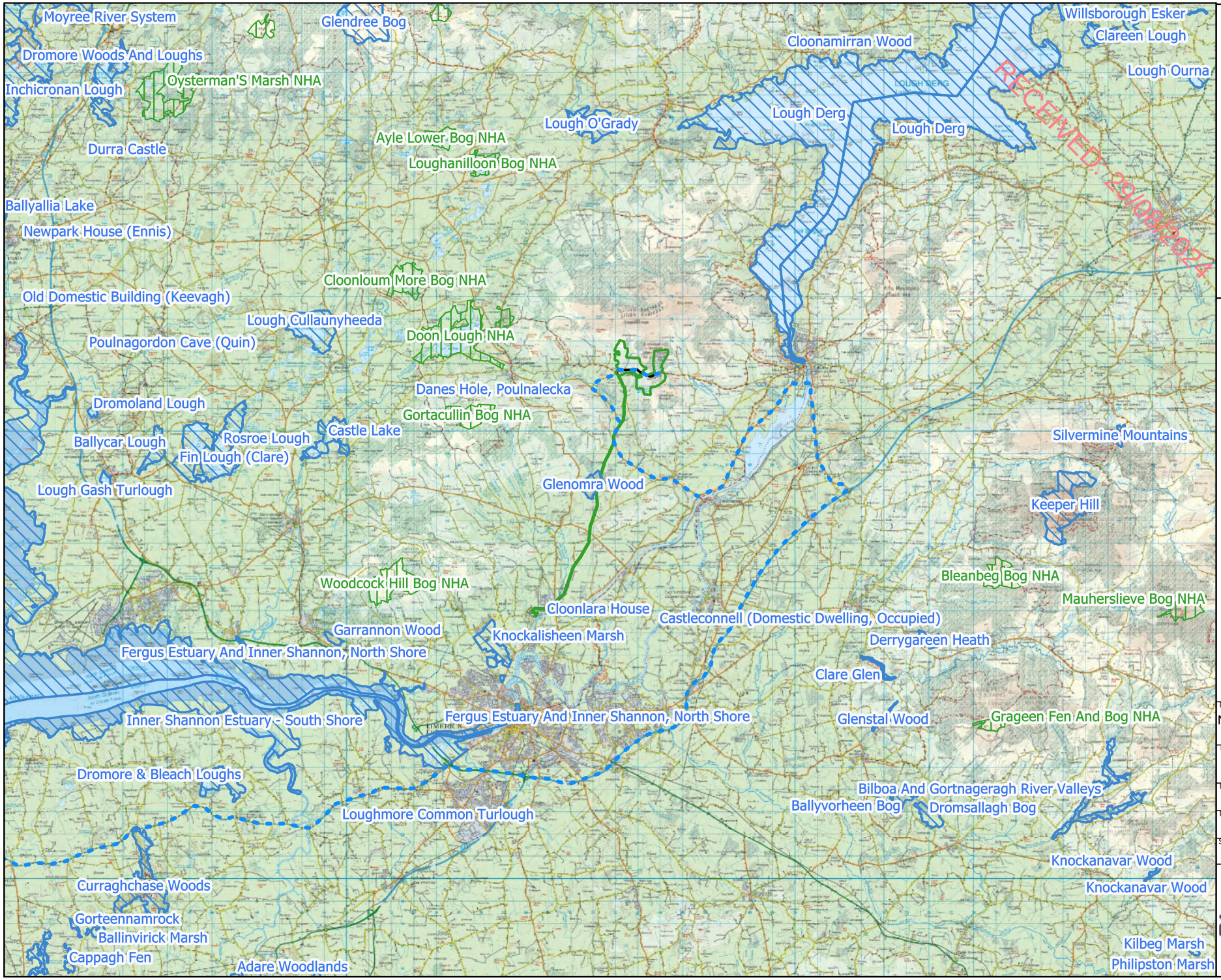

Map Legend

- Proposed Site Boundary
- Proposed Turbine Delivery Route
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)
- WFD Hydrological Catchments

Drawing Title
Nationally Designated Sites Within the Likely Zone of Influence

Project Title
Lackareagh Wind Farm

Drawn By	Checked By
NOD	RW
Project No.	Drawing No.
220245	Figure 6.2
Scale	Date
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6.3.1.2 NPWS Article 17 Reporting

A review of the 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 datasets were conducted prior to undertaking the multi-disciplinary walkover survey.

A search of the NPWS Article 17 datasets (2019) was undertaken to identify Article 17 habitats within or adjacent to the EIAR Site Boundary, as seen in Figure 6-3.

Dry heath (4030) is mapped within the south-east of the EIAR Site boundary and to the immediate south-east of the EIAR Site boundary at two separate locations. Approximately 23ha is Dry heath (4030).

A small area of Wet heath (4010) is mapped in the south-east corner of the EIAR Site boundary. This area is approximately 40.4ha. The same area is also mapped as Blanket bog (7130).

Alpine and subalpine heath (4060) is mapped in two locations approximately 50m and 300m south-east of the EIAR Site boundary, these areas combined are mapped at approximately 4ha. An area of Alpine and subalpine heath is also mapped within the north-east of the EIAR Site boundary, as seen in Figure 6-3, this area is approximately 6.8ha.

Slieve Bernagh Bog SAC is also located adjacent to the EIAR Site boundary. This SAC has Northern Atlantic wet heaths with *Erica tetralix* [4010], European dry heaths and blanket bogs listed as qualifying interests.

Gortacullin Bog NHA, located north of the EIAR Site boundary, is mapped as Active blanket bog (7130), wet heath (4010) and dry heath (4030).

Following a review of the Irish Semi-natural Grasslands Survey (ISGS) no areas of the lands within the EIAR Site boundary were found to have been surveyed as part of the ISGS.

6.3.1.3 Vascular plants

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 I of the EU Habitats Directive, The Irish Red Data Book, 1, Vascular Plants (Curtis, 1988) or the Flora (Protection) Order (1999, as amended 2022) had been recorded in the relevant 10km squares in which the study site is situated (R67). Species of conservation concern are given in Table 6-5.

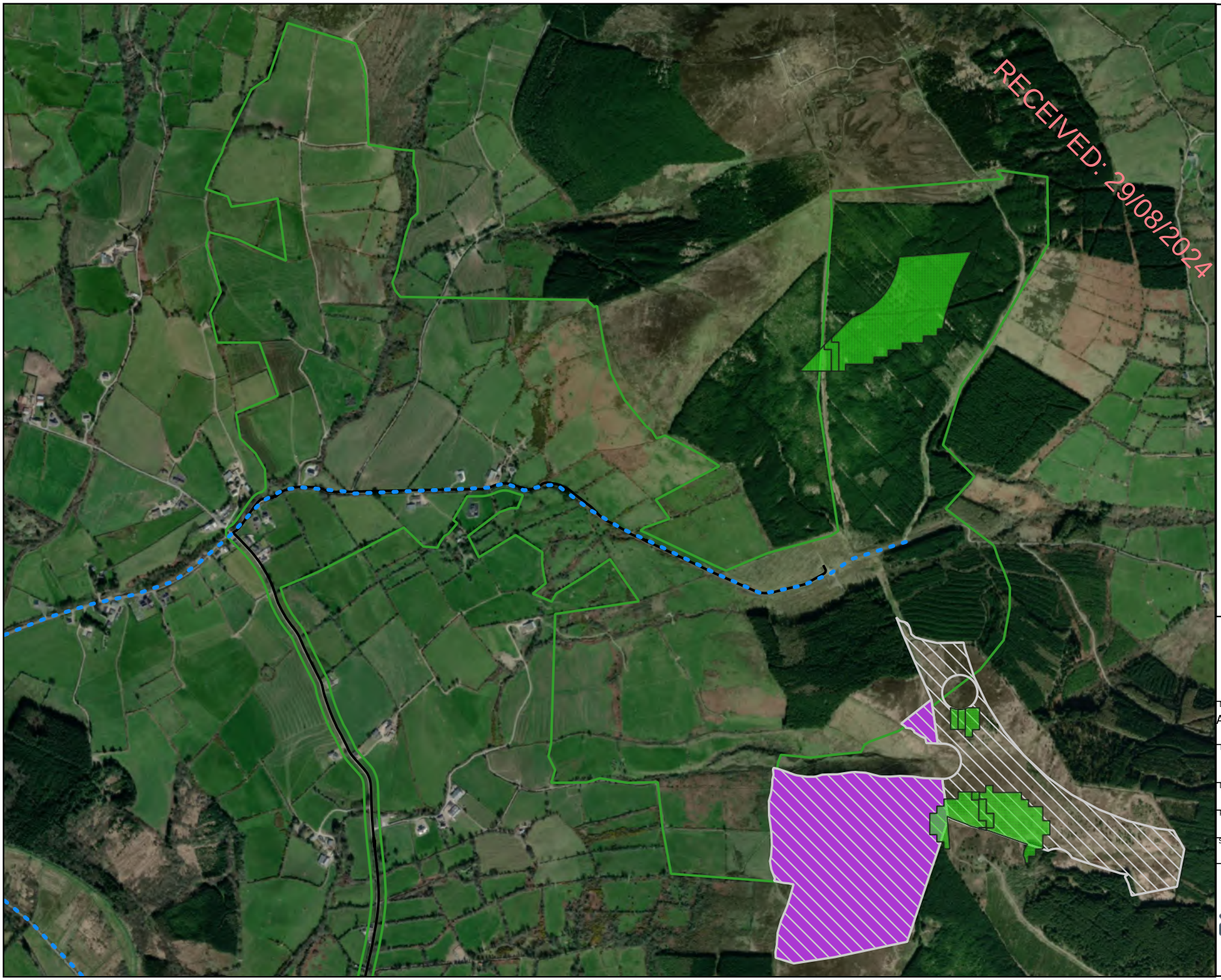
Table 6-5 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad R67

Common Name	Scientific Name	Hectad	Status
Heath cudweed	*Gnaphalium sylvaticum*	R67	EN
Opposite-leaved pondweed	*Groenlandia densa*	R67	NT

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

6.3.1.4 Bryophytes

A search of the NPWS online database for bryophytes (non-vascular land plants comprising of mosses, hornworts and liverworts) was also undertaken with no protected bryophytes recorded within or adjacent to the proposal (NPWS, 2021).



Map Legend

- Proposed Site Boundary
- Proposed Grid Connection Route
- Turbine Delivery Route
- EPA Rivers
- Alpine and Subalpine Heath
- Dry Heath
- Wet Heath Mosaic with Active Blanket Bog

N

Drawing Title

Article 17 habitats Within/Adjacent to Proposed Site Boundary

Project Title

Lackareagh Wind Farm

Drawn By	Checked By
NOD	RW
Project No.	Drawing No.
220245	Figure 6.3
Scale	Date
1:14,000	12.08.2024

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6.3.1.5 Bats and Birds

Please note the result of desktop studies in relation to bats and birds are detailed in the Bat Report, Appendix 6-2, and Chapter 7 (Ornithology).

6.3.1.6 National Biodiversity Data Centre (NBDC) Records

6.3.1.6.1 Fauna

A search of the National Biodiversity Data Centre (NBDC) records for the relevant hectad R67, provided records on a number of fauna species of conservation concern, these are provided in Table 6-6 below.

Table 6-6 NBDC records for protected species and species of conservation interest (excl. birds) in hectad R67

Common Name	*Scientific Name*	Protected Under Legislation	Hectad
Brown Long -eared Bat	*Plecotus auritus*	HD Annex IV, WA	R67
Common Frog	*Rana temporaria*	HD Annex V, WA	R67
Common Pipistrelle	*Pipistrellus pipistrellus*	HD Annex IV, WA	R67
Daubenton's Bat	*Myotis daubentonii*	HD Annex IV, WA	R67
Eurasian Badger	*Meles meles*	WA	R67
Eurasian Pygmy Shrew	*Sorex minutus*	WA	R67
Eurasian Red Squirrel	*Sciurus vulgaris*	WA	R67
European Otter	*Lutra lutra*	HD Annex II, IV, WA	R67
Large White-moss	*Leucobryum glaucum*	HD, Annex IV, WA	R67
Leisler's Bat	*Nyctalus leisleri*	HD Annex IV, WA	R67
Marsh Fritillary	*Euphydryas aurinia*	HD Annex II	R67
Pine Marten	*Martes martes*	HD Annex V, WA	R67
Red Deer	*Cervus elaphus*	WA	R67
Soprano Pipistrelle	*Pipistrellus pygmaeus*	HD Annex IV, WA	R67

Common Name	*Scientific Name*	Protected Under Legislation	Hectad
West European Hedgehog	*Erinaceus europaeus*	WA	R67

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

6.3.1.6.2 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. A number of invasive species including those subject to restrictions under Regulations 49 and 50 and included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 were found to be present in hectad R67 as shown in Table 6-7 below.

Table 6-7 NBDC records for invasive species (hectad R67)

Common Name	Scientific Name	Hectad
Greylag Goose	*Anser anser*	R67
Crustacean	*Crangonyx pseudogracilis*	R67
Crustacean	*Hemimysis anomala*	R67
Water Fern	*Azolla filiculoides*	R67
Flatworm (Tubellaria)	*Arthurdendyus triangulatus*	R67
Canadian Waterweed	*Elodea canadensis*	R67
Cherry laurel	*Prunus laurocerasus*	R67
Curly waterweed	*Lagarosiphon major*	R67
Himalayan Honeysuckle	*Leycesteria formosa*	R67
Himalayan Knotweed	*Persicaria wallichii)*	R67
Japanese Knotweed	*Fallopia japonica*	R67
Nuttall's Waterweed	*Elodea nuttallii*	R67
Flowering plant	*Rhododendron ponticum*	R67
Sycamore	*Acer pseudoplatanus*	R67
Budapest Slug	*Tandonia budapestensis*	R67
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	R67
Zebra Mussel	*Dreissena (Dreissena) polymorpha*	R67
American Mink	*Mustela vison*	R67

Common Name	Scientific Name	Hectad
Bank Vole	*Myodes glareolus*	R67
European Rabbit	*Oryctolagus cuniculus*	R67
Fallow Deer	*Dama dama*	R67
Wild Boar	*Sus scrofa*	R67

6.3.1.1 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 R67. An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. Table 6-8 lists rare and protected species records obtained from NPWS within 5km of the Proposed Project site, as received on the 28th of April 2024, as well as those recorded available through the online NPWS map viewer.

Table 6-8 NPWS records for rare and protected species

Common name	Scientific name	Designation	Hectad
Annual Knawel	*Scleranthus annuus*	Vulnerable (VU)	R66
Brooke Lamprey	*Lampetra planeri*	Annex II, FA	R66
Common frog	*Rana temporaria*	Annex V, WA	R57, R67
Eurasian Badger	*Meles meles*	WA	R56, R57, R66, R67
Fallow Deer	*Dama dama*	WA	R57, R67
Heath cudweed	*Gnapalium sylvaticum*	Endangered (EN)	R67
Hen Harrier	*Circus cyaneus*	Annex I, WA	R56, R57, R66, R67
Irish Hare	*Lepus timidus subsp. Hibernicus*	Annex V, WA	R56, R66, R67,
Opposite-leaved Pondweed	*Groenlandia densa*	Endangered (EN)	R67
Peregrine falcon	*Falco peregrinus*	Annex I, WA	R57
Pine marten	*Martes martes*	Annex V, WA	R56, R67
Eurasian Otter	*Lutra lutra*	Annex II, IV, WA	R56, R66, R67
European Hedgehog	*Erinaceus europaeus*	WA	R57
European Pigmy shrew	*Sorex minutus*	WA	R56
Red Deer	*Cervus elaphus*	WA	R67

Common name	Scientific name	Designation	Hectad
Small White Orchid	*Pseduorchis albida*	Endangered (EN)	R56
Smooth Brome	*Bromus racemosus*	Vulnerable (VU)	R66
Wood Club-rush	*Scirpus sylvaticus*	Near Threatened (NT)	R56
Northern Dead-nettle	*Lamium confertum*	Near Threatened (NT)	R66

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

6.3.1.2 Inland Fisheries Ireland Data

The Inland Fisheries Ireland (IFI) online database was reviewed for fish species records within the catchments downstream of the site. The Proposed Wind Farm site drains into the Broadford River. The Broadford River drains into the Doon Lough NHA to the west of the site. A search of the IFI online database was carried out to determine the species richness of the Broadford River.

Fish stock assessments were undertaken by IFI in 2009 and 2013 for the Broadford River at two sites. The Broadford River and Doon Lough NHA are located within the Shannon Estuary North catchment and have hydrogeological connectivity to the Proposed Project. Surveys were undertaken in Broadford Village and where the river drains into Doon Lough. Aquatic species recorded at each site are shown in Table 6-9 below.

Further detail with regard to fisheries desk study data is available in the Aquatic Baseline Report (Appendix 6-3).

Table 6-9 Inland Fisheries Ireland Data

Station Name	Species	Q Status	Assessment Year
Broadford river (Doon Lough) Site code: 27B020800A	Gudgeon, Salmon, Perch, Brown Trout, Three-spined stickleback, Minnow, European eel	Good	2013
Broadford River (Broadford Village) Site code: 27B020700A	Brown trout, Salmon, European eel	Good	2013

6.3.1.3 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The NPWS *Margaritifera* Sensitive Area map (Version 8, 2017) was consulted during the desk study. There is no surface water connectivity between the Proposed Project and any *Margaritifera* catchment.

6.3.1.4 Regional and Local Hydrology and Hydrogeology

6.3.1.4.1 Proposed Wind Farm

A regional hydrology map is shown in Figure 9-1 within Chapter 9 'Water' of this EIAR. The following description has been summarised from Chapter 9 'Water' of the EIAR and provides a baseline of the local watercourses within and downstream of the site of the Proposed Wind Farm.

Regional hydrology:

> *'The Proposed Wind Farm site is located across 2 no. regional surface water catchments. The east of the Proposed Wind Farm site is located in the Lower Shannon surface water catchment and Hydrometric Area 25D. Meanwhile, the west of the Proposed Wind Farm site is located in the Shannon Estuary North surface water catchment and Hydrometric Area 27. Both regional surface water catchments are located in the Shannon River Basin District.*
>
> *The Lower Shannon Catchment (HA 25D) covers a total area of 1,041km2 and includes the lower reaches of the River Shannon to Limerick City and the catchment of the Mulkaer River. The catchment is underlain by mostly impure limestones in low lying areas and the sandstone and metamorphic rocks in the uplands of the Slieve Bernagh and Arra Mountains in the northwest, and the Silvermines and Slieve Feilim Mountains in the east (EPA, 2018).*
>
> *Within the Lower Shannon surface water catchment, the Proposed Wind Farm site is located in the Shannon [Lower]_SC_080 sub-catchment. More locally this section of the Proposed Wind Farm site lies within the catchment of the Ardcloony River. This river rises near the summit of Moylussa and flows to the southeast, ~1km east of the Proposed Wind Farm site. The Ardcloony River discharges into Lough Derg ~5km to the southeast. In terms of WFD river sub-basins, this area of the Proposed Wind Farm site is mapped in the Ardcloony_010 river sub-basin.*
>
> *The Shannon Estuary North catchment (HA 27) includes the area drained by the River Fergus and all streams entering the tidal waters between Thomond Bridge and George's Head Co. Clare and drains a total area of 1,658km2 (EPA, 2018).*
>
> *Within the Shannon Estuary North surface water catchment, the Proposed Wind Farm site is located in the Owenogarney_SC_010 sub-catchment.'*

Local hydrology:

> *'More locally, this area of the Proposed Wind Farm site is drained by the Glenomra River and is mapped in the Broadford_010 WFD river sub-basin. The Glenomra River flows to the northwest, ~1km southwest of the Proposed Wind Farm site. Several mountain streams rise on the slopes of Lackareagh and Glennagalliagh mountains and flow to the southwest, through the site, before discharging into the Glenomra River. Many of these mountain streams are locally unnamed, with the exception of the Ailleenagommaun Stream which flows ~200m north of T7 and ~250 south of T6. Many of these streams have been assigned names in the EPA blueline database. The Ailleenagommaun Stream is referred to as the Cloncorry Beg Stream, while a stream referred to as the Kilbane Stream flows to the south ~220m east of T2. Downstream of the Proposed Wind Farm site, the Glenomra River flows to the west, through the village of Broadford. Downstream of Broadford, this watercourse is referred to as the Broadford River. This river discharges into Doon Lough, ~6.7km west of the Proposed Wind Farm site and outfalls from this lake as part of the Owenogarney River.'*

6.3.1.4.2 Proposed Grid Connection Route

A Proposed Grid Connection Route hydrology map is shown in Figure 9-3, Chapter 9 of this EIAR. The following description has been summarised from Chapter 9 'Water' of the EIAR and provides a baseline of the local watercourses within and downstream of the site of the Proposed Grid Connection Route.

> *'The northern section of the Proposed Grid Connection Route, in the vicinity of the Proposed Wind Farm site is mapped in the Shannon Estuary North surface water catchment and Hydrometric Area 27. There are a total of 3 no. watercourse crossings over EPA mapped rivers and streams in this area. These crossings are located as follows:*
>
> - *Along the L3022-8 over the Ailleenagommaun Stream;*
> - *Along the L3022-8 over the Glenomra River at Ahnagor Bridge; and,*
> - *Along the L3022-8 over a small locally unnamed tributary of the Glenomra Stream referred to by the EPA as the Ballquin Beg Stream.*
>
> *The vast majority of the Proposed Grid Connection Route is mapped in the Lower Shannon surface water catchment and Hydrometric Area 25D. Within this catchment, there is 1 no. crossing over the EPA mapped Blackwater River along the R463 at Blackwater Bridge.*'

6.3.1.4.3 Water Quality

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envision map viewer was consulted regarding the status of the rivers which run within and directly adjacent to the Proposed Wind Farm site, most recently, on 15th August 2024. However, the EPA Envision map viewer does not contain data for every waterbody in the country. Available data on the WFD River Waterbody Status 2013 – 2018 for the watercourses which flow through the site have been assessed in Table 6-10.

Table 6-10: Watercourses on site with relevant water quality statuses

River Waterbody Name	Entity Name	Location	Q-Value	Status	Risk
Broadford_010	Kilbane Stream	The Kilbane Steam enters the Proposed Wind Farm site at the north-west and flows through the Proposed Wind Farm site in a south westerly direction where it exits the Proposed Wind Farm site at the south-western boundary.	4-5	High	At risk
Broadford_010	Broadford River	The Kilbane Steam feeds into the Broadford River which is located south-west of the Proposed Wind Farm site and flows in a north-westerly direction through the town of Broadford and into Lough Doon.	3-4	Moderate	At risk

Status– WFD River Waterbody Status 2010-2015 Risk – WFD River Waterbodies Risk

6.3.1.5 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in hectad R67 within which the Proposed Project is located. The majority of the Proposed Wind Farm site is located in the Shannon Estuary North catchment and to a lesser extent in the Lower Shannon catchment, where the majority of the Proposed Project is within the Owenogarney_SC_010 sub-catchment and to a lesser extent in the Shannon [Lower]_SC_080 and Shannon [Lower]_SC_100 sub-catchments.

As part of the desk study, small areas of Habitats Directive Annex I habitats Dry heath (4030), Wet heath (4010), Alpine and subalpine heath (4060) and Blanket bog (7130) were mapped within the EIAR Site Boundary. Two records of rare or protected flora have been recorded within 10km of the Proposed Wind Farm site.

In summary, four European sites were identified to be within the ZoI of the Proposed Project, namely:

- Glenomra Wood SAC [001013]
- Lower River Shannon SAC [002165]
- Lough Derg (Shannon) SPA [004058]
- River Shannon and River Fergus Estuaries SPA [004077]

The following NHAs were identified as being within the likely ZoI of the Proposed Project:

- Doon Lough NHA [000337]

The following pNHAs were identified as being within the likely ZoI of the Proposed Project:

- Glenomra Wood [001013]
- Castle Lake [000239]
- Fergus Estuary and Inner Shannon, North Shore [002048]

The desk study identified that a variety of protected faunal species are known to occur within the wider study area, including bats, otter, badger, pine marten etc. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits. The mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009).

The desk study provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological features.

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 Proposed Wind Farm site are provided in Appendix 6-1 of this EIAR. A habitat map of the Proposed Wind Farm site is provided in Figure 6-4. A map showing the development footprint overlaying the Habitat Map is shown in Figure 6-5.

A total of fifteen habitats were recorded within the Proposed Wind Farm site, including;

- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Conifer plantation (WD4)
- Mixed broadleaved woodland (WD1)
- Hedgerows (WL1)

- Treelines (WL2)
- Scrub (WS1)
- Wet Grassland (GS4)
- Dense bracken (HD1)
- Wet heath (HH3)
- Upland blanket bog (PB2)
- Stone walls (BL1)
- Spoil and bare ground (ED2)
- Earth banks (BL2)
- Buildings and Artificial Surfaces (BL3)

6.4.1.1 Improved Agricultural Grassland (GA1) and Wet Grassland (GS4)

A number of agricultural fields within the Proposed Wind Farm site were characterised as improved agricultural grassland (GA1) pasture. This habitat type (see Plate 6-1) was predominantly recorded along the north-west section of the Proposed Wind Farm site, as well as in the south of the Proposed Wind Farm site where small patches of wet grassland (GS4) form mosaics with this habitat. The sward within most fields of this nature was dominated by Perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), Creeping bent (*Agrostis stolonifera*), Creeping buttercup (*Ranunculus repens*), Crested dogs tail (*Cynosurus cristatus)*, Smooth meadow grass (*Poa pratensis)*, White clover (*Trifolium repens*), Ragwort (*Jacobaea vulgaris*), Yarrow (*Achillea millefolium*), Common chickweed (*Stellaria media*) and occasional Soft rush (*Juncus effusus*). These areas of grassland are under agricultural management, managed for sheep and cattle grazing. Turbines T1, T2, T6 and T7, the met mast (and associated infrastructure) along with some of the internal site access tracks are proposed to be located within this habitat.

Plate 6-1. An example of improved agricultural grassland (GA1) in the vicinity of the proposed location for Turbine 2, in the north-west section of the Proposed Wind Farm site.

6.4.1.2 Conifer Plantation (WD4) & Recently Felled Woodland (WS5)

Conifer plantation (WD4) and recently felled woodland (WS5) were the two dominant habitat types recorded in the east of the Proposed Wind Farm site.

These forestry blocks (see Plate 6-2) were dominated by Sitka (*Picea* sp.) and Japanese larch (*Larix kaempferi*) with ground flora dominated by bryophyte species, as well as Grasses, Bramble, Rushes, Ferns. There was a greater diversity of flowering plants recorded within areas of drains and firebreaks (see Plate 6-2) some additional species recorded in these areas comprised Lousewort (*Pedicularis sylvatica*), and Tormentil (*Potentilla erecta).*

Plate 6-2 Example of receiving habitat (WD4) at the proposed Turbine 4 location.

6.4.1.3 Scrub (WS1)

Areas of scrub (WS1) are associated with the outskirts of agricultural grassland areas and overgrown hedgerows in the case of hardstanding areas for Turbines 6 and 7 and proposed new roads and upgrades to existing roads (Plate 6-3). Where Scrub habitat has started to develop it is dominant by Gorse (*Ulex europaeus*), Bramble (*Rubis fruticosus agg*) and Bracken (*Pteridium aquilinum*).

Plate 6-3 Example of receiving habitat (WS1) at the proposed internal access track between Turbines 6 and 7.

6.4.1.4 Recently felled woodland (WS5)

Other scrub areas which have developed over recently felled woodland (WS5) on wetter soils are closer associated with heath habitats in the case of the proposed borrow pit, proposed onsite 38kV substation, temporary construction compound, proposed storage area and proposed new roads (Plate 6-4). These areas are managed for commercial purposes, forestry in these areas is felled and then replanted. Whilst forestry is maturing, other pioneer habitats occur throughout, between the saplings such as scrub. These areas comprised Heathers, Rushes, Grasses and Bryophytes, other species associated are Heath bedstraw (*Galium saxatile*), Tormentil (*Potentilla erecta)* and Rosebay willowherb (*Chamaenerion angustifolium).*

Plate 6-4 Example of receiving habitat (WS5) at the proposed borrow pit, substation, construction compound and storage area.

6.4.1.5 Mixed Broadleaved Woodland (WD1)

A small area categorised as a linear broadleaved woodland occurs within the EIAR Site Boundary where the proposed internal access road for turbines T1 and T2 joins the L7080 (Plate 6-5). The overstory is dominated by Sycamore (*Acer pseudoplatanus*) and Hazel (*Corylus avellana*) while the understory is comprised of Bramble (*Rubus fruticosus agg.)*, Common nettle (*Urtica dioica*), Bracken (*Pteridium aquilinum*), Wild Angelica (*Angelica sylvestris*), Ivy (*Hedera helix*), Wood sorrel (*Oxalis acetosella*) and Ground ivy (*Glechoma hederacea*).

Plate 6-5 Example of receiving habitat (WD1) at the proposed internal access road joining the Gap Road.

6.4.1.6 Dense Bracken (HD1)

Areas of dense bracken (HD1) are associated with the outskirts of agricultural grassland areas, in the case of hardstanding areas surrounding turbines T6 and T7 (Plate 6-6). Bracken (*Pteridium aquilinum*) cover in these areas range between 70-90% of the relevés taken.

Plate 6-6 Example of receiving habitat (WD1) at the proposed internal access tracks and hardstanding areas of between Turbines 6 and 7.

6.4.1.7 Wet heath (HH3) and Upland Blanket Bog (PB2)

Areas of Wet heath (HH3) with mosaics of Upland blanket bog (PB2) are situated in the south-east and north-east of the Proposed Wind Farm site, north of T3 and south of T5 (Plate 6-7). These habitats have links with Annex I habitats. Wet heath corresponds to the annexed habitat, *'northern Atlantic wet heaths with Erica tetralix (4010)'.* While blanket bogs correspond to the annexed habitats, that are still capable of peat formation correspond to the priority habitat, '*blanket bogs (*if active bog) (7130)*' and *'depressions on peat substrates of the Rhynchosporion (7150)'* occurs in pockets as a sub-habitat of blanket bog. However, no works are proposed to take place in these areas.

Small areas of these mosaic habitats also occur along firebreaks within conifer plantation forestry within the vicinity of T3 and T4. However, these areas are fragmented and small.

Plate 6-7 Example of receiving habitat mosaic of Wet heath (HH3) and Upland blanket bog (PB2) south-east of the Proposed Wind Farm site.

6.4.1.8 Hedgerow (WL1) and Stonewalls (BL1)

Hedgerow habitat was recorded was recorded within the Proposed Wind Farm site near turbines T1, T2, T6 and T7 (see Plate 6-8). Other linear habitats forming field boundaries within the site comprised of heavily vegetated stonewalls and/or earth banks (discussed further below). Hedgerow habitat was mainly associated with agricultural fields. Some hedgerows were outgrown in nature and dominated by Gorse, Hawthorn and Bramble. As per Fossitt (2000) heavily vegetated, overgrown stone walls should also be considered as hedgerow habitat. Vegetation on these stone walls was dominated by Bramble, Gorse and Grasses (see Plate 6-9).

Plate 6-8 Example of receiving hedgerow (WL1) habitat with scattered trees delineating field boundaries within the Proposed Wind Farm site.

Plate 6-9 Example of receiving habitat, heavily vegetated/overgrown stone walls mapped as hedgerow (WL1) along existing farm track which will form internal tracks of the Proposed Wind Farm site.

6.4.1.9 Earth banks (BL2)

Earth banks are a common type of field boundary in many parts of Ireland (Fossitt, 2000). Most are completely vegetated when intact as was the case within the Proposed Wind Farm site. This habitat type was recorded around field boundaries in the north-west of the Proposed Wind Farm site in close proximity to T1 and T2. Vegetated earth banks were very overgrown in parts and were dominated by Gorse and Bramble (see Plate 6-10). These vegetated earth banks are very similar in nature of hedgerows and due to their overgrown nature have been mapped as so for the purposes of this report as they form a linear wildlife corridor within the landscape.

Plate 6-10 Example of receiving habitat, earth bank (BL2) heavily overgrown with Gorse and Bramble, delineating field boundaries within the Proposed Wind Farm site.

6.4.1.10 Treeline (WL2)

Where linear 'hedgerow' features were over 5m in height and were made up of semi-mature to mature trees, these were characterised as treelines, with Hawthorn and Willow species making up the majority of the treelines on the Proposed Wind Farm site, occasional treelines of native broadleaved species were also recorded comprising of Beech (*Fagus sylvatica), Sycamore (Acer pseudoplatanus)* and Alder (*Alnus glutinosa*) west of Turbine 1 (Plate 6-11).

Plate 6-11 Example of treeline (WL2) habitat west of the proposed Turbine 1 location.

6.4.1.11 Spoil and bare ground (ED2), Recolonising bare ground (ED3), Dry meadows and grassy verges (GS2), Amenity grassland (GA2), Buildings and artificial surfaces (BL1) and Scattered Trees.

Unbound farm tracks within the Proposed Wind Farm site are categorised as spoil and bare ground (ED2), with areas becoming recolonised by ruderal plants categorised as recolonising bare ground (ED3), habitats adjacent to public roads and farm tracks are categorised as Dry meadows and grassy verges (GS2). These habitats are small and are not mapped in detail. Private dwellings and agricultural buildings are also present within the site and are categorised as buildings and artificial surfaces (BL3) (see Plate 6-12). Habitats such as garden areas associated with private dwellings are categorised as amenity grasslands (GA2), scattered trees associated with the forementioned habitats occur occasionally within the Proposed Wind Farm site, as these occur infrequently in areas they have not been mapped in detail.

Plate 6-12 Example of buildings and artificial surfaces (BL3) habitat within Proposed Wind Farm site.

6.4.1.12 Upland Eroding Rivers (FW1)

Three watercourses were recorded within the Proposed Wind Farm site all of which drain to the west and south-west. All three watercourses were classed as upland eroding streams (FW1). The unnamed stream, Killeagy (see site A3, Figure 2.1 in Aquatics Report, Appendix 6-3), flows through agricultural pasture, scrub and under the L7080 Gap Road by means of a box culvert. The stream is a channelised, narrow watercourse, ephemeral in nature which was tunnelled by dense scrub vegetation comprised of Gorse, Bramble and Bracken. Any potential culvert works at this location will be subject to a pre-commencement survey, if upgrade/extension works are not deemed necessary then no works will be undertaken within the watercourse. However, if upgrade/extension works are deemed necessary then a Section 50 application will be submitted to IFI for approval prior to works. No instream works will occur.

The Cloonconry Beg River, Ballymoloney (see site A5, Figure 2.1 in Aquatics Report, Appendix 6-3) flows through agricultural pasture and scrub. The stream is straightened in the lower reaches and more natural upstream where it flows through deep valley banks tunnelled by dense scrub vegetation comprised of Gorse, Bramble and Bracken. An invasive alien plant species listed on the Third Schedule, Japanese knotweed (*Reynoutria japonica*) is situated along the channel. A new water crossing is proposed at this watercourse via clearspan or box culvert to allow access between Turbines 6 and 7. Culvert works at this location will be subject to a pre-commencement survey and a Section 50 application will be submitted to IFI for approval prior to works.

The Kilbane Stream, Shannaknock (see site A9, Figure 2.1 in Aquatics Report, Appendix 6-3) is a high energy, fast flowing river which flows through scrub, mixed broadleaved woodland and amenity grassland (see Plate 6-13). The stream has a natural, steep gradient. Macrophytes were not present due to the fast flow, medium shading on the banks by woodland species such as Willow, Hazel and Sycamore. A new water crossing is proposed at this watercourse via clearspan or box culvert to allow access between T2 and the L7080 Local Road. Culvert works at this location will be subject to a pre-

commencement survey and a Section 50 application will be submitted to IFI for approval prior to works. No instream works will occur.

Additional details of representative watercourses within the Proposed Wind Farm site are provided in Chapter 9 of the EIAR: Water.

Plate 6-13 Example of receiving habitat upland eroding river (FW1) at proposed new road linking internal access track to the local road L7080 Gap Road.

6.4.1.13 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, agricultural lands and along sections of the existing forestry access roads (see Plate 6-14). Most were deep and narrow (30-40cm wide) and devoid of any significant aquatic vegetation. Overall, these drains were considered to be of relatively low ecological value given their narrow, deep, shaded nature and lack of aquatic vegetation.

Plate 6-14 Example of typical drain recorded throughout the Proposed Wind Farm site (within areas of forestry)

6.4.1.14 Habitats along the Proposed Grid Connection Route

The underground cabling required to facilitate the Proposed Grid Connection Route will be laid beneath the surface of the internal site road network and public road. It is proposed that the Proposed Grid Connection Route will originate at the proposed onsite 38kV substation, which is located within an area of **recently felled woodland (WD5)** which is currently transitioning to scrub (WS1) habitat in the east of the Proposed Grid Connection Route The cable will run west along the existing L7080 Local Road within the site before meeting the local public road L3022-8 in the village of Kilbane. Adjacent habitats along this section comprise of **recently felled woodland (WD5)**, **improved agricultural grasslands (GA1)**, **dry meadows and grassy verges (GS2), drainage ditches (FW4), stone walls and other stonework (BL3), scrub (WS1), hedgerows (WL1)** and **treelines (WL2).**

It is proposed that the Proposed Grid Connection Route will proceed south along local road L3022-8 briefly joining the Regional road R466. Adjacent habitats along this section of the route were assessed as consisting of **improved agricultural grasslands (GA1)**, **hedgerows (WL1), treelines (WL2)**, **scrub (WS1)**, **stone walls and other stonework (BL3), buildings and artificial surfaces (BL3)** with one instance of an **upland eroding river (FW1).**

The Proposed Grid Connection Route will proceed south-west where it joins the local road L3046 before crossing over the regional road R463 to join the local road L3056 where it ultimately ends of Ardnacrusha Power Station. Adjacent habitats along this section comprise of **improved agricultural grasslands (GA1)**, **buildings and artificial surfaces (BL3), hedgerows (WL1), treelines (WL2), scrub (WS1)**, **stone walls and other stonework (BL3)** along with one instance of an **upland eroding river**

(FW1) and **Oak-birch-holly woodland (WN1)** which corresponds to the Annex I habitat, 'old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (91A0). However, the works will occur within the existing road carriageway will not occur in any adjacent habitats.

6.4.1.14.1 Watercourse/Bridge Crossings

The Proposed Grid Connection Route will involve 3 No. bridge crossings, crossing methodologies include Horizonal Directional Drilling (HDD), Ducting in Trefoil within Bridge Deck and cable strapping to the bridge structure; each methodology will be deployed as appropriate. Further information is contained in Appendix 4-5 to Chapter 4 of this EIAR.

8 No. existing culverts crossings will be implemented using open trenching with either an undercrossing or an overcrossing, depending on the depth of the culvert.

No instream works are required along the Proposed Grid Connection Route. Bridge and culvert crossing points are shown in Figure 4-28 in Chapter 4 of this EIAR, and Figure 9-3 in Chapter 9 of this EIAR and listed in the table below. The bridge/watercourse crossings are listed in the Table 6-12 below starting with the water crossing closest to the EIAR Site Boundary (e.g. BC1)

Table 6-12 Bridge crossing infrastructure

Crossing ID	Works Proposed	Stream Description	Photo
BC1	Bridge strapping (no instream works)	A lowland depositing river mostly naturalised with some areas of modification. Associated with treelines, scrub and riparian woodland comprised of Oak, Beech, Sycamore and Horse chestnut. Invasive species within the surrounding habitat include Giant hogweed, Winter heliotrope and Cherry laurel. Evidence of Otter recorded.	
BC2	Ducting in Trefoil within Bridge Deck	A lowland depositing river mostly naturalised with some areas of modification. Associated with agricultural grassland, scrub and treelines comprised of Bracken, Common nettle, Hogweed, Hawthorn and Sycamore.	

BC3	HDD (no instream works)	A lowland depositing river mostly naturalised. Associated with agricultural grassland, treelines and scrub comprised of Common nettle, Field bindweed, Bramble, Willow, Sycamore and Hawthorn. Heavily infested with invasive species Japanese knotweed.	

6.4.1.15 Habitats – Turbine Delivery Route

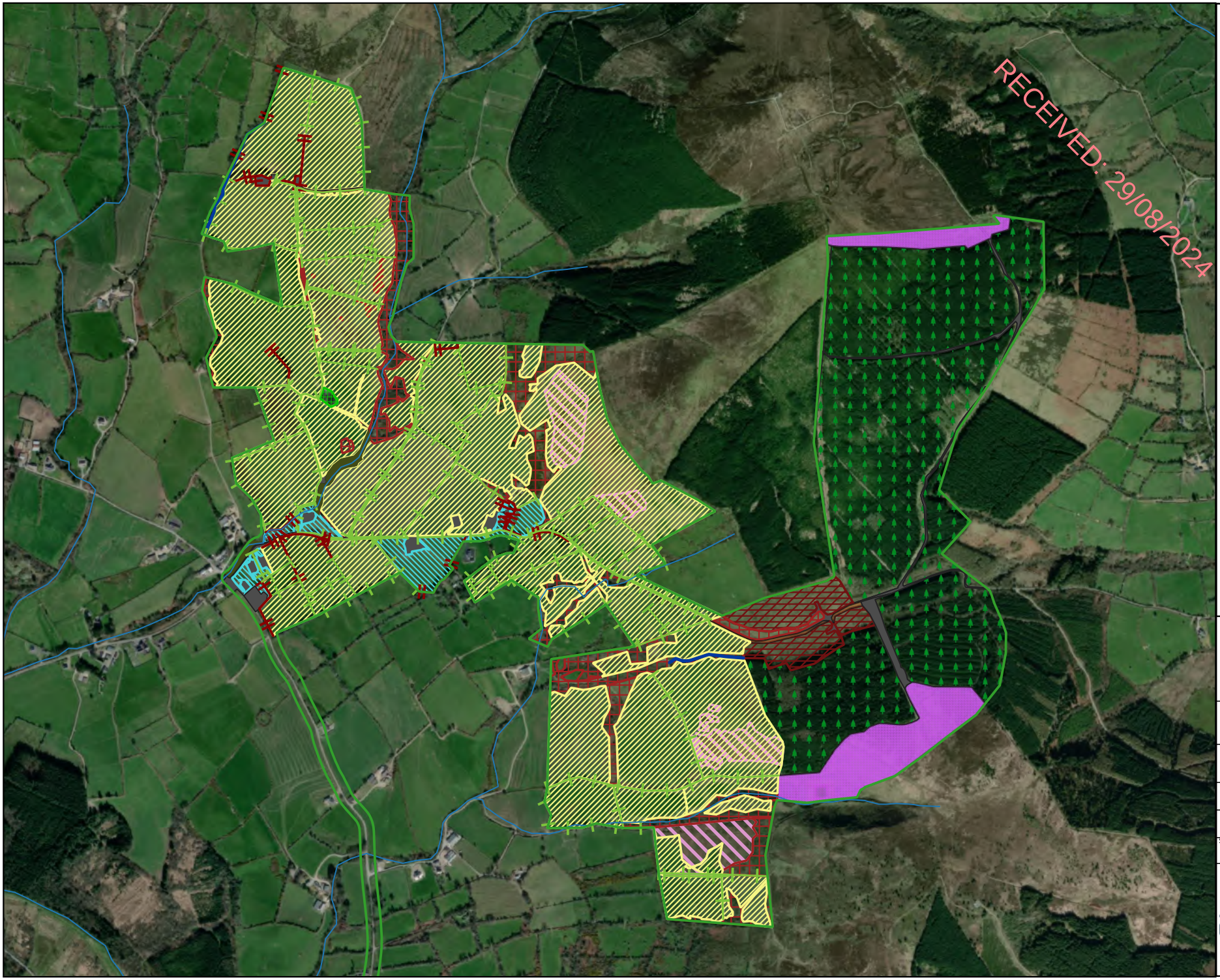
Accommodation Area

Road and junction widening are sometimes required along proposed turbine transport routes to accommodate the large vehicles used to transport turbine components to proposed wind farm sites. The proposed Turbine Delivery Route (TDR) for the Proposed Project has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic impact assessment set out in Section 15.1.8 of this EIAR and summarised below. There are sections on the route where the horizontal alignment may require specialist transport vehicles. These sections will be further considered by the appointed transport company following turbine procurement process. Accommodation works will be required at various locations on the national and regional road network between the port of arrival in Foynes (Shannon) Co. Limerick and the Proposed Wind Farm. These will be limited to temporary measures including temporary local road widening, overruns of roundabout island and temporary relocation of some signs and street furniture.

The locations of the accommodation areas are shown in Figure 4-22a, Chapter 4.

It has been identified that accommodation works at Location 9 – O'Briensbridge Cross R463/R466 (see Figure 4-22b, Chapter 4) will require the temporary loss of habitat due to the proposed blade transition area in the field north of the Regional road R466. Habitats within this accommodation area comprised of a mosaic of **improved agricultural grassland (GA1)** and **wet grassland (GS4)** comprised of Cuckoo flower (*Cardamine pratensis*), Creeping buttercup (*Ranunculus repens*), Soft rush (*Juncus effusus*), Perennial ryegrass (*Lolium perenne*), Meadow foxtail (*Alopecurus pratensis*), Rough meadow grass (*Poa trivialis*), Meadow buttercup (*Ranunculus acris*), Common daisy and Germander speedwell (*Veronica chamaedrys*). **Drainage ditches (FW4)** lie adjacent to the western and northern field boundary. **Treelines (WL2)** comprised of Ash (*Fraxinus excelsior*), Horse chestnut (*Aesculus hippocastanum*), Willow (*Salix* spp.) and Sessile Oak (*Quercus robur*) are located along the west, north and eastern boundaries. **Hedgerow (WL1)** comprised of Hawthorn (*Crataegus monogyna*), Ivy (*Hedera hibernica*), Bracken (*Pteridium aquilinum*), Bramble (*Rubus fructicosus agg.)* and Elder (*Sambucus nigra*) lies along the southern boundary.

Plate 6-15 Photo showing receiving habitat along the proposed TDR (Accommodation Area: Proposed turbine blade transition area)



Map Legend

- Proposed Site Boundary
- EPA Rivers
- Treelines
- Hedgerows
- Drainage Ditches
- Improved agricultural grassland
- Amenity grassland (improved)
- Dry meadows and grassy verges
- Conifer plantation
- (Mixed) broadleaved woodland
- Recently-felled woodland
- Scattered trees and parkland
- Wet heath
- Scrub
- Dense bracken
- Buildings and artificial surfaces

N

Drawing Title

Habitat Map

Project Title

Lackareagh Wind Farm

Drawn By	Checked By
NOD	RW
Project No.	**Drawing No.**
220245	Figure 6.4
Scale	**Date**
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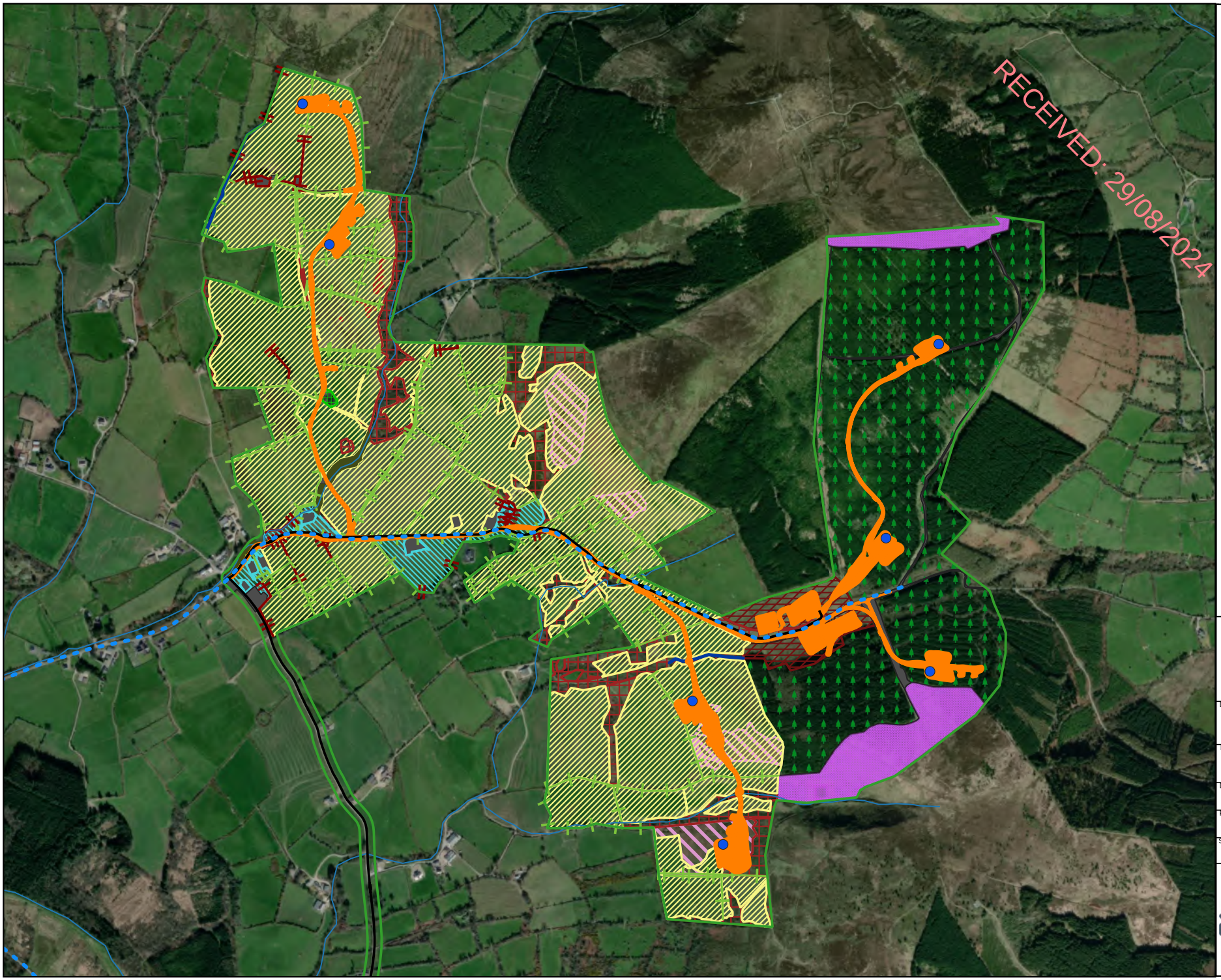

Drawing Title

Habitat Map with Development Overlay

Project Title

Lackareagh Wind Farm

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Project No.	Drawing No.
220245	Figure 6.5
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6.4.1.16 Protected Habitats/Flora

In summary, as described in the preceding sections, the survey effort confirmed the presence of Wet heath (HH3) with mosaics of Upland blanket bog (PB2) which are situated in the northeast and south-east of the EIAR Site Boundary, south of Turbine 5, north of Turbine 3 (Plate 6-7 above) and as small, fragmented pockets within a conifer plantation. These habitats have links with Annex I habitats. Wet heath corresponds to the annexed habitat, 'northern Atlantic wet heaths with *Erica tetralix* (4010)'. While blanket bogs correspond to the annexed habitats, that are still capable of peat formation correspond to the priority habitat, 'blanket bogs (*if active bog) (7130)' and 'depressions on peat substrates of the *Rhynchosporion* (7150)' occurs in pockets as a sub-habitat of blanket bog. However, no works are proposed to take place in the areas south of Turbine 5 or north of Turbine 3. Furthermore, no botanical species listed under the Flora (protection) Order or listed in the Irish Red Data Books were recorded on the site. All species recorded are common in the Irish landscape. No rare and protected plant species recorded in the desk study, including those obtained from NPWS data request were recorded within the Proposed Wind Farm site during the survey effort.

6.4.1.17 Invasive species

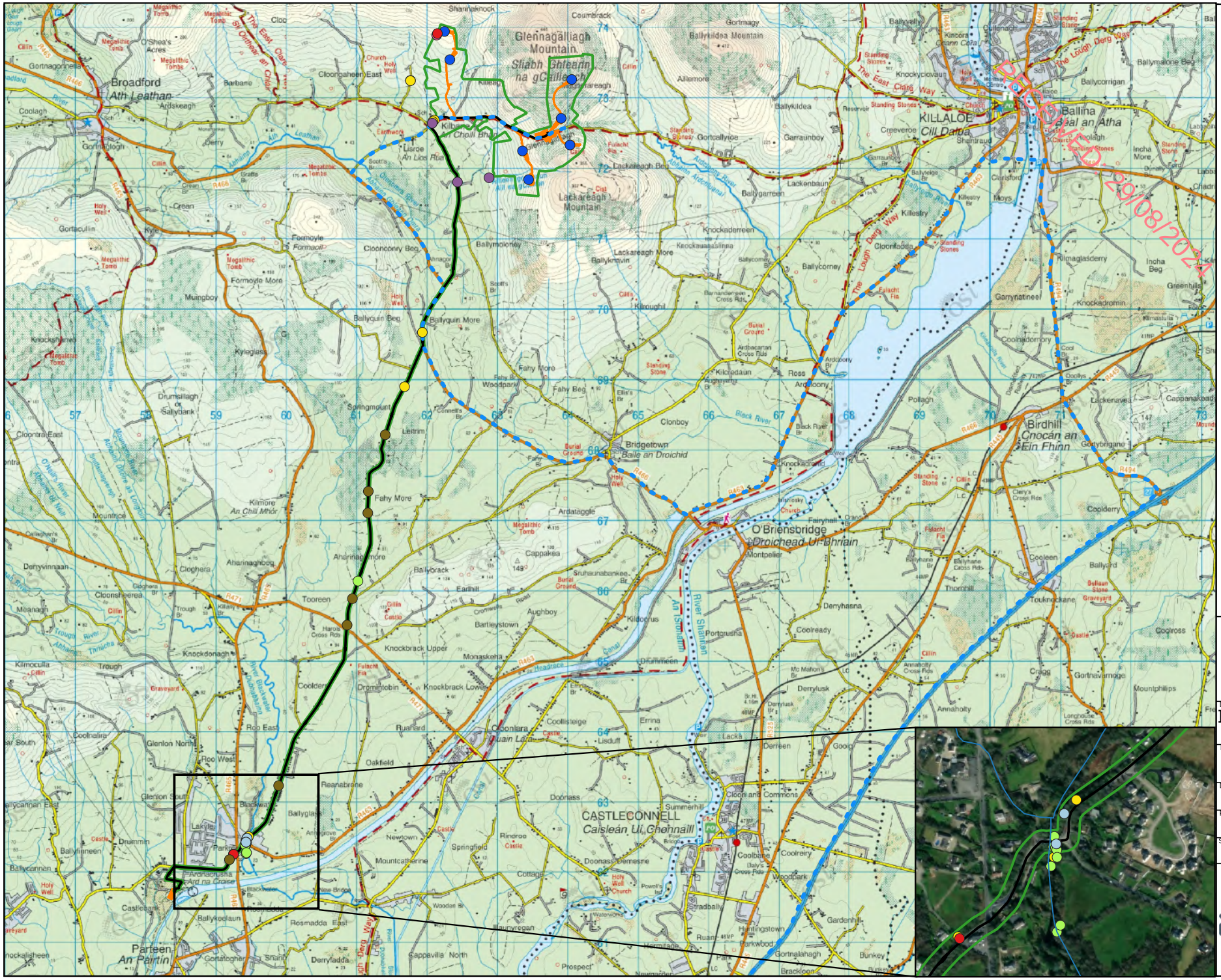
Two invasive plant species listed on the Third Schedule were recorded within the Proposed Wind Farm site, Japanese knotweed (*Reynoutria japonica*) and Rhododendron (*Rhododendron ponticum*). Other low to high impact invasive plant species recorded within the Proposed Project site are Winter heliotrope (*Petasites fragrans),* Cherry laurel (*Prunus laurocerasus*), Montbretia (*Crocosmia x crocosmiiflora*) and Hardy Fuchsia (*Fuchsia magellanica).* Three invasive species listed on the Third Schedule were recorded along the Proposed Grid Connection Route, Giant hogweed (*Heracleum mantegazzianum*), Japanese knotweed (*Reynoutria japonica*) and Rhododendron (*Rhododendron ponticum*). Evidence of invasive species recorded are depicted in Figure 6-6.

6.4.2 Fauna in the Existing Environment

The following subsections provide the results of the faunal surveys undertaken within the Proposed Wind Farm site and assessments as outlined in Section 6.2.3 (Field Surveys). Evidence of fauna recorded within the site is depicted in Figure 6-7 and Appendix 6-5.

6.4.2.1 Badger

Signs of badger activity were recorded within the Proposed Wind Farm site comprising dis-used setts, latrines, scat and snuffle holes (See Plate 6-16). Badger activity was mainly concentrated in the north-west of the site in agricultural grasslands and field boundaries nearby turbines T1 and T2. Signs of badger in the form of a latrine and scat were also recorded in an area of scrub in the south-east of the site, north of T6. Further snuffle holes were recorded in grasslands in the south-east of the site, west of T7. Dis-used badger setts and scat were recorded within north-west of the site. Four camera traps were deployed at potential mammal den/resting sites (see Plate 6-17) and although fauna activity was picked up on camera (discussed further in Section 6.5.2.2 below), no badger activity was recorded.



Map Legend

- Proposed Site Boundary
- Proposed Wind Farm Footprint
- Proposed Turbine Delivery Route
- Proposed Grid Connection Route
- Proposed Turbines
- EPA Rivers
- Rhododendron
- Giant hogweed
- Japanese knotweed
- Cherry laurel
- Fushcia magellanica
- Winter heliotrope
- Montbretia

Drawing Title
Invasive Species Survey Results

Project Title
Lackareagh Wind Farm

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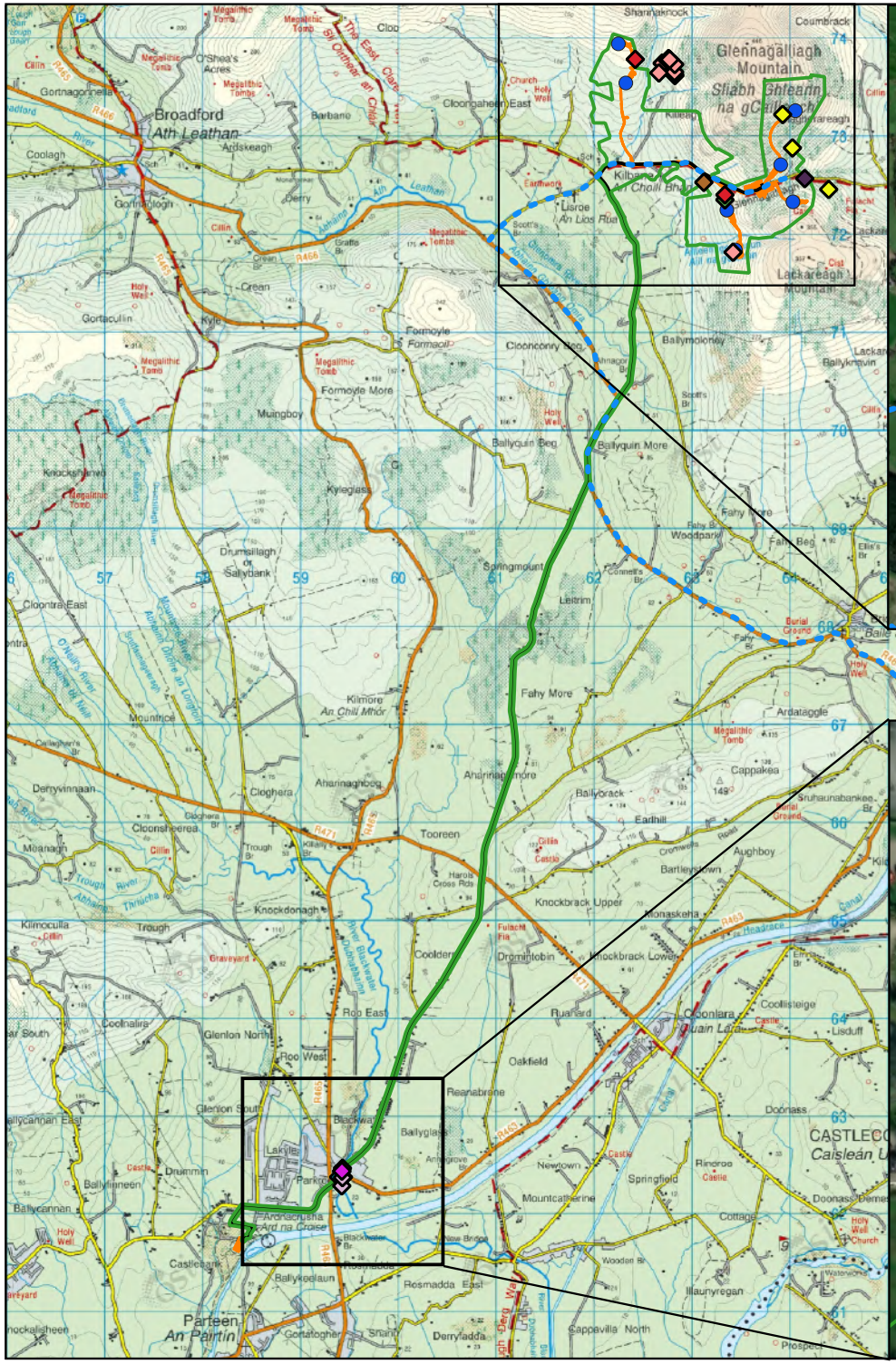

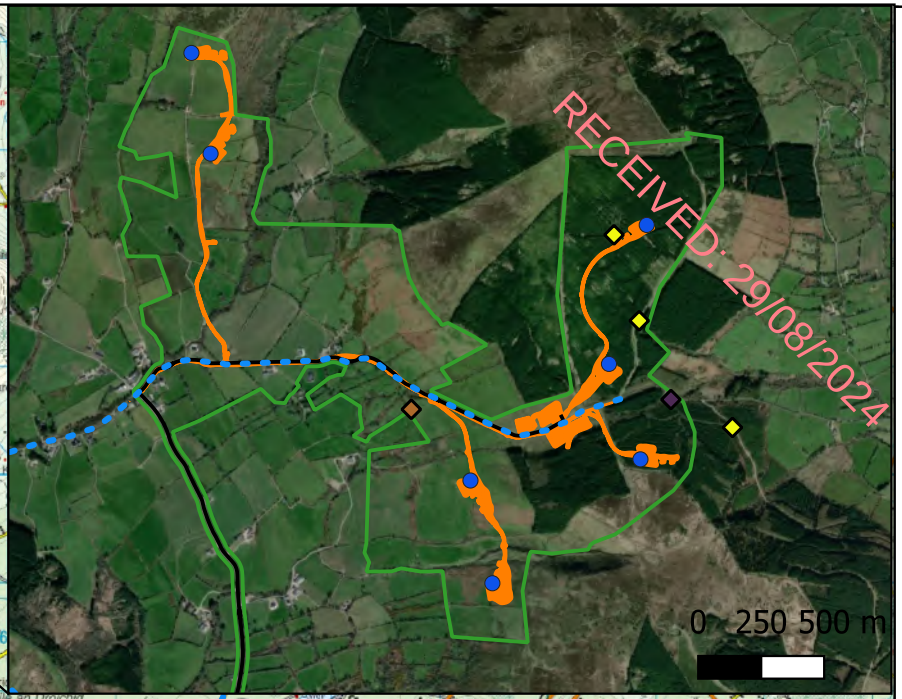

Map Legend

- Proposed Site Boundary
- Proposed Wind Farm Footprint
- Proposed Turbine Delivery Route
- Proposed Grid Connection Route
- Proposed Turbines
- EPA Rivers
- Otter Scat
- Otter Print
- Fox Scat
- Frog Spawn
- Deer Skull
- Lamprey Ammocoete

Drawing Title
Fauna Survey Results

Project Title
Lackareagh Wind Farm

Drawn By	Checked By
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Plate 6-16 Badger signs recorded within the EIAR Site Boundary including scat and snuffle holes (recorded south of Turbine 1)

Plate 6-17. Camera traps set up at potential mammal resting sites (in earth banks and hedgerows south of Turbine 2)

6.4.2.2 Otter

The desk study identified that otter are widespread in the wider area surrounding the Proposed Project site. Watercourses within the Proposed Wind Farm site and along the Proposed Grid Connection Route provide suitable habitat for otter, all watercourses within the Proposed Wind Farm site and along the Proposed Grid Connection Route were surveyed for signs of otter, watercourses in the wider study area were also surveyed to inform the aquatic baseline, including for otter (see Figure 3.1, Aquatic Baseline Report, Appendix 6-3 for survey locations and Figure 6-8 below). No otter signs were recorded within

the Proposed Wind Farm site. Otter prints and scat were recorded along the Proposed Grid Connection Route along the River Blackwater [Clare] under the Blackwater Bridge (ITM: 559378, 662470). Additionally, Otter surveys undertaken in the wider study area identified a single spraint along the Broadford River under the Killaderry Bridge (ITM 555663, 673479) at a hydrological distance of approx. 7.8km from the Proposed Wind Farm site. The spraint site featured superimposition (marking) by non-native American mink (*Neovison vison*) which is an invasive species listed on the Third Schedule (see Site A16 in Appendix 6-3 for further detail). No breeding (holts) or resting (couch) sites were identified either within the Proposed Wind Farm site, along the Proposed Grid Connection Route or in the wider study area where otter surveys were conducted.

6.4.2.3 Bats

Full details of results of bat surveys undertaken in Spring, Summer and Autumn 2022 are provided in the Bat Report (Appendix 6-2) and are summarised in this section. All survey and detector locations are shown in Figure 2-1 in the Bat Report.

In 2022, the Proposed Wind Farm site was surveyed for bats in Spring, Summer and Autumn. Seven static detectors were deployed at or near the Proposed Wind Farm turbine locations during each season. In complement, a bat habitat appraisal and manual activity surveys were conducted.

The static surveys revealed that the site was mainly used by common pipistrelles (n=58,020). Soprano pipistrelles bat passes (n=8,035) were the second highest bat species recorded on site followed by Leisler's bat (n=6,400), *Myotis* spp. (n=1,707) and brown long-eared bat (n=877). Nathusius' pipistrelle (n=156) and lesser horseshoe bats (50) were present in lower numbers. These bats species were the only ones which used the site inconsistently over the deployments.

Median activity levels were assessed for each species by detector location. In Spring, Leisler's bat had low median activity across the site, while common pipistrelles were recorded with a high activity at D05. Little soprano pipistrelle activity was recorded. In Summer, high activity levels were recorded primarily by common pipistrelles, with high activity peaks at all detectors by D03. In Autumn, high median activity was recorded at D08 for Leisler's, with common pipistrelle activity peaking at D07. The turbine originally proposed in proximity of D07 has been removed during the iterative design process.

The manual activity surveys, carried out during each season, covered potential roosts and tracks near proposed T1 and T2, the roadway and forest track in proximity of T6, T5, T4 and T3 and a central hedgerow and mature treeline leading to detector D07. The species composition recorded throughout the transects was similar to the static results, except for Nathuisus' pipistrelle, which were not recorded during manual surveys. The surveys allowed to identify forest tracks and edges as foraging habitat and commuting corridors for a small number of bats, as well as an area of mature trees in proximity of proposed turbine T1 as foraging habitat for common and soprano pipistrelles.

These trees were also assessed as having potential to host roosting bats during the bat habitat appraisals. A number of structures were inspected for presence of bats. None of the structures are located within the EIAR Site Boundary. A lesser horseshoe bat roost was identified at a derelict house located approximately 710m west of proposed turbine T6. However, this is not located in proximity to any works and will not be affected by the Proposed Wind Farm. No other roosts were identified during the surveys carried out in 2022.

6.4.2.4 Amphibians

Common frog has been recorded within hectad R67 in which the Proposed Wind Farm is located. Frog spawn was recorded during field surveys in drains and wet areas in conifer plantation woodland within the north-east of the Proposed Wind Farm site, north-east of T4 and south-west of T3. However, these observations were recorded outside of the infrastructure footprint. No significant suitable breeding habitat (ponds) for common frog were identified within the Proposed Wind Farm footprint, however,

smaller ponded areas and ditches across the site may provide some suitable breeding habitat for these species.

6.4.2.5 Other Fauna

Pygmy shrew, Red squirrel, Pine marten, Hedgehog, Irish hare and Marsh fritillary were all recorded within the wider landscape during the desk study. Scatter areas of patches of devils bit scabious which is the foodplant of Marsh Fritillary were found along grassy roadside verges, which were searched. No larval webs were recorded and no evidence of the forementioned species inhabiting the Proposed Wind Farm was recorded during survey days.

Field mice were documented from footage obtained by the camera trap within the Proposed Wind Farm site. Signs of fox in the form of scat and signs of deer in the form of a partial skull fragment were also recorded within the Proposed Project site.

6.4.2.6 Fisheries and Aquatic Fauna

Full details of results of aquatic surveys undertaken in July 2022 are provided in the Aquatic Baseline Report (Appendix 6-3) and are summarised in this section. All survey locations (n=19) are shown in Figure 2-1 in the Aquatic Baseline report. The following summary has been extracted from the baseline report. In addition, as noted in Section 6.5.2.2 aquatic surveys, including Otter were also conducted along the Proposed Grid Connection Route.

6.4.2.6.1 Watercourses

The majority of surveyed watercourses in vicinity of the Proposed Project site were natural or semi-natural in character, maintained good summer flows and were of high aquatic value for both fish and macroinvertebrates. Most were evaluated as local importance (higher value) given the presence of aquatic species of high conservation value and or ≥Q4 (good status) water quality. Of note is the presence of Q4-5 (high status) biological water quality at sites on the Kilbane Stream and Ardcloony River. High status waterbodies continue to decline significantly in Ireland (Trodd et al., 2022) and thus these watercourses require strict protection in light of proposed construction works that can result in impacts through siltation, enrichment and or hydrocarbons.

6.4.2.6.2 Fish Species

The following paragraphs summarise the fish species that were recorded during the aquatic baseline surveys. The below paragraphs should be read in conjunction with Figure 2.1 (survey locations) in the Aquatic Baseline Report (Appendix 6-3):

- **Salmonids** were present at 11 no. sites in total, with **Brown trout** present at 11 of these (i.e. A7, A9, A10, A11, A13, A14, A15, A16, B1, B2 & B3) and **Atlantic salmon** present at 5 no. sites on the Broadford River (A15 & A16) and Ardcloony River (B1, B2 & B3).
- No **Lamprey ammocoetes** (*Lampetra* sp.) were recorded during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed Project.
- **European eel** were relatively widespread in the survey area and were recorded in low densities from a total of 7 no. sites on the Broadford River (A7, A14 & A16), Kilbane Stream (A11 & A13) and the Ardcloony River (B2 & B3).

6.4.2.6.3 White-clawed crayfish & crayfish plague

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia during the survey and no crayfish remains were identified in otter spraint sites recorded during the survey. Furthermore, white-clawed crayfish eDNA was not detected in samples collected from the Broadford

River (site A16) or Ardcloony River (site B3) supporting the species absence from the sub catchments. The presence of crayfish plague in the Broadford and Ardcloony Rivers also supports the absence of crayfish.

6.4.2.6.4 eDNA Analysis

No white-clawed crayfish or freshwater pearl mussel eDNA was detected in composite water samples collected from the Broadford River (site A16) or Ardcloony River (B3) (0 positive qPCR replicates out of 12, respectively). These results were considered as evidence of the species' absence at and or upstream of the sampling locations. These results were in keeping with the known distribution (absence) of the species in the wider survey area.

Both sites on the Broadford River (site A16) and Ardcloony River (B3) tested positive for crayfish plague (*Aphanomyces astaci*) (5 and 12 positive qPCR replicates out of 12, respectively). No freshwater pearl mussel eDNA was detected in the 5 no. samples. These results were considered as evidence of the species absence within the survey area, in keeping with the known distribution (absence) of the species in the wider survey area.

6.4.2.6.5 Kick-sampling and Q-Value

The following paragraphs summarise the results of kick-sampling and Q-Value evaluation carried out:

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=19 wetted riverine sites in July 2022. No rare or protected macrophytes/aquatic bryophytes were recorded at any of the aquatic survey locations.

The Annex I habitat '*Water courses of plain to montane levels, with submerged or floating vegetation of the Ranunculion fluitantis and Callitricho-Batrachion or aquatic mosses [3260]*' ('floating river vegetation', FRV) was recorded at sites A14 and A15 on the Broadford River.

Sites on the Kilbane Stream (A9 & A13) and Ardcloony River (B3) achieved **Q4-5 (high status)** water quality, with a further 9 no. sites on the Cloonconry Beg River (A5) and unnamed tributary (A4), Kilbane Stream (A8, A11 & A13), Killeagy Stream (A10), Kilbane 27 Stream (A12), Broadford River (A14) and the Ardcloony River (B1 & B2) achieving **Q4 (good status)** water quality. Thus, a total of 12 no. survey sites met the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC)

In general, the biological water quality of the survey area was good although impacts from agriculture (siltation) and instream modifications (hydromorphology) were noted during the site visits. Channelisation, causing siltation, is the primary threat to water quality in the Broadford_010 river waterbody, containing the Kilbane Stream and upper reaches of the Broadford River (EPA, 2018).

Supplementary aquatic surveys in the form of kick sampling and Otter surveys were undertaken by MKO to support the aquatic baseline of Triturus Environmental. These survey were undertaken at water crossings and along the Proposed Grid Connection Route (See Figure 6-8).

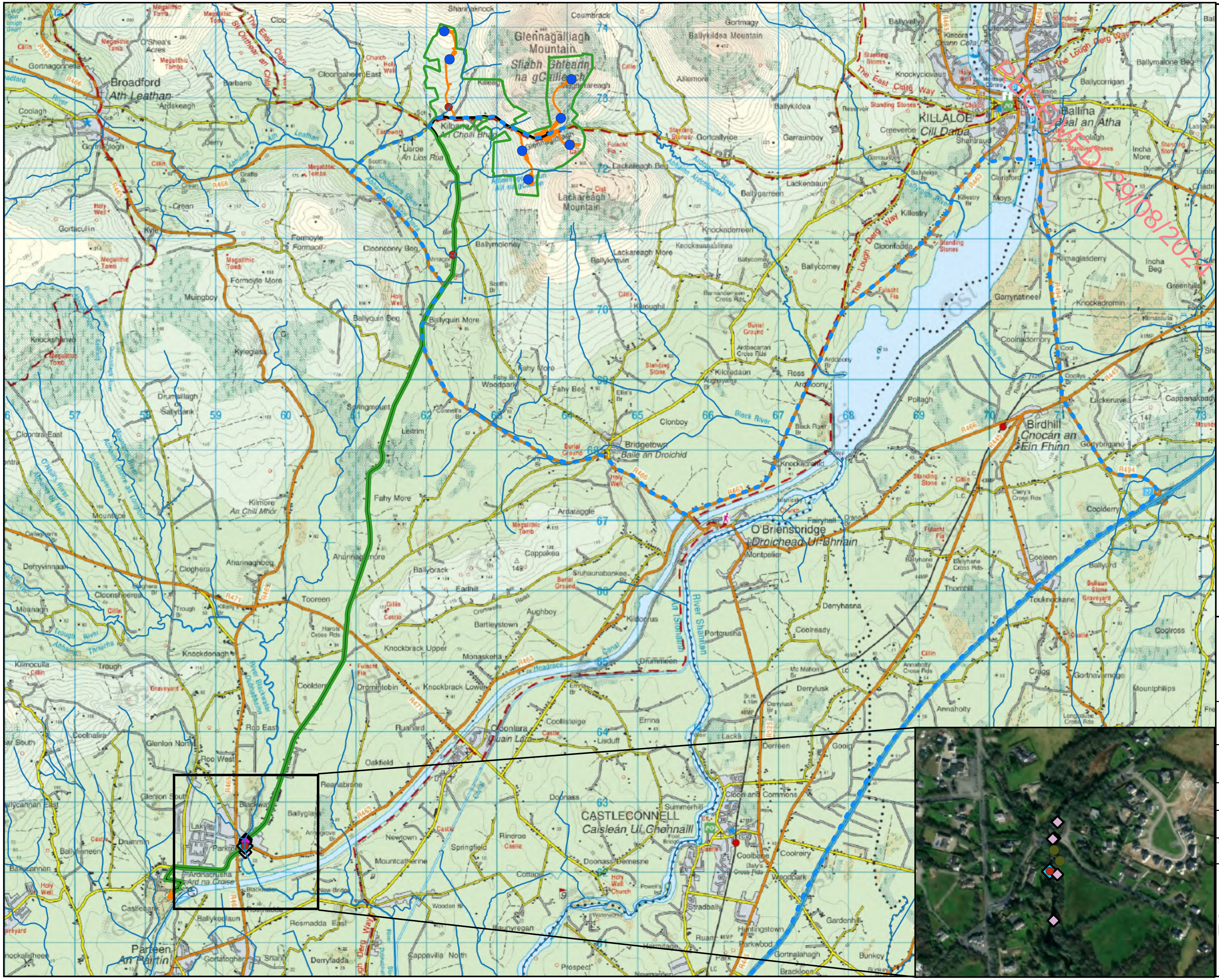
The following summarise the results of kick-sampling, Q-Value evaluation and Otter surveys carried out:

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=4 wetted riverine sites in March 2024. No rare or protected macrophytes/aquatic bryophytes were recorded at any of the aquatic survey locations.

Sites on the Kilbane Stream (C1) and Blackwater (Clare) River (C3) achieved **Q4 (good status)** water quality while the Ballyquin Beg River (C2) achieved **Q3-4 (moderate status)** water quality. Thus 2/3 of

the survey sites along the Proposed Grid Connection Route achieved a target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC). No Salmonids or European Eel were recorded during the surveys. However, one Lamprey ammocoete was recorded during kick sampling at the Blackwater (Clare) River (C3) along with evidence of Otter in the form of footprints and spraint.

In general, the biological water quality of the survey areas were good although impacts from agriculture (siltation) and instream modifications (hydromorphology) were noted during the site visits.



Map Legend

- Proposed Site Boundary
- Proposed Wind Farm Footprint
- Proposed Turbine Delivery Route
- Proposed Grid Connection Route
- Proposed Turbines
- EPA Rivers
- Kick sampling locations
- Otter Scat
- Otter Print
- Lamprey Ammocoete
- Suitable Lamprey Habitat

Drawing Title: Aquatic Survey Results

Project Title: Lackareagh Wind Farm

Drawn By	Checked By
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Project No.	**Drawing No.**
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Scale	**Date**
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6.4.3 Identification of Key Ecological Receptors

Table 6-13 below summarises the ecological evaluation of all features as outlined in Section 6.2.3. It provides the rationale for the determination and identifies the habitats and fauna that are considered to be Key Ecological Receptors (KERs) and therefore those features that are subject to impact assessment and considered in Section 6.6 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	The Proposed Project is hydrologically linked to downstream European site, namely the: › Lower River Shannon SAC [002165] › River Shannon and River Fergus SPA [004077] The Proposed Grid Connection Route overlaps the following SAC boundary via the local road L3046 which bisects the SAC. › Glenomra Wood SAC [001013] Potential for Likely Significant Effects 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 KERs as there is potential for direct effects via habitat loss in the case of Glenomra Wood SAC and indirect effects in the case of the Lower River Shannon SAC, River Shannon and River Fergus SPA via water pollution. **Note: SPAs within the Likely Zone of Influence are considered in Chapter 7, Ornithology and in the NIS.**	**Yes**
Nationally Designated Sites	The following Nationally designated sites were identified as being within the ZoI of the Proposed Project: › Doon Lough NHA [000337] › Glenomra Wood pNHA [001013] › Castle Lake pNHA [000239] › Fergus Estuary and Inner Shannon, North Shore pNHA [002048] Doon Lough NHA has been assigned **National Importance** as it is a Natural Heritage Area comprised of raised bog, that includes both areas of high bog and cutover bog, woodlands,	**Yes**

Ecological feature or species	Reason for inclusion as a KER	KER
	lakes, marsh, fen and wet meadows. The site is included as a KER as the QI listed for this NHA (Peatlands) is potentially sensitive to surface water and groundwater disturbance from indirect effects via water pollution. The Glenomra Wood pNHA has been assigned **International Importance** as it is an SAC which is a good example of a deciduous semi-natural woodland and is of considerable conservation significance as it is of a type of habitat listed on Annex I of the E.U Habitats Directive. The site is included as a KER as there is potential for direct effects via habitat loss. Castle lake pNHA has been assigned **National Importance** as it is a proposed Natural Heritage Area comprised of wetland and woodland habitats including lake habitats, areas of marshland and wet grassland, reed-beds and mature woodland with various habitats connected by the Owenogarney River. The site is included as a KER as several habitats potentially sensitive to indirect effects via water pollution. Fergus Estuary and Inner Shannon, North Shore pNHA has been assigned **National Importance** as it is a proposed Natural Heritage Area comprised of a large estuarine complex that forms an essential part of the north shore of both the Lower River Shannon SAC (002165) and the River Shannon and River Fergus SPA (004077) and is included as a KER as there is potential for indirect effects via water pollution.	
Habitats (Terrestrial)		
Linear Habitats - Treelines (WL2), Hedgerows (WL1), Stone walls (BL1) and Earth banks (BL2)/ Mixed broadleaved woodland (WD1)	Hedgerows, treelines and stone walls have all 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 Wind Farm there will be some loss of hedgerow (often associated with stone walls and earth banks) and treeline habitat within the Site. For this reason, these habitats have been identified as KERs. Earth banks within the site provide a similar function to those habitats listed above. However, there will be no loss of this habitat associated with construction of the Proposed Project and as such they are not identified as a KER. The majority of linear Mixed broadleaved woodland (WD1) habitat is located outside of the Proposed Project footprint, as such the area of habitat loss due to the Proposed Project is considered small. This habitat exists within the wider landscape however due to its ecological value this habitat has been classified as Local Importance (Higher value). For this reason, this habitat has been identified as a KER.	**Yes**

Ecological feature or species	Reason for inclusion as a KER	KER
Scrub (WS1)/ Dense bracken (HD1)	The majority of scrub (WS1) habitat is located outside of the Proposed Wind Farm footprint, as such the area of scrub loss due to the Proposed Project is considered small. This habitat is common and widespread within the wider landscape. Dense bracken (HD1) is a species poor habitat where it occurs, common and widespread within the wider landscape. As such these habitats are assessed as being Local importance (Lower value). For these reasons, these habitats have not been identified as a KERs.	No
Improved agricultural grassland (GA1)/Amenity grassland (GA2)/ Dry meadows and grassy verges (GS2)/ Recolonising bare ground (ED3)/ Scattered trees (WD5)	Much of the Proposed Wind Farm infrastructure is located within improved agricultural grassland (GA1) and to a much lesser extent in amenity grassland habitat (GA2). 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, this habitats have not been identified as a KERs. There are small areas of dry meadows and grassy verges (GS2), recolonising bare ground (ED3) and scattered trees (WD5) along roadsides. These areas are small, fragmented, common and widespread in the wider landscape as such the loss of theses habitat types was not considered to be significant. Therefore, they are classified as Local Importance (Lower Value). For these reasons, these habitats have not been identified as a KERs.	No
Conifer plantation (WD4)/ Recently felled woodland (WS5)	Infrastructure associated with the Proposed Wind Farm is proposed to be located within Conifer Plantation (WD4) and Recently felled woodland (WS5). It should be noted that habitat classified as WS5 within the Proposed Wind Farm site was conifer plantation that had been recently felled. Both habitats are highly modified, as well as being widespread in the wider landscape as such the loss of these habitat types was not considered to be significant. Therefore, they are classified as Local Importance (Lower Value). For these reasons, these habitats have not been identified as a KERs.	No
Buildings and artificial surfaces (BL3)	This habitat type is largely associated with artificial site access tracks throughout the site and along the Proposed Grid Connection Route, it has little biodiversity value. For this reasons, this habitat has not been identified as a KER.	No
Upland Blanket Bog (PB2)/ Wet heath (HH3)	Areas of Wet heath (HH3) with mosaics of Upland blanket bog (PB2) are situated in the north-east and south-east of the Proposed Wind Farm and are fragmented within the conifer plantation within the vicinity of proposed T3 and T4 in areas of firebreaks. These habitats have links with Annex I habitats. Wet heath corresponds to the annexed habitat, *'northern Atlantic wet heaths with Erica tetralix (4010)'*. While blanket bogs correspond to the annexed habitats, that are still capable	**Yes**

Ecological feature or species	Reason for inclusion as a KER	KER
	of peat formation correspond to the priority habitat, '*blanket bogs (*if active bog) (7130)*' and *'depressions on peat substrates of the Rhynchosporion (7150)*' occurs in pockets as a sub-habitat of blanket bog. These habitats are assigned **National Importance** although are not designated under European legislation they are of high biodiversity value. Albeit that these habitats either occur as small, fragmented areas within the Proposed Wind Farm they also occur north of the EIAR Site Boundary which is designated under International legislation as the Slieve Bernagh Bog SAC. Although the footprint of the Proposed Wind Farm infrastructure avoids these mapped areas, there is potential for indirect effect on these habitats as a result of drainage or dust deposition and are included as KERs for further assessment.	
Aquatic habitats		
Eroding/upland rivers (FW1)	**Eroding/upland rivers (FW1)** A number of natural watercourses and rivers are located within the site. These watercourses include: › An unnamed stream in Killeagy, flowing to west/southwest › The Kilbane Stream to the west › The Cloonconry Beg Stream to the east These Rivers and Streams have been assigned **Local importance (Higher Value)** as they are of high biodiversity value and connect to downstream waterbodies in the local area. They also provide a conduit to downstream SACs/SPAs of international importance and so have been identified a KER.	**Yes**
Drainage ditches (FW4)	**Drainage ditches (FW4)** Drainage ditches are found throughout the site along field boundaries and particularly throughout conifer plantation woodland. They are highly modified and species poor where they occur but do provide some connectivity with natural watercourses within the site. As such they are assessed as being local importance (lower value) but are considered further as a KER due to potential for conductivity with higher value watercourses.	**Yes**
Fauna		
Badger	Badger as an ecological feature that has been assigned **Local Importance (Higher value)** on the basis that the habitats within and adjacent to the study area are likely to be utilised by a locally occurring badger population of Local Importance. Direct effects on badger are not anticipated as no badger setts were identified within the vicinity of the Proposed Wind Farm infrastructure during the surveys undertaken. There will be no	**Yes**

Ecological feature or species	Reason for inclusion as a KER	KER
	loss of resting or breeding places associated with the development. However, evidence of badger activity was found in the wider area. Therefore, it is evident that badger use the habitats within the Proposed Wind Farm site for foraging and commuting. There is potential for badger setts to be created in the vicinity of the Proposed Wind Farm development during the interim between surveys and construction. Therefore, badger is included as a KER.	
Otter	Otter spraints were recorded in the River Blackwater [Clare] downstream of the Proposed Wind Farm. Streams within the Proposed Wind Farm site are generally smaller headwater type rivers with lower suitability to support fish and Otter. However, the Proposed Project has the potential to result in indirect effects on Otter (as a result of deterioration in habitat associated with indirect water pollution or disturbance during construction/decommissioning) downstream which are potentially associated with Lower River Shannon SAC, a population of International Importance, and it is therefore included as a KER and requires further assessment.	**Yes**
Bats	The Proposed Project is located in proximity of two European Sites designated for the protection of Lesser horseshoe bats. This species has been recorded foraging and commuting across the site. However, the populations associated with the designated roosts are not likely to utilise the site as it is not within or in close proximity of their core foraging ranges (2.5km). A lesser horseshoe roost was identified however this is not located in proximity to any works and will not be affected by the Proposed Project. No other roosts were identified during the surveys carried out in 2022. Populations of bat species recorded within the site have been assigned **Local Importance (Higher value)** on the basis that the habitats within the site are utilised by a regularly occurring bat population of Local Importance. All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976, as amended in 2017) and European legislation – (Habitats Directive (92/43/EEC). Bats are known to forage and commute within the vicinity of the site. Although no significant bat roosts were identified within the Proposed Wind Farm footprint, the Proposed Project has the potential to result in direct and indirect effects bats. Therefore, bats are included as a KER for further assessment.	**Yes**
Common frog	It is considered that the Proposed Project will not result in a significant loss of suitable habitat for amphibians. No evidence of populations of amphibians being significant at more than a local level was recorded. No likely significant effects on these species are anticipated and therefore further survey/assessment was not deemed necessary. Based on the limited observation of amphibians within the site (two areas containing frogspawn	No

Ecological feature or species	Reason for inclusion as a KER	KER
	outside the Proposed Wind Farm infrastructure footprint) and the lack of any significant breeding sites for these species, these species have been assessed as of Local Importance (Lower Value) and therefore are not considered to be KERs.	
Invasive species	Third Schedule invasive species Japanese knotweed, Rhododendron ponticum and Giant hogweed have been identified as KERs due to the potential for spread during the construction of the Proposed Project. As described in Section 6.4.1.17, invasive species were identified within areas of the Proposed Wind Farm and Proposed Grid Connection Route. A number of non-third schedule invasive species were identified within the EIAR Site Boundary. However, they do not occur within the Proposed Wind Farm development footprint and there is no potential for significant effect associated with these.	**Yes**
Additional fauna (e.g. Field mouse, Fox, etc).	The recorded evidence suggests that the site is not utilised by populations of higher than Local Importance (Lower Value) and no potential for significant effects have been identified at the population level. Due to the relatively small footprint and nature of the Proposed Project, they are unlikely to be significantly affected by the Proposed Project. For this reason, other faunal species are not considered as KERs and as such are not considered further in this assessment.	No
Aquatic and Fisheries Species		
Aquatic and Fisheries Species	Watercourses downstream of the Proposed Wind Farm and along the Proposed Grid Connection Route are known to support aquatic species (see Section 6.4.2.6 and Appendix 6-3 Aquatic baseline report for further detail). Brown trout was recorded within one watercourse (Kilbane stream) within the EIAR Site Boundary (e.g. survey locations A9). Watercourses within the site are hydrologically linked to downstream watercourses (and aquatic fauna within them) which have been identified as having **International Importance** due to their designation as an SAC or as QIs of the SAC (e.g. otter, white-clawed crayfish, lamprey spp.). Known populations of Salmon and Eel downstream would also be considered of **Local Importance (Higher Value)**. There is potential for indirect effect on these features as a result of impacts on water quality. Fish and other aquatic species are therefore included as a KERs for further assessment.	**Yes**

6.5 Ecological Impact Assessment

6.5.1 Do-Nothing Effect

If the Proposed Project were not to proceed, it is unlikely that any changes would be made to the current land use practice. The majority of the lands within the Proposed Project site would continue to be managed as they are now either as forestry or improved agricultural grassland and associated grazing. The other habitats identified within the Proposed Wind Farm site and Proposed Grid Connection Route, including stone walls, treelines, hedgerows, watercourses etc. would likely remain in a similar condition.

In some areas where scrub succession is establishing, this scrub may develop if not managed by the landowners and in time, this may undergo succession to small areas of woodland. The general biodiversity on the Proposed Wind Farm site and Proposed Grid Connection Route, as described in this chapter, would likely remain similar to its current state as activity levels and land use would not change

Should the Proposed Project not go ahead, the Biodiversity Enhancement and Management Plan (Appendix 6-4) would not be implemented, thus leading to no biodiversity enhancement measures being introduced into the local area.

6.5.2 Likely Significant Effects During Construction Phase

6.5.2.1 Effects on Habitats During Construction

Table 6-14 below provides details of the habitat extent that will be lost to facilitate the Proposed Wind Farm development within the Proposed Project site.

Table 6-14 Habitats occurring within the site.

Habitat	Approximate area to be lost to development footprint (hectares(ha)/meters(m))	KER
Improved agricultural grassland (GA1)	4.94ha	No
Buildings and other artificial surfaces (BL3)	1.09ha	No
Recently felled woodland (WS5)	2.01ha	No
Conifer plantation (WD4)	3.30ha	No
Recolonising bare ground (ED3)	0.2ha	No
Amenity Grassland (GA2)	0.29ha	No
Dry meadows and grassy verges (GS2)	0.25ha	No
Dense bracken (HD1)	1.31ha	No
Mixed Broadleaved Woodland (WD1)	0.05ha	No

Habitat	Approximate area to be lost to development footprint (hectares(ha)/meters(m))	KER
Scrub (WS1)	0.55ha	No
Treelines (WL2)	247.2m	**Yes**
Hedgerows (WL1) and associated stone walls (BL1)	2104.2m	**Yes**
Wet heath (HH3)	0.00ha	**Yes**
Upland Blanket Bog (PB2)	0.00ha	**Yes**
Upland Eroding Rivers (FW1)	0.00ha	**Yes**

The Proposed Grid Connection Route will not result in the permanent loss of any habitat. The works will be primarily restricted to the existing road categorised as Buildings and Artificial Surfaces (BL3). This is not significant at any geographic scale.

6.5.2.1.1 Assessment of Potential Effects on Treeline (WL2) Hedgerow (WL1)/Stonewall (BL1)/ Mixed broadleaved woodland (WD1)

Table 6-15 Assessment of Potential Effects on Treeline (WL2), Hedgerow (WL1)/Stonewall (BL1)

Description of Effect	The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 247.2 meters of treeline, 2104.2m of hedgerow (and associated stone wall) and 0.05ha of linear missed broadleaved woodland to enable widening of existing access tracks. The Proposed Wind Farm will also result in the temporary loss of approximately 112m of hedgerow at the accommodation works area, turbine blade transition area.
Assessment of Significance prior to mitigation	The permanent loss of these habitats is not considered to be a significant effect greater than the local geographical scale, as these habitats, are widespread and common within the local farmlands surrounding the Proposed Project. The removal of the hedgerows/treelines/linear woodland at this scale would not cause any significant fragmentation of habitat connectivity within the landscape. The loss of approx. 2463m of linear habitats (treeline and hedgerow) and 0.05ha of linear broadleaved woodland is considered **significant at the local geographic scale only.**
Mitigation	The loss of habitat will be mitigated through the establishment and enhancement of approx. 2,673m of planting comprising native broadleaved trees, shrubs and hedgerow habitat within the Proposed Wind Farm site. This habitat creation will provide an establishment of approx. 890m of new native broadleaved treelines, approx. 1,240m of new native hedgerow and enhancement of approx. 550m of treelines and 530m of hedgerows via supplementary planting. Additionally, broadleaved tree planting will be undertaken along the Kilbane Stream to produce a linear woodland of approx. 1.4 ha to enhance the watercourse. Planting will be of semi-mature specimens to ensure

	connectivity is immediate and will be of local provenance outlined in the Biodiversity Enhancement and Management Plan (BEMP), (Appendix 6-4). In cases where semi-mature specimens cannot be obtained then fast-growing species such as Willow may be supplemented. The replanting areas are presented in Figures 2-2 and 3-3 of the BEMP (Appendix 6-4), in consultation with the landowners who are supportive of the proposal. This will result in a no net loss of these habitats within the site. Species planted in these locations will be of a similar composition to those occurring on site and will be of local provenance. Further details with regard to species, planting location, and management is contained within the BEMP. In addition, stone walls that have to be taken down will be re-instated where possible. Where stone walls are re-instated, they will be left to naturally re-colonise with vegetation. Regarding habitats along the Proposed Grid Connection Route, proposed works will take place within the existing roads. Works along the Proposed Grid Connection Route on the local road L3046 which bisects the Glenomra Wood SAC will ensure there is no damage, disturbance or loss of habitat by erecting temporary fencing either side of the road along that section to ensure no materials are stockpiled or vehicles are parked there which could potentially damage the habitat.
Residual Effect following Mitigation	Following implementation of mitigation via tree and hedgerow planting, no potential for significant effects exist at any geographic scale. The planting of additional linear habitats and woodland as outlined above will result in a no net loss of linear habitats within the Proposed Project.

6.5.2.1.2 Assessment of Potential Effects on Groundwater, Surface Watercourses, Upland Eroding Rivers (FW1), Drainage ditches (FW4) and Sensitive Aquatic Faunal Species

Table 6-16 Potential for impact on Watercourses and Sensitive Aquatic Species

Description of Effect	The effects on water quality are fully described in Chapter 9 Water of this EIAR and are described here in relation specifically to ecology. This section assesses the potential for likely significant effects on groundwater/surface watercourses and associated aquatic faunal species, including, lamprey, white-clawed crayfish, European eel, salmonids, coarse fish, and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur within or downstream of the Proposed Project. **Surface Watercourses (and associated aquatic species)** *Direct impacts (mortality)* There are 5 no. watercourses (EPA/non-EPA mapped) located within the Proposed Wind Farm, and a number of other drains/ditches with connectivity to the watercourses within the EIAR Site Boundary. The Proposed Wind Farm development will require 1 no. upgrade to an existing crossing and 4 no. new proposed crossings. These crossing locations are outlined below: › A new proposed watercourse crossing over the EPA named Cloonconry Beg Stream between T06 and T07;

- Upgrade of an existing crossing along the L7080 Local Road over an unnamed 1st order stream (tributary of the EPA named Cloonconry Beg Stream) ~380m to the west of the proposed borrow pit location; and,
- A new crossing along a farm access track and linear woodland over the Kilbane Stream ~300m south of the proposed met mast location.

In addition to the EPA mapped watercourses, there is a high-density of drainage ditches and unmapped natural 1st order streams draining the site. There are an additional 2 no. crossings over these streams:

- A new crossing over a 1st order stream ~220m south-east of T6;
- A new crossing over a 1st order stream ~120m north of T6.

Fish or other sensitive aquatic features were only recorded within 1 no. watercourse (Kilbane stream, A9 (Baseline aquatic report)) within the EIAR Site Boundary during the aquatic baseline surveys, other watercourses within the Proposed Project site were deemed not to have any fisheries value (further detail provided in Aquatic Baseline report Site A3, A4, A5 and A9). Drainage ditches associated with field boundaries and conifer plantation woodland. These are highly modified and species poor habitats where they occur but do provide some connectivity with natural watercourses within the site. Therefore, there is a potential for direct impacts on any aquatic features associated with the Proposed Wind Farm.

Sensitive aquatic features in the form of Otter and Lamprey were only recorded at 1 no. watercourse (Blackwater River (Clare)) along the Proposed Grid Connection Route. The general description of the various construction methods employed at watercourse crossings along the Proposed Grid Connection Route are described in Chapter 4 of the EIAR. The measures minimise potential for impact on the receiving environment as instream works are completely avoided. Therefore, there is no potential for direct impacts on any aquatic features associated with the Proposed Grid Connection Route.

Indirect impacts (water quality)

A direct surface water pathway exists between the Proposed Wind Farm site and downgradient watercourses. Within the Proposed Wind Farm site, there are 5 no. watercourses and a number of drainage ditches across the site which flow into these 5 no. 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 species downstream.

Potential sources of pollution to surface waters within the site and along the Proposed Grid Connection Route:

- Silt laden surface water run-off;
- Release of chemicals, including hydrocarbons, from onsite machinery, concrete and other cement-based products.
- Drainage and seepage water resulting from infrastructure excavations;
- Stockpiled excavated material providing a point source of exposed sediment;

	› Construction of the cabling trench including small amounts of peat soils, resulting in entrainment of sediment from the excavations during construction; and, › Erosion of sediment from emplaced site drainage channels. **Groundwater** There are no karst features in the area of the Proposed Wind Farm or along the proposed TDR. Although approximately 2.4km of the Proposed Grid Connection Route is underlain by a Regionally Important Karst Aquifer. However, no karst features are mapped along the Proposed Grid Connection Route or in the surrounding lands. The closest mapped karst feature is a swallow hole mapped ~2.2km to the east of the Proposed Grid Connection Route. No groundwater level impacts are predicted from the construction of the Proposed Grid Connection Route, access roads, substation compound, TDR works or met mast due to the shallow nature of the excavations proposed (i.e. maximum approx. 1m). Significant impacts on groundwater are not predicted to occur given the low permeability nature of the underlying bedrock aquifers within the Proposed Wind Farm site and the low potential for groundwater dispersion and movement within the underlying aquifer.
Assessment of Significance prior to mitigation	In the absence of mitigation and following the precautionary principle, there is potential for works associated with the Proposed Wind Farm site and Proposed Grid Connection Route works to result in a significant indirect effect on the identified aquatic habitats and species at a **local geographic scale** in the form of pollution during the construction phase. This would also result in impacts on aquatic features ranging from **Local (Higher Value)** to a feature of **International Importance** (i.e. the Lower River Shannon SAC, River Shannon and River Fergus SPA and associated QI/SCI species).
Mitigation	Detailed mitigation measures in relation to the protection of surface water during construction is detailed in Chapter 9 (Water). In summary the key mitigation measure during the construction phase is the avoidance of sensitive hydrological features, by application of suitable buffer zones and the following mitigation measures. New watercourse crossings will comprise pre-cast concrete bottomless box culverts or clear span culverts and will be constructed in accordance with guidance from Inland Fisheries Ireland (IFI). The IFI (2016) document: *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*; and the Scottish Natural Heritage (SNH) *Good Practice During Wind Farm Construction* (SNH, 2019, 4th Edition) will also be adhered to. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI). Further to this: › All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing locations; › Where the proposed underground cabling route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road; › Near stream construction work will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document “Requirements for the Protection of Fisheries Habitat

	during Construction and Development Works at River Sites", that is, May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses; › During the near stream/river construction work, double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed on-site. › A self-imposed buffer zone of 50m has been put in place for on-site streams and rivers. In addition, a 10m buffer will be applied to the main manmade agricultural and forestry drains within the Proposed Wind Farm site. All of the key infrastructure areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossings and upgrades to existing site access tracks. Mitigation measures in relation to the 5 no. proposed watercourse crossings within the Proposed Wind Farm site is detailed in Section 9.5.2.9 of Chapter 9. A drainage maintenance plan for the Proposed Project is provided in Section 4.7 (Chapter 4 of this EIAR). This plan provides details of how water quality will be protected during the construction of the Proposed Wind Farm site, as outlined in Section 9.5.2.2 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 Proposed Project (see further detail on monitoring in Section 9.5.2.2 Chapter 9.). Although no significant impacts to groundwater are predicted as part of the construction of the Proposed Project, measures to protect groundwater during construction are detailed in Section 9.5.2.5 in Chapter 9.
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.

6.5.2.1.3 *Assessment of Potential Effects on Wet heath (HH3) and Upland Blanket Bog (PB2)*

Table 6-17 Assessment of Potential Effects on Wet heath (HH3) and Upland Blanket Bog (PB2)

Description of Effect	**Direct habitat loss:** All areas of Article 17 mapped peatland habitats have been completely avoided by the Proposed Wind Farm infrastructure. Small, fragmented areas of mosaic wet heath (HH3) and upland blanket bog (PB2) within a conifer forestry plantation are present within the footprint of T3 and T4. As discussed in the Botanical Appendix (Appendix 6-1), these areas of wet heath are remnant areas where Sitka spruce trees have failed to grow. The areas are considered degraded due to the presence of conifer forestry. Wet heath also occurs within firebreaks through which Proposed Wind Farm roads are proposed. Although the direct loss wet heath habitat is minor and fragmented it is considered further below in this assessment.

	There will be no other direct impacts on peatland habitats within the EIAR Site Boundary. **Indirect effects due to drainage:** The majority of the Proposed Wind Farm infrastructure is located within agricultural grasslands and conifer plantation forestry, completely outside of peatland habitats. However, the potential for indirect effects to nearby peatland habitats as a result of drainage effects from adjacent construction areas requires further assessment. **Indirect effects due to air quality:** The potential for impacts to nearby peatland habitats as a result of dust and nitrogen deposition due to excavations from adjacent construction areas has been considered. Such air quality impacts could occur as a result of dust production and wind blow during construction and excavation activities, as well as transport of materials and vehicle and plant emissions. Exhaust emissions associated with vehicles and plant such as NO_2, Benzene and PM_{10} will arise as a result of construction activities.
Assessment of Significance prior to mitigation	**Direct habitat loss** As discussed above, there will be a permanent loss of small patches of fragmented, degraded wet heath (HH3). According to the 2019 Article 17 Report dataset for County Clare, the total area of mapped wet heath and blanket bog habitat is 130km^2. The fragmented areas to be lost are not included within this mapping as those areas are dominated by conifer plantation. This impact is therefore considered to be negligible at a local and County scale. **Indirect effects due to drainage** Small scale temporary dewatering may occur at some excavations associated with Proposed Wind Farm infrastructure (i.e., turbine bases, cable trenches), and these have the potential to temporarily affect local groundwater levels. However, temporary reductions in groundwater levels by short duration and transient dewatering works will be very localised and of small magnitude due to the nature and permeability of the local subsoil and bedrock geology. Groundwater level effects will not be significant due the local hydrogeological regime and the elevation of the Proposed Wind Farm. Any effects will be temporary and localised. No potential for significant effect on peatland habitats as a result of drainage impacts is anticipated at any geographic scale. **Indirect effects due to air quality** Taking a precautionary approach, it is considered that there is potential for indirect impacts to peatland habitats of International Importance adjacent to the Proposed Project site due to dust impacts associated with construction of the Proposed Wind Farm development. The total area of wet heath and blanket bog habitat present within the EIAR Site Boundary is approx. 0.9km2. This represents a small fraction of the county land cover of wet heath and blanket bog habitat (130km^2) and no significant effects are predicted at the National or County scale. However, taking a precautionary approach, it is

	considered that there is potential for significant effect on these habitats at the local scale.
Mitigation	**Habitat loss** Mitigation by design - The Proposed Project has been specifically designed to avoid Article 17 mapped and unmapped areas of peatland habitat where possible and to minimise impacts thereon. This was achieved through an early-stage ecological constraints study informed by field surveys and habitat mapping. The proposed layout was thereby altered through the iterative design process to avoid sensitive habitats. The loss of minor, fragmented areas of wet heath for the Proposed Wind Farm development will be offset through the BEMP (Appendix 6-4) which includes for the restoration of peatland habitats which are currently forested within the EIAR Site Boundary. This will involve felling an area measuring approximately 12.7 hectares and a bespoke management and monitoring plan for restoration of peatland within these areas. In addition, the selected areas will provide linkages and join up previously fragmented areas of peatlands in the vicinity of the EIAR Site Boundary which will support the objective of Article 10 of the Habitats Directive to maintain landscape connectivity for flora and fauna. The BEMP provided as Appendix 6-4 to this EIAR, and the proposed enhancement areas are shown in Figure 3-4 of this Plan. On completion of successful peatland restoration to peatland habitats, this will result in an additional area of 6.18ha of restored peatland habitat as a result of the Proposed Project. The mitigation/restoration measures will be monitored over the lifetime of the Proposed Project as part of the BEMP to determine their effectiveness and to allow for alteration in approaches where necessary. A Peat & Spoil Management Plan has been prepared and is provided in Appendix 4-2 of this EIAR. This Plan outlines construction methodologies with regard to infrastructure located on peat spoils which will minimise impacts on peat hydrology and prevent issues with peat stability during construction. **Exhaust Emissions** Mitigation: › All construction vehicles and plant used onsite during the construction phase will be maintained in good operational order. If a vehicle requires repairs this work will be caried out, thereby minimising any emissions that arise. › Turbine components will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. › All machinery will be switched off when not in use. › Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum. **Dust Emissions** Mitigation measures to prevent significant effects to nearby peatland habitats as a result of airborne nitrogen deposition are provided below.

	› A wheel wash facility will be installed on the site and will be used by vehicles before leaving the Proposed Project site. › In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, grid route, road widening sections, substation, and construction compounds to ensure dust does not cause a nuisance. If necessary, such as during periods of dry weather, de-silted water will be taken from stilling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, turbine bases, and site compounds to prevent the generation of dust where required. Water bowser movements will be carefully monitored by the Environmental Manager/Environmental Clerk of Works to avoid increased runoff. › Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation and placement of material in peat placement areas. › The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as instructed by the construction Site Supervisor/Site Manager.
Residual Effect following Mitigation	With the implementation of the Biodiversity Management and Enhancement Plan, there is no potential for residual significant effect. There will be a positive effect on the extent of peatland habitat within the Proposed Project site upon implementation of the Plan which will provide an overall long-term net gain in terms of area. With the implementation of the above listed mitigations with regard to drainage impacts and dust deposition impacts to peatlands, there is no potential for residual effect to peatland habitats.

6.5.2.1.4 Assessment of Potential Effects via Invasive Species

Table 6-18 Assessment of Potential Effects via Spread of Invasive Species

Description of Effect	A small stand of *Rhododendron ponticum* was identified within the Proposed Wind Farm site outside the works area, Japanese knotweed (*Reynoutria japonica*) was recorded along the channel of the Cloonconry Beg River, Ballymoloney within the footprint of the Proposed Wind Farm. The infestation occurs throughout the channel and is located downstream of a proposed new water crossing between T6 and T7, potentially in the buffer of the works area. Additionally stands were recorded along the Kilbane stream adjacent to proposed road upgrades along the TDR in the village of Kilbane within the buffer of the works area and along the Proposed Grid Connection Route at Bridge Crossing 3 where HDD is proposed. Giant hogweed was recorded along the Proposed Grid Connection Route within the vicinity of the Blackwater Bridge (Bridge 1) where bridge strapping is proposed adjacent to the works area. Due to the construction works associated with the upgrade of an internal road within the EIAR Site Boundary, a water crossing, HDD and bridge strapping associated with the Proposed Grid Connection Route in the absence of mitigation there is potential for spread of these species to other habitats within the EIAR Site Boundary and outside of the Proposed Project site. This could occur via dispersal of seeds locally, or inappropriate disposal of the plant material whereby seeds or propagatable material are spread to another area. Vector material may also be spread to other sites as a result of

	entrainment within machinery or staff clothing/footwear. The potential for invasive species to be introduced into the EIAR Site Boundary also requires assessment. All other records of invasives species within the EIAR Site Boundary are completely avoided.
Assessment of Significance prior to mitigation	The potential for spread of Rhododendron, Japanese knotweed and Giant hogweed to other habitats is categorised as being a permanent, significant effect at the local level. However, if appropriate mitigation as prescribed below is undertaken then the affect can be reversible.
Mitigation	Rhododendron, Japanese knotweed and Giant hogweed regrow vigorously when cut. As a result, some method of stump killing, or removal is always necessary. Any untreated cut stump will regrow and in most cases flower within 3-4 years. The following measures will be in place: › A pre-commencement survey for invasive species within the footprint of the Proposed Wind Farm site will be carried out by a suitably qualified ecologist to ensure there is no new growth of Third Schedule invasive species in these areas. › If new infestations of invasive species are recorded within the construction areas, an Invasive Species Management Plan will be prepared in advance of construction which will incorporate the measures necessary to prevent spread additional to the measures laid out below. › A Toolbox Talk will be given by the Environmental Clerk of Works or Ecological Clerk of Works in relation to the management of invasive species within construction areas. › The infested area will be demarcated and works in the vicinity of the infestation will only be carried out under supervision by a suitably qualified Ecological Clerk of Works or Environmental Clerk of Works. › In advance of construction of the road upgrade works in the vicinity of the infested area, it will be necessary to completely remove the infestation outside of the flowering period (May to July) and dig the roots completely out. The effectiveness of this technique is increased by removing all viable roots. To avoid regrowth, stumps will be turned upside down and soil will be brushed off roots. The roots are relatively shallow, seldom being deeper than 45cm[12] › Once the supervising ecologist confirms that the material is dried out and non-viable, it will be chipped and composted on-site. › It is envisaged that no contaminated soil is to be removed from the site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.

[12] *TII (2020) - The Management of Invasive Alien Plant Species on National Roads – Technical Guidance GE-ENV-01105*

	In order to avoid the potential for spread of invasive species into the site: › Any construction material imported into the site will come from a source confirmed to be free of invasive species. › All plant and machinery will be thoroughly cleaned before entering and exiting the Site. (Maguire et al. 2008[13])
Residual Effect following Mitigation	With the above mitigation measures implemented, there will be no residual significant effect via the potential for spread of invasive species.

6.5.2.2 Effects on Fauna During Construction

The Proposed Project has the potential to result in habitat loss and disturbance impacts on faunal species included as KERs. Therefore, the following species have been brought forward for further assessment:

- Badger
- Otter
- Bats

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 6.5.2.1.2 above and is not repeated below.

6.5.2.2.1 *Assessment of Potential Effects on Badger*

Table 6-19 Assessment of Potential Impacts on badger

Description of Effect	**Habitat Loss/Fragmentation** Given the nature of the Proposed Project, there will be some minimal loss of suitable badger foraging habitat i.e., agricultural grassland (GA1), conifer plantation (WD4) 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 active badger setts were identified during the ecological surveys undertaken of the Proposed Project. However, numerous signs of badger activity were recorded within the site (latrines, snuffle holes, prints) in close proximity to the Proposed Wind Farm infrastructure. There is potential for new badger setts to be created during the interim between baseline ecological surveying and commencement of construction. Therefore, a potential for impact via disturbance/mortality of badger exists should new setts be created in close proximity to the Proposed Project construction works.

[13] https://invasivespeciesireland.com/wp-content/uploads/2012/01/Rhododendron-BPM.pdf

	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 development 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.
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 Proposed Wind Farm site, baseline surveys identified that the site 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** Prior to the commencement of construction works, the following measures will be undertaken for the avoidance of disturbance and to ensure no additional setts have been established since the original surveys undertaken. The following measures are in line with *Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes* (TII 2009). › A pre-commencement badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period. › Any setts identified within 150m of the Proposed Wind Farm infrastructure will subsequently be monitored for a minimum period of 2 weeks using remote cameras in order to ascertain use by badgers and levels of activity. If an active badger sett is identified and works can be undertaken safely (as to avoid sett collapse) then an exclusion zone will be set up around the sett as follows: Exclusion zone fencing, and appropriate signage will be put in place between working areas and badger sett exclusion zones to ensure that there will be no encroachment of the badger sett exclusion zones by construction activities. › If a newly established and active sett was identified within an area where works could not avoid direct impacts on the sett then the sett would likely need to be excluded prior to works

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

	commencing. This would need to be undertaken in line with current guidelines by an appropriately qualified ecologist in advance of construction works commencing and in consultation with NPWS. › Mitigation measures as per the above mentioned TII document will be implemented to prevent disturbance of any active sett.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative effects to badger is anticipated at any geographic scale.

6.5.2.2.2 Assessment of Potential Effects on Otter

Table 6-20 Assessment of Potential Impacts on otter

Description of Effect	No signs of otter were recorded within any of the watercourses within the Proposed Wind Farm. However, signs of otter were recorded in the wider study area (see Aquatic Baseline Report) and at 1 no. location along the Proposed Grid Connection Route (Blackwater River (Clare)). **Habitat Loss/Fragmentation, Disturbance, Mortality** For the Proposed Grid Connection Route, only minor underground cabling installation works are proposed within the public road and all bridge crossings will be by HDD or bridge strapping. Given the proposed works and the findings of the baseline surveys for otter, no significant habitat destruction, no loss of breeding or resting places and no direct mortality related impacts on this species are anticipated. Proposed new culverts within the Proposed Wind Farm are to be clearspan or box culverts, if necessary, wildlife ledges will be included. Therefore, there is no potential for the Proposed Project to result in any barrier to the movement of otter. In relation to disturbance, otter 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. Any disturbance impacts would be short-term in nature and not considered to have a significant impact on the local otter population. **Habitat Degradation (impacts on water quality)** Taking a precautionary approach, it is assumed that otter may occur within and near the Proposed Project on occasion, particularly the lower reaches of the main watercourses downstream of the Proposed Wind Farm and Proposed Grid Connection Route. 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 Proposed Wind Farm and Proposed Grid Connection Route. This represents a potential indirect effect on otter in the form of habitat degradation/loss of prey resource through water pollution.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation, Disturbance, Mortality** Significant effects regarding habitat destruction, barrier effect, disturbance and mortality are not anticipated as a result of the Proposed Project.

	Habitat Degradation (impacts on water quality) Although otter as a KER has been valued of international importance (due to otter being a QI species of the downstream Lower River Shannon SAC) water quality impacts if they did occur in the absence of mitigation would be considered **significant at the local geographic scale only** as impacts would occur on the local population only.
Mitigation	Specific mitigation is provided in relation to water quality in Chapter 9: 'Water' of this EIAR and is assessed in Section 6.5.2.1.1 above. Prior to the commencement of construction works associated with the installation of watercourse crossings, 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 undertaken (TII, 2007): › From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Project development footprint, consultation will be undertaken with the NPWS and a derogation licence applied for. › All conditions of a derogation licence will be implemented in full. › 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 should also not take place within 15m of such holts, except under licence (TII, 2006). › All of the above works will be undertaken or supervised by an appropriately qualified ecologist.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Project at any geographic scale.

6.5.2.2.3 *Assessment of Potential Effects on Bats*

The impact assessment in relation to bats has been undertaken in accordance with NIEA[15] and NatureScot Guidance[16]. As per the NatureScot Guidance, wind farms present five 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

[15] *Northern Ireland Environment Agency Natural Environment Division (NED) published Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland (NIEA, 2021).*
[16] *NatureScot published Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Version: August 2021 (NatureScot, 2021).*

- Disturbance

For each of these five 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 6.6.3.2.1.

Table 6-21 Assessment of Potential Impacts on Bats

Description of Effect	**Loss of, or Damage to, Roosts** Trees were assessed as having potential to host roosting bats during the bat habitat appraisals. A number of structures were inspected for presence of bats. None of the structures are located within the Proposed Project site. A lesser horseshoe roost was identified; however, this is not located in proximity to any works and will not be affected by the Proposed Project. No other roosts were identified during the surveys carried out in 2022. The site consists primarily of conifer plantation and agricultural grasslands which do not provide roosting habitat of significance for bats. There will be no requirement to fell trees/forestry as part of the Proposed Grid Connection Route. Therefore, there will be no loss of potential tree roosting habitat associated with these works. HDD is proposed for 2 no. bridges along the Proposed Grid Connection Route with the option of and cable strapping to bridge being investigated at 1 no. bridge (Blackwater bridge) where there is already existing strapping along the bridge deck. The Blackwater bridge along the Proposed Grid Connection Route, was identified as having *Moderate* potential for roosting bats, no loss of roosting habitat is anticipated.
	Loss or Damage to Commuting and Foraging Habitat In absence of appropriate design, the loss or degradation of commuting/foraging habitat has the potential to reduce feeding opportunities and/or displace bat populations. Bats were observed and recorded foraging and commuting throughout the site. The Proposed Wind Farm will include the construction and/or widening of access roads and tracks across forestry and grasslands, as well as other associated infrastructure, which will require the felling of existing trees. A total of 13.8 hectares of conifer plantation and recently felled woodland will be permanently lost within and around the footprint of the Proposed Wind Farm. The felling of trees is provided to allow for the construction of the permanent footprint as well as achieve the required buffer distance for the protection of bats, from the turbines to the canopy of the nearest habitat feature, as recommended by the Natural England (2014) and NatureScot (2021). Further details on buffer calculations can be found in Section 6.1.3 of the Bat Report (Appendix 6-2). The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 247meters of treeline and 2104m of hedgerow (and associated stone wall) to enable widening of the existing access track into the Proposed Wind Farm. Only the northern section of hedgerow/stone wall will be removed. The Proposed Project will result in the temporary loss of approximately 112m of hedgerow at the turbine blade transition area within the accommodation works area.

	Bat buffers will be created around turbines as detailed in Section 6.1.3 of the Bat Report (Appendix 6-2). The creation of buffers will not sever existing corridors but has the potential to create additional habitat for foraging and commuting bats along proposed keyholes, where trees are not harvested by ongoing forestry operations.
	Displacement of Individuals or Populations The Proposed Wind Farm is predominantly located within conifer plantation and agricultural grassland with areas of wet grassland, and scrub. There will be a loss of linear landscape features for commuting and foraging bats. However, the habitats on the Proposed Wind Farm site will remain suitable for bats and no significant displacement of individuals or populations is anticipated.
	Disturbance Any bridge strapping works on the Blackwater bridge are expected to incur no loss of roosting habitat. However, the works have the potential to affect roosting bats in the form of temporary disturbance during the construction phase of the Proposed Project.
Assessment of Significance prior to mitigation	**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 is proposed.
	Loss or Damage to Commuting and Foraging Habitat The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 247meters of treeline (associated with new road access), 2104m of hedgerow (and associated stone wall) to enable widening of the existing access track into the site and 0.05ha of mixed broadleaved woodland to allow for a new water crossing. Only the north-western and south-eastern sections of hedgerow/stone wall will be removed. The Proposed Project will also result in the temporary loss of approximately 112m of hedgerow at the proposed turbine blade transition area in a field north of the Regional road R466 as part of the accommodation works area. The construction of the Proposed Project has the potential to result in short-term negative effects on the local bat populations in the form of habitat loss. However, given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (i.e. natural hedgerows, treelines and scrub) no significant effects on bat species have been identified. The following potential long-term positive effects are noted. The felling of plantation forestry (WD4) within the site, to facilitate site access roads and turbine infrastructure, will result in the creation of more woodland edge habitat and as such can benefit feeding and commuting bat species. Given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (i.e. natural hedgerows, treelines and scrub), no significant negative effects with regard to loss of commuting and foraging habitat for bats are anticipated.
	Displacement of Individuals or Populations

	The habitats within the site will remain suitable for bats and no significant displacement of individuals or populations is anticipated from the construction phase of the Proposed Project. Impacts from noise and lighting have the potential to result in temporary negative effects on the bat populations recorded at the site during construction, this would be considered **significant at the local geographic scale only** in the absence of mitigation.
	Disturbance All bridges were considered to have either a low or moderate potential for roosting bats, a potential to result in temporary negative effects on the bat populations would be **considered significant at the local geographic scale only** in the absence of mitigation in the event that works are carried out during sensitive periods of the bat lifecycle. During the hibernation period, disturbance could result in a waste of energy and potential starvation, and during the maternity period it could cause abortions or pup abandonment. Therefore, mitigation measures are recommended on a precautionary basis.
Mitigation	**Loss or Damage to Commuting and Foraging Habitat** Significant effects with regard to loss of commuting and foraging habitat are not anticipated. However, mitigation and enhancement measures in relation to habitats as detailed in the BEMP (See Appendix 6-4) will include approx. 2,673m of planting comprising native broadleaved trees, shrubs and hedgerow habitat within the Proposed Wind Farm site. This habitat creation will provide an establishment of approx. 890m of new native broadleaved treelines, approx. 1,240m of new native hedgerow and enhancement of approx. 550m of treelines and 530m of hedgerows via supplementary planting. Additionally, broadleaved tree planting will be undertaken along the Kilbane Stream to produce a linear woodland of approx. 1.4 ha to enhance the watercourse for fauna including bats. The planting will provide additional foraging and commuting habitat for bats within the Proposed Project site following construction. This will result in a no net loss of linear habitat features within the Proposed Wind Farm.
	Displacement of Individuals or Populations The following construction best practice will be employed to minimise general noise and disturbance potential. During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001). Where lighting is required, directional lighting will be used to prevent overspill on to forestry edges. Exterior lighting during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Project, and consequently on bats i.e. lighting will be directed away from mature trees/treelines around the periphery of the site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.

	The proposed lighting around the Proposed Project site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK. In addition, the applicant commits to the use of lights during construction (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: › Every light needs to be justifiable › Limit the use of light to when it is needed › Direct the light to where it is needed › Reduce the light intensity to the minimum needed › Use light spectra adapted to the environment When using white light, use sources with a "warm" colour temperature (less than 3000K).
	Disturbance On a precautionary basis, works at bridge crossings will be undertaken to avoid sensitive life cycle periods for bats, namely deep hibernation (December – February) and the maternity season (May-August), as disturbance at these times can cause mortality. A pre-commencement bat activity survey will be undertaken prior to works to assess bat usage of the Blackwater Bridge. The function of this survey will be to reassess the baseline environment since the time of undertaking the assessment in 2022, and to identify bat presence at the time of works. If a bat roost is identified within the bridge, a bat derogation licence to disturb bats will be obtained from the NPWS, prior to works and the works will be supervised by a qualified ecologist.
Residual Effect following Mitigation	Taking into consideration the sensitive design of the Proposed Project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats as a result of loss or damage to commuting and foraging habitat, loss of, or damage to, roosts, displacement of individuals or populations, and disturbance, are not anticipated.

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 land take or loss of habitats and as such there is no potential for any significant effects in this regard.

The implementation of the Biodiversity Management and Enhancement Plan (see Appendix 6-4) will ensure that any treeline or hedgerow habitats lost to facilitate the Proposed Project will be replaced within the site.

6.5.3.1.1 *Effects on surface watercourses during operation*

Table 6-22 Assessment of potential effects on surface watercourses during operation

Description of Effect	The effects on water quality are fully described in Chapter 9 Water of this EIAR and are described here in relation specifically to ecology. This section

	assesses the potential for likely significant effects on surface watercourses and associated aquatic faunal species, including, lamprey, white-clawed crayfish, European eel, salmonids, coarse fish, and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur within or downstream of the Proposed Project site. The following impact assessment is summarised from Section 9.5.3.1, Chapter 9 Water and is summarised here in the context of ecology. **Increased hardstanding/run-off impacts:** Proposed Wind Farm Progressive replacement of the peat or vegetated surface with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the surface water drainage network. This could potentially increase runoff from the site and increase flood risk downstream of the Proposed Project. In reality, the access roads will have a higher permeability than the underlying peat. However, it is conservatively assumed in this assessment that the Proposed Wind Farm access roads and hardstands are impermeable. The assessed Proposed Project footprint comprises turbine bases and hardstands, access roads, site entrances, proposed onsite 38kV substation and battery energy storage system, and temporary construction compounds. Accommodation works areas are excluded from the Proposed Project as these works are temporary and only considered in the construction phase, not operational. During storm rainfall events, additional runoff coupled with increased velocity of flow could increase hydraulic loading, resulting in erosion of watercourses and impact on aquatic ecosystems. Surface waters in the vicinity and downstream of the Proposed Wind Farm site (Glenomra, Broadford and Ardcloony rivers and their associated tributaries) and associated aquatic species could be impacted. Proposed Grid Connection Route There will be no potential increase in runoff along the Proposed Grid Connection Route. The works are located in the carriageway of the existing road corridor and no change in surface water runoff rates will result as the trench and road surface will be reinstated.
Assessment of Significance prior to mitigation	In the absence of mitigation and following the precautionary principle, there is potential for the operational stage of the Proposed Project to result in a significant indirect effect on the identified aquatic habitats and species at a **local geographic scale** in the form of sediment laden run-off during storm rainfall events. This would also result in impacts on aquatic features ranging from **Local (Higher Value)** to a feature of **International Importance** (i.e. the Lower River Shannon SAC, River Shannon and River Fergus Estuaries SPA and associated QI/SCI species).
Mitigation	**Increased hard-standing/run-off** 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 below and as shown on the Drainage drawings submitted with this planning application (Appendix 4-8):

	› Interceptor drains will be installed up-gradient of all Proposed Project infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader; › Swales/roadside drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; › On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/roadside drains; › Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; › Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, › Settlement ponds have been designed in consideration of the greenfield runoff rate. As described in Chapter 9 the proposed integration of the Proposed Wind Farm site drainage with the existing forestry drainage is a key component of the proposed drainage management within the Proposed Project. In this context, integration means maintaining surface water flow paths where they already exist, avoid creation of new or altered surface water flow paths, and maintaining the drainage regime (i.e. normal flow) within each forestry compartment. Critically, there will be no alteration of the catchment size contributing to each of the main downstream watercourses. All Proposed Project drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.
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

Potential for significant effects on bat species and Otter resulting from the operation of the Proposed Project were identified and therefore, these are identified as KERs during the operational phase and discussed further in Section 6.5.3.2.1 below.

There is no potential for significant negative effects on non-volant terrestrial fauna (badger, pine marten, red squirrel) or amphibians/reptiles during the operational phase of the Proposed Project. Implementation of the BEMP measures during the operational phase of the development will result in a no net loss of linear features of value for local faunal species, providing more foraging opportunities for fauna, as well as additional shelter for birds and mammals, and commuting links for bats. Management of habitats to enhance for heathlands/peatlands will be undertaken throughout the operational life of the Proposed Project having a positive impact on these habitats as well as other local invertebrate/pollinator

species. Finally den/nesting boxes provided for red squirrel and pine marten will provide additional suitable breeding sites for these species within the Proposed Project.

6.5.3.2.1 Assessment of Potential Effects on Bats during operation

Potential for significant effects on bat species resulting from the operation of the Proposed Project were identified in the form of collision mortality, barotrauma and other injuries.

Table 6-23 Assessment of Potential Effects on Bats

Description of Effect	The following high-risk species were recorded during the dedicated surveys: › Leisler's bat, › Common pipistrelle › Soprano pipistrelle › Nathusius' pipistrelle Together with the following low risk species: › Myotis spp. › Brown long-eared bat › Lesser horseshoe bat. Site-level collision risk for high collision risk bat species was typically ***Medium***. Overall bat activity levels were typical of the nature of the site, which is agricultural grassland with upland commercial forestry, with regular levels of bat activity recorded during the static detector surveys as well as the walked and driven transects undertaken. However, following per detector site-specific analysis, detectors D05, D07 and D08 showed high median activity levels across at least one season for common pipistrelle and Leisler's bat. Detector D07 does not correspond to any turbine location.
Assessment of Significance prior to mitigation	Overall activity levels were low for the above species. However, 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**. No significant effects are anticipated at any other geographic scale.
Mitigation	Detailed mitigation measures in relation to bats are provided in the Bat Report (see Appendix 6-2) and summarised below. Mitigation measures are proposed together with post-construction monitoring: › Introduce felling buffers around turbines › Implement blade feathering as a standard › Implement curtailment on proposed turbines which recorded high median activity levels, as per Table 6-1 of the Bat Report, in Appendix 6-2. › A minimum of three years operational monitoring 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.

Residual Effect following Mitigation	Taking into consideration the sensitive design of the Proposed Project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats as a result of collision and barotrauma are not anticipated.

Potential for significant effects on Otter resulting from the operation of the Proposed Project were identified in the form of fragmentation.

Table 6-24 Assessment of Potential Effects on Otter

Description of Effect	No signs of otter were recorded within any of the watercourses within the Proposed Wind Farm. However, signs of otter were recorded in the wider study area (see Aquatic Baseline Report) and at 1 no. location along the Proposed Grid Connection Route (Blackwater) River(Clare). **Fragmentation** Proposed new culverts within the Proposed Wind Farm are to be clearspan or box culverts, if necessary, wildlife ledges will be included. Therefore, there is no potential for the Proposed Project to result in any barrier to the movement of otter.
Assessment of Significance prior to mitigation	**Fragmentation** Significant effects regarding fragmentation were considered due to the addition of new water crossings within the Proposed Wind Farm. Although otter as a KER has been valued of international importance (due to otter being a QI species of the downstream Lower River Shannon SAC) fragmentation impacts if they did occur in the absence of mitigation would be considered **significant at the local geographic scale only** as impacts would occur on the local population only.
Mitigation	Specific mitigation is provided in relation to Otter above in Section 6.5.2.2.2.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Project at any geographic scale.

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 Wind Farm are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Project may be decommissioned fully.

Upon decommissioning of the Proposed Project, 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 turbines will likely be removed from the Proposed Wind Farm using the same transport methodology adopted for delivery to the Proposed Wind Farm initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the proposed onsite 38kV 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 will remain in place underground and will 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 environmental emissions such as noise, dust and/or vibration.

Site roadways will 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 the Proposed Wind farm roads will be left in situ for future use. It is envisaged that the roads will serve as agricultural roads for local landowners.

The Proposed Grid Connection Route electrical cabling and proposed onsite 38kV substation will remain in place as it will be under the ownership and control of the ESBN/Eirgrid.

A Decommissioning Plan has been prepared (Appendix 4-7) the detail of which will be agreed with the local authority prior to any decommissioning. 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 Project has been fully assessed in the 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 Proposed Project, 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 Wind Farm is located completely outside of the boundary of any European site. The Proposed Grid Connection Route overlaps with the local road L3046 which bisects the Glenomra Wood SAC, while watercourses within the Proposed Wind Farm site have a direct hydrological link to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. The Proposed Wind Farm footprint is within the core foraging range for Cormorant (5.2km, Thaxter et al. 2012) which

is a SCI of the Lough Derg (Shannon) SPA. Therefore, a potential for likely significant effect was identified on the following European sites:

- Glenomra Wood SAC [001013]
- Lower River Shannon SAC [002165]
- Lough Derg (Shannon) SPA [004058]
- River Shannon and River Fergus Estuaries SPA [004077]

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:

- *Glenomra Wood SAC [001013]*
- *Lower River Shannon SAC [002165]*
- *Lough Derg (Shannon) SPA [004058]*
- *River Shannon and River Fergus Estuaries SPA [004077]*

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

As discussed in Section 6.4.1.1, the Nationally Designated Sites listed below have been identified as occurring within the Likely Zone of Influence of the Proposed Wind Farm development.

- Doon Lough NHA [000337]
- Glenomra Wood pNHA [001013]
- Castle Lake pNHA [000239]
- Fergus Estuary and Inner Shannon, North Shore pNHA [002048]

6.5.5.2.1 *Habitat loss*

A potential for effect to the following nationally designated site was identified due to the Proposed Grid Connection Route overlapping with the local road L3046 which bisects this pNHA was identified via direct impacts of habitat loss from construction works:

- Glenomra Wood pNHA [001013]

The potential for the construction of the Proposed Project to result in a significant effect on treelines and hedgerows has been assessed in Section 6.5.2.1.1. A range of mitigation measures to protect these habitats are in place as summarised in Section 6.5.2.1.1. With these mitigation measures in place, there is no potential for significant effect on these habitats and in turn on the above listed Nationally Designated Sits as a result of construction of the Proposed Project.

6.5.5.2.2 *Hydrological Effects*

Hydrological connectivity was identified between the Proposed Project and the following Nationally designated sites:

- Glenomra Wood pNHA [001013]
- Castle Lake pNHA [000239]
- Fergus Estuary and Inner Shannon, North Shore pNHA [002048]

The potential for the construction and operation of the Proposed Project to result in a significant effect on water quality within local and downstream watercourses has been assessed in Sections 6.5.2.1.2 and 6.5.3.1.1. A range of mitigation measures to protect downstream water quality are in place as summarised in Sections 6.5.2.1.2 and 6.5.3.1.1. and are detailed in Chapter 9 of this EIAR. With these mitigation measures in place, there is no potential for residual significant effect on local water quality and in turn on the above listed downstream Nationally Designated Sites as a result of construction or operation of the Proposed Project.

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 to 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:

- Clare County Development Plan 2023-2029
- 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 6-25.

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

Table 6-25 Assessment of Plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
Clare County Development Plan 2023-2029	**CDP3.3** It is an objective of the Clare County Council: a) To require compliance with the objectives and requirements of the Habitats Directive, specifically Article 6(3) and where necessary 6(4), Birds, Water Framework, and all other relevant EU Directives and all relevant transposing national legislation; b) To require project planning to be fully informed by ecological and environmental constraints at the earliest stage of project development and any necessary assessment to be undertaken, including assessments of disturbance to species, where required together with the preparation of both statutory and non-Statutory Ecological Impact Assessments (EcIA); c) To protect, manage and enhance ecological connectivity and improve the coherence of the Natura 2000 Network; d) To require all proposals to ensure there is 'no net loss' of biodiversity within developments **CDP15.3** - It is an objective of Clare County Council: a) To afford the highest level of protection to all designated European sites in accordance with the relevant Directives and legislation on such matters; b) To require all planning applications for development that may have (or cannot rule out) likely significant effects on European Sites in view of the site's Conservation Objectives, either in isolation or in combination with other plans or projects, to submit a Natura Impact Statement in accordance with the requirements of the EU Habitats Directive and the Planning and Development Act, 2000 (as amended); and c) To recognise and afford appropriate protection to any new or modified SPAs or SACs that are identified during the lifetime of this Development Plan through the planning application process bearing in mind proposals for development outside of a European site may also have an indirect effect.	Having reviewed Clare County Development Plan, the Proposed Project is in accordance with the objectives described in relation to biodiversity and Natura 2000 sites. On review of the Plan, no potential for cumulative impacts in combination with the Proposed Project was identified.

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	CDP15.4 - It is an objective of Clare County Council: a) To implement Article 6(3) and where necessary 6(4) of the Habitats Directive and to ensure that Appropriate Assessment is carried out in relation to works, plans and projects likely to impact on European sites (SACs and SPAs), whether directly or indirectly or in combination with any other plan(s) or project(s); and b) To have regard to Appropriate Assessment of Plans and Projects in Ireland – Guidelines for Planning Authorities 2009 or any updated version.	
	CDP11.42 It is an objective of Clare County Council: a) To require proposals for development that include the provision of external lighting, to clearly demonstrate that the lighting scheme is the minimum needed for security and working purposes; b) To ensure that external lighting and lighting schemes are designed so that the incidence of light spillage is minimised ensuring that the amenities of adjoining properties, wildlife and the surrounding environment are protected; and c) To require that external lighting is designed taking the Bat Conservation Ireland Guidance Notes for: planners, engineers, architects and developers on bats and lighting into consideration, together with EUROBATS Guidelines for consideration of bats in lighting projects.	The proposed external lighting schemes for the Proposed Wind Farm site have been designed in line with the most up to date bat mitigation guidelines, and designed such that there will be no significant impacts on wildlife.
4th National Biodiversity Action Plan 2023-2027	**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.	No cumulative impacts were identified upon review of the Plan in conjunction with the Proposed Project. The Proposed Project will not contravene the proposed objectives of the NBAP.
	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.	

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	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.	
Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032	**Regional Policy Objective 5.5 –** Ensure efficient and sustainable use of all our natural resources, including inland waterways, peatlands, and forests in a manner which ensures a healthy society a clean environment and there is no net contribution to biodiversity loss arising from development supported in this strategy. Conserve and protect designated areas and natural heritage area. Conserve and protect European sites and their integrity. **Regional Policy Objective 5.7 -** Ensure that all plans, projects and activities requiring consent arising from the RSES are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. There will be no impact on designated sites or biodiversity as a result of the development. Mitigation measures will be implemented as well as a bespoke Biodiversity Management and Enhancement Plan to ensure no net loss to biodiversity.

6.6.2 Assessment of Projects

As described in Section 2.9 of the EIAR, relevant projects have been assessed in-combination with the Proposed Project and include planning applications in the vicinity of the Proposed Project site, within the 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 6.6.3 concludes on their potential for impact on biodiversity.

For the purposes of this cumulative assessment wind farms within a 25km radius of the Proposed Project development area were considered in further detail below. Wind farms occurring at greater distances were considered, however, given the nature of the KERs identified within the EIAR study area and that no significant residual effects were identified, further detailed analysis is not provided below as it was not warranted for the Proposed Project. Cumulative impacts on bird species considered other wind farms within a 25km radius and is fully assessed in Chapter 7 of this EIAR.

6.6.2.1 Proposed Grid Connection

A desk-based planning search was undertaken to identify permitted developments within 500m vicinity of the Proposed Grid Connection Route. The projects within this boundary are provided in Appendix 2-3. 64 projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, as well as agriculture and energy. Projects with the potential for in-combination effects were reviewed in detail and included the following:

- Drummin Solar Farm. The NIS for this project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the Lower River Shannon SAC (disturbance, waterborne pollution, changes to hydrology, spread of invasives, injury or mortality) and the River Shannon and River Fergus Estuaries SPA (disturbance, waterborne pollution and spread of invasives). As such the potential for in-combination effects with the Proposed Project specifically in relation to the Lower River Shannon SAC were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for Drummin Solar Farm no potential for in-combination effects were identified.
- Ballyglass Solar Farm. The NIS for this project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the Lower River Shannon SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the Lower River Shannon SAC. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for Ballyglass Solar Farm. no potential for in-combination effects were identified.

6.6.2.2 Other Wind Farm Projects

For the purposes of this cumulative assessment, wind farms within a 25-kilometre radius of the Proposed Project were considered in further detail below. Details of wind farm projects within 25km of the Proposed Project are provided in Appendix 2-3 of this EIAR and are summarised below also in the context of terrestrial ecology. Eight wind farms were identified as being within the cumulative study boundary as outline in Table 6-26 below. Potential for in-combination effects in relation to European sites are fully assessed in Section 8.1.3 in the NIS accompanying this application.

Table 6-26 Wind farm projects considered to be within the cumulative study area (Biodiversity) of the Proposed Project

County	Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)
Clare	Fahybeg Wind Farm	Permitted	8	c.1.3km
	Carrownagowan Wind Farm	Permitted	19	c.2.2km
	Knockshanvo Wind Farm	Proposed	9	c.5.1km
	Oatfield Wind Farm	Proposed	11	c.6.1km
	Ballycar Wind Farm	Proposed	12	c.11km
	Parteen Turbine	Existing	1	c.12.3km
	Single Domestic Turbine at Portdrine	Existing	1	c.19km
Limerick	Vistakon Turbine	Existing	1	c.13.7km

6.6.2.3 Fahybeg Wind Farm

The permitted Fahybeg wind farm consists of 8 no. turbines and is located approx. 1.3km from the Proposed Wind Farm at its closest point. The EIAR for Fahybeg Wind Farm was consulted. The site of the permitted Fahybeg Wind Farm and that of the Proposed Project are both hydrologically linked to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. The NIS for the Fahybeg Wind Farm project was also reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Wind Farm specifically in relation to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within the NIS accompanying this application and the mitigation measures outlined within the NIS for the Fahybeg Wind Farm project **no potential for in-combination effects were identified.**

6.6.2.4 Carrownagowan Wind Farm

The permitted Carrownagowan Wind Farm consists of 19 no. turbines and is located approx. 2.2km from the Proposed Wind Farm at its closest point. The EIAR for Carrownagowan Wind Farm was consulted in order to identify any potential cumulative impacts alongside the Proposed Wind Farm. The site of the permitted Carrownagowan Wind Farm and that of the Proposed Project are both hydrologically linked to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. The EIAR identified potential for likely significant effects on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Wind Farm specifically in relation to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within this NIS and

the mitigation measures outlined within the NIS for the Carrownagowan Wind Farm project **no potential for in-combination effects were identified.**

6.6.2.5 Knockshanvo Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Knockshanvo Wind Farm, which is c. 5km for the nearest proposed turbine within the Proposed Wind Farm, was considered. Knockshanvo Wind Farm is at the pre-planning stage and therefore no planning application has been lodged and no impact assessment has been completed. Knockshanvo Wind Farm is located primarily within commercial forestry.

6.6.2.6 Oatfield Wind Farm

The proposed Oatfield Wind Farm consists of 11 no. turbines and is approx. 6.1km from the Proposed Wind Farm. The EIAR for Oatfield Wind Farm was consulted. The site of the Proposed Oatfield Wind Farm and that of the Proposed Project are both hydrologically linked to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. The NIS for the Oatfield Wind Farm project was also reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Wind Farm specifically in relation to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within the accompanying NIS in conjunction with the mitigation measures outlined within the NIS for the Oatfield Wind Farm project **no potential for in-combination effects were identified.**

6.6.2.7 Ballycar Wind Farm

This wind farm consists of 12 no. turbines and is approx. 11km from the Proposed Wind Farm. The EIAR for Ballycar Wind Farm was consulted. The site of the Proposed Ballycar Wind Farm and that of the Proposed Project are both hydrologically linked to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. The NIS for the Ballycar Wind Farm project was also reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Wind Farm specifically in relation to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within the accompanying NIS in conjunction with the mitigation measures outlined within the NIS for the Ballycar Wind Farm project **no potential for in-combination effects were identified.**

6.6.2.8 Parteen Turbine

The Parteen Turbine site consists of 1 no. existing turbine and is approx. 12.3km from the Proposed Wind Farm. The Parteen Turbine has already been constructed and as such there is no potential for in-combination effects with the Proposed Wind Farm which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). **No potential for in-combination effects were identified**

6.6.2.9 Single Domestic Turbine at Portdrine

A Single Domestic Turbine at Portdrine consists of 1 no. existing turbine and is approx. 19km from the Proposed Wind Farm. The Single Domestic Turbine has already been constructed and as such there is no potential for in-combination effects with the Proposed Wind Farm which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). **No potential for in-combination effects were identified**

6.6.2.10 Vistakon Turbine

The Vistakon Turbine site consists of 1 no. existing turbine and is approx. 13.7km from the Proposed Wind Farm. The Vistakon Turbine has already been constructed and as such there is no potential for in-combination effects with the Proposed Wind Farm which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). **No potential for in-combination effects were identified**

6.6.2.11 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 commercial forestry (WD4/WS5) habitats. The Proposed Project will result in the loss of some conifer plantation both of which generally provide low value habitats for faunal species. In addition, due to the nature of the plantation forestry, this habitat is of low biodiversity value locally. However, the loss of this habitat within the Proposed Wind Farm will be minimal 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 Proposed Wind Farm 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 and hedgerow will be mitigated through the replanting measures described in the BEMP. The Proposed Grid Connection Route will not result in the permanent loss of any habitat or change in land use as works are proposed within the existing road corridor. The Proposed Project will not contribute to any overall permanent loss of high value habitat, it has been deliberately designed to be located on habitats of low value for faunal species.

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 Proposed Wind Farm site or along the Proposed Grid Connection Route.

6.6.3 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 6.6.1, and 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 6.5 (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 features 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.